WENTWORTH-SMITH MATHEMATICAL SERIES

# ARITHMETIC

## BOOK ONE

BY

GEORGE WENTWORTH

AND

DAVID EUGENE SMITH

GINN AND COMPANY

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# PREFACE

This book has been prepared to meet the needs of pupils and teachers in Grades III and IV, not alone as to subject matter but also as to convenience of arrangement. It is a well-recognized fact that every detail of the work in the primary grades must be presented to a child several times, in order that it may be assimilated, and hence that the plan of recurring topics must be followed in the preparation of a textbook for these years.

An earnest effort has been made to arrange the exercises in such a way as always to avoid the appearance of a difficult task. Young children are easily discouraged, and a topic appeals more to a beginner if presented with an appearance of brevity than when it extends over two or three pages. The lessons have, on this account, been so arranged as to fill either a half page or a page, and they may be further subdivided as occasion demands.

It is recognized that a large proportion of the work in the primary grades is of an oral nature, and for this reason a few typical oral problems are given at the beginning of each exercise. It is hardly necessary to say that the teacher will get the best

results by supplementing this oral work with problems having some local significance, and that the various interests of the children at the particular time should be drawn upon. Work that they may be doing in industrial arts, local concerns of the community in which they may have an interest, their games, and their objects of study in other lines, furnish material for work in arithmetic that should not be neglected.

The authors have sought fairly to balance the abstract and the concrete, and to furnish a wide range of modern applications that appeal to the interests of children, and that contain information that will be of value to them. They have put forth their best endeavors to make the book thoroughly practical, avoiding all of those transient extremes of method that appear so frequently but have merely a temporary interest.

For schools that desire an introduction to decimal fractions in Grade IV a brief treatment of this topic is provided in the Appendix.

Any corrections or suggestions relating to the work will be thankfully received.

GEORGE WENTWORTH
DAVID EUGENE SMITH

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# ARITHMETIC

## BOOK ONE

## CHAPTER I.

### NUMBERS TO 100

### I. REVIEW OF NUMBERS TO 10

#### 1. Counting

*Examples 1 and 2, oral — Examples 3 to 5, written*

1. Count from 1 to 10.

2. Count by 2's from 2 to 10.

| | | | | | |
|---|---|---|---|---|---|
| *Figures* | 1 | 2 | 3 | 4 | 5 |
| *Names* | one | two | three | four | five |
| *Objects* |  | | | | |
| *Figures* | 6 | 7 | 8 | 9 | 10 |
| *Names* | six | seven | eight | nine | ten |
| *Objects* | | | | | |

*Naught or zero is written thus: 0.*

3. Write the numbers from 1 to 10.

4. Write the numbers found in counting by 2's from 2 to 10.

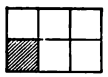
5. Write the numbers found in counting by 3's from 3 to 9.

### 2. Adding 1's

*Examples 1 to 4, oral — Examples 5 to 13, written*

1. How many squares are 5 squares and 1 square?

2. How many marbles are 4 marbles and 1 marble?



3. How much is 7+1? 6+1? 3+1? 5+1?

4. Add 2 feet and 1 foot; 3 cents and 1 cent.

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

### 3. Subtracting 1's

*Examples 1 to 4, oral — Examples 5 to 21, written*

1. How many dots are ⁘ less •?

2. How many cents are 4 cents less 1 cent?

3. How many inches are 6 inches less 1 inch?

4. How many boys are 8 boys less 1 boy?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

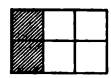
14. 7 − 1.
15. 4 − 1.
16. 3 − 1.
17. 9 − 1.
18. 1 − 1.
19. 6 − 1.
20. 8 − 1.
21. 2 − 1.

### 4. Adding 2's

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. How many squares are 4 squares and 2 squares?

2. John is 8 years old and Frank is 2 years older. How old is Frank?



3. Will has 7 marbles and Harry has 2 more than Will. How many marbles has Harry?

*Copy and add:*

| 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 2 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 |

### 5. Subtracting 2's

*Examples 1 to 4, oral — Examples 5 to 21, written*

1. How many stars are $\begin{matrix}*&*\\*&*\end{matrix}$ less $\begin{matrix}*\\*\end{matrix}$?
2. How many books are 5 books less 2 books?
3. How many desks are 6 desks less 2 desks?
4. How many girls are 9 girls less 2 girls?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

| | | | |
|---|---|---|---|
| **14.** $7-2$. | **16.** $4-2$. | **18.** $8-2$. | **20.** $9-2$. |
| **15.** $5-2$. | **17.** $3-2$. | **19.** $2-2$. | **21.** $6-2$. |

### 6. Adding 3's

*Examples 1 to 4, oral — Examples 5 to 21, written*

1. How much is 3 + 3? 4 + 3?
2. Count by 2's from 2 to 10.
3. Count by 3's from 3 to 9.
4. How many apples are 6 apples and 3 apples?

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0 | 3 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 0 |

| | | | |
|---|---|---|---|
| 14. 3 + 1. | 16. 6 + 3. | 18. 3 + 3. | 20. 3 + 7. |
| 15. 3 + 5. | 17. 2 + 3. | 19. 5 + 3. | 21. 4 + 3. |

### 7. Subtracting 3's

*Examples 1 to 4, oral — Examples 5 to 21, written*

1. How many marks are / / / / / / / less / / /?
2. How much is 7 cents less 3 cents?
3. How many pencils are 7 pencils less 3 pencils?
4. How many circles are ○○○○ less ○○○?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 3 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 0 |

| | | | |
|---|---|---|---|
| 14. 7 − 3. | 16. 8 − 3. | 18. 5 − 3. | 20. 3 − 0. |
| 15. 6 − 3. | 17. 9 − 3. | 19. 4 − 3. | 21. 10 − 3. |

### 8. Adding 4's

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. How many cubes are 3 cubes and 4 cubes?

2. How many cents are 5 cents and 4 cents? Add 5 and 4.

3. Count by 4's from 1 to 9.

*Copy and add:*

| 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 0 | 4 |
| 4 | 4 | 4 | 4 | 4 | 4 | 4 | 0 |

12. If a man has 1 dollar and earns 4 dollars, and then another 4 dollars, how much has he?

### 9. Subtracting 4's

*Examples 1 to 4, oral — Examples 5 to 12, written*

1. How many dots are ⁘ less ⁙?

2. How many cents are 6 cents less 4 cents?

3. If I take 4 cubes from 7 cubes, how many cubes are left?

4. If you have 9 marbles and lose 4 marbles, how many marbles are left?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|
| 4 | 5 | 6 | 7 | 8 | 9 | 10 | 8 books |
| 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 books |

### 10. Adding 5's

*Examples 1 to 4, oral — Examples 5 to 13, written*

1. How many cents are 3 cents and 5 cents?
2. How many inches are 5 inches and 5 inches?
3. What must you add to 2 to make 7?
4. How many five-cent pieces are worth a dime?

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 0 | 5 | 5 cents |
| 5 | 5 | 5 | 5 | 5 | 5 | 0 | 4 cents |

13. How much is 2 cents and 3 cents and 5 cents?

### 11. Subtracting 5's

*Examples 1 to 4, oral — Examples 5 to 13, written*

1. How many pins are 10 pins less 5 pins?
2. How many boys are 9 boys less 5 boys?
3. How many inches are 8 inches less 5 inches?
4. How many days are 6 days less 5 days?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|
| 5 | 6 | 7 | 8 | 9 | 10 | 5 | 7 feet |
| 5 | 5 | 5 | 5 | 5 | 5 | 0 | 5 feet |

13. There are 7 days in a week, and you go to school 5 days. How many days do you not go?

### 12. Adding 6's

*Examples 1 to 4, oral — Examples 5 to 20, written*

1. How many books are 2 books and 6 books?
2. How many quarts are 3 quarts and 6 quarts?
3. What must you add to 4 to make 10?
4. How much is half of 6? 3+3? 2+4? 1+5?

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 6 | 0 | 6 | 3 boys |
| 6 | 6 | 6 | 6 | 4 | 6 | 0 | 6 boys |

13. 6 + 4. 15. 3 + 6. 17. 6 + 0. 19. 2 + 6.
14. 1 + 6. 16. 6 + 2. 18. 4 + 6. 20. 0 + 6.

### 13. Subtracting 6's

*Examples 1 to 3, oral — Examples 4 to 14, written*

1. How many boxes are 7 boxes less 6 boxes?
2. How many chairs are 9 chairs less 6 chairs?
3. How many apples are 8 apples less 6 apples?

*Copy and subtract:*

| 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|---|---|---|
| 6 | 7 | 8 | 9 | 10 | 6 | 6 | 9 books |
| 6 | 6 | 6 | 6 | 6 | 0 | 1 | 6 books |

12. From 6 take 4 and then take 2 more.
13. From 10 take 6 and then take 4 more.
14. From 8 take 6 and then take 2 more.

### 14. Adding 7's

*Examples 1 to 5, oral — Examples 6 to 14, written*

1. How many pencils are 3 pencils and 7 pencils?
2. How many yards are 2 yards and 7 yards?
3. What must you add to 1 to make 8?
4. What must you add to 3 to make 10?
5. How much is $6+1$? $5+2$? $4+3$? $3+4$?

*Copy and add:*

| 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 0 | 7 | 7 | 7 | 2 men |
| 7 | 7 | 7 | 7 | 0 | 2 | 1 | 7 men |

14. How much is $1+2+3+1$?

### 15. Subtracting 7's

*Examples 1 to 5, oral — Examples 6 to 14, written*

1. How many cents are 10 cents less 7 cents?
2. How much is 10 dollars less 3 dollars?
3. How many men are 9 men less 7 men?
4. What must you add to $3+1$ to make 7?
5. If a boy is 10 years old and his sister is 7 years old, how much older is the boy?

*Copy and subtract:*

| 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. |
|---|---|---|---|---|---|---|---|---|
| 7 | 8 | 9 | 10 | 7 | 7 | 7 | 7 | 7 |
| 7 | 7 | 7 | 7 | 0 | 2 | 3 | 4 | 5 |

### 16. Adding 8's

*Examples 1 to 5, oral — Examples 6 to 16, written*

1. How many pens are 2 pens and 8 pens?
2. How many boys are 1 boy and 8 boys?
3. How much is 1 and 7? 2 and 6? 3 and 5?
4. What must you add to 2 to make 10?
5. How much is 2 + 2 + 4? 1 + 2 + 2 + 3?

*Copy and add:*

| 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 0 | 8 | 8 | 8 | 4 | 5 | 6 |
| 8 | 8 | 8 | 1 | 2 | 0 | 4 | 3 | 2 |

15. 2 + 2 + 2 + 2.

16. 1 + 1 + 3 + 3.

### 17. Subtracting 8's

*Examples 1 to 5, oral — Examples 6 to 15, written*

1. How many yards are 10 yards less 8 yards?
2. How many feet are 9 feet less 8 feet?
3. What must you add to 4 to make 8?
4. What must you take from 8 to leave 3?
5. How much is 8 cents less 4 cents less 4 cents?

*Copy and subtract:*

| 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. |
|---|---|---|---|---|---|---|---|---|
| 8 | 9 | 10 | 8 | 8 | 8 | 8 | 8 | 8 |
| 8 | 8 | 8 | 0 | 1 | 2 | 3 | 4 | 5 |

15. What must I take from 10 to leave 8?

### 18. Adding 9's

*Examples 1 to 5, oral — Examples 6 to 16, written*

1. How many desks are 1 desk and 9 desks?
2. How many chairs are 4 chairs and 5 chairs?
3. How much is 8 and 1? 7 and 2? 6 and 3?
4. How much is 1 and 8? 2 and 7? 4 and 5?
5. How much is 4 more than 5? 1 more than 8?

*Copy and add:*

| 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. |
|---|---|---|---|---|---|---|---|---|
| 1 | 9 | 0 | 9 | 7 | 2 | 3 | 6 | 5 |
| 9 | 1 | 9 | 0 | 2 | 7 | 6 | 3 | 4 |

15. $3 + 3 + 3$.

16. $2 + 2 + 2 + 3$.

### 19. Subtracting 9's

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. How much is 10 cents − 9 cents?
2. How much is 10 cents − 1 cent?
3. What must be added to 1 to make 10?
4. What must be added to 9 to make 10?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 10 | 9 | 9 | 9 | 9 | 9 | 9 |
| 9 | 9 | 1 | 0 | 1 | 2 | 3 | 4 | 5 |

14. $10 - 5 - 4$.

15. $10 - 6 - 3$.

16. $9 - 6 - 3$.

17. $9 - 7 - 2$.

### 20. Review

*Examples 1 to 10, oral — Examples 11 to 19, written*

1. Add 2 and 7; 6 and 3; 5 and 4; 8 and 1.

*State rapidly the sums:*

| 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|---|---|
| 2 | 3 | 2 | 5 | 2 | 8 | 6 | 7 | 4 |
| 4 | 6 | 3 | 2 | 7 | 1 | 0 | 3 | 5 |

| 11. | 12. | 13. | 14. | 15. | 16. | 17. | 18. | 19. |
|---|---|---|---|---|---|---|---|---|
| 2 | 2 | 3 | 4 | 2 | 3 | 4 | 6 | 4 |
| 3 | 1 | 2 | 1 | 7 | 2 | 2 | 1 | 0 |
| 4 | 5 | 4 | 1 | 1 | 3 | 2 | 3 | 5 |

### 21. Ordinal Numbers

*Examples 1 to 6, oral — Examples 7 to 9, written*

In counting we call 1 the *first* number after 0, 2 the *second* number, 3 the *third* number, 4 the *fourth* number, 5 the *fifth* number, and so on.

*Calling 1 the first number, state the*

1. Second number.
2. Fourth number.
3. Ninth number.
4. Seventh number.
5. Sixth number.
6. Eighth number.

7. Write the first number after 6.
8. Write the fifth number after 4.
9. Write the fourth number after 2.

## II. COUNTING TO 100

### 22. Counting by 10's

*Examples 1 to 9, oral — Examples 10 to 14, written*

1. We call 2 tens *twenty*, and write it thus: 20.

*Read and learn:*

2. Thirty, 3 tens = 30.
3. Forty, 4 tens = 40.
4. Fifty, 5 tens = 50.
5. Sixty, 6 tens = 60.
6. Seventy, 7 tens = 70.
7. Eighty, 8 tens = 80.
8. Ninety, 9 tens = 90.
9. Hundred, 10 tens = 100.

*Write the names of these numbers:*

10. 60. 11. 70. 12. 20. 13. 50. 14. 90.

### 23. Counting

*Examples 1 to 11, oral — Examples 12 to 17, written*

1. Count from 10 to 20: 10 and 1, and so on.

*Read and learn:*

2. Eleven, $10 + 1 = 11$.
3. Twelve, $10 + 2 = 12$.
4. Thirteen, $10 + 3 = 13$.
5. Fourteen, $10 + 4 = 14$.
6. Fifteen, $10 + 5 = 15$.
7. Sixteen, $10 + 6 = 16$.
8. Seventeen, $10 + 7 = 17$.
9. Eighteen, $10 + 8 = 18$.
10. Nineteen, $10 + 9 = 19$.
11. Twenty, $10 + 10 = 20$.

*Write these numbers in figures:*

12. Nineteen.
13. Seventeen.
14. Eighteen.
15. Twelve.
16. Sixteen.
17. Fifteen.

### 24. Adding 10's

*Examples 1 to 4, oral — Examples 5 to 16, written*

1. Count by 10's from 10 to 100.

2. Read: 20, 40, 30, 90, 60, 50, 80, 70, 10, 100.

3. How many are 2 and 4? 2 cubes and 4 cubes? 2 tens and 4 tens? 20 and 40? 30 and 50?

4. How much is 5 and 4? 50 and 40? 60 and 30?

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|
| 2 | 20 | 30 | 40 | 60 | 70 | 30 | 20 |
| 5 | 50 | 20 | 30 | 20 | 10 | 60 | 70 |

13. $6 + 4$. 14. $60 + 40$. 15. $70 + 30$. 16. $80 + 20$.

### 25. Subtracting 10's

*Examples 1 to 4, oral — Examples 5 to 12, written*

1. How many cents are 7 cents less 2 cents?

2. How many tens are 7 tens less 2 tens? 9 tens less 2 tens?

3. How much is $70 - 20$? $60 - 40$? $80 - 10$?

4. How much is $10 - 4$? 10 tens $-$ 4 tens? $100 - 40$? 100 feet $-$ 60 feet?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|
| 10 | 100 | 100 | 100 | 90 | 80 | 70 | 90 |
| 7 | 70 | 10 | 30 | 60 | 30 | 20 | 30 |

### 26. Reading and Writing Numbers

*Examples 1 to 12, oral — Examples 13 to 18, written*

1. 20 and 1 are 21, and 21 is read *twenty-one*. Read these: 22, 23, 24, 25, 26, 27, 28, 29.

2. Read these: 31, 42, 55, 67, 73, 80, 99.

*Read aloud:*

| | | | | |
|---|---|---|---|---|
| 3. 47. | 5. 72. | 7. 33. | 9. 35. | 11. 97. |
| 4. 63. | 6. 86. | 8. 78. | 10. 45. | 12. 92. |

*Write in figures:*

13. Fifty-one.
14. Sixty-three.
15. Eighty-six.
16. Forty-four.
17. Ninety-five.
18. Seventy-three.

### 27. Reading and Writing Numbers

*Examples 1 to 5, oral — Examples 6 to 13, written*

1. How many eggs are 3 eggs and 5 eggs?
2. How many tens are 3 tens and 5 tens?
3. How much is $40 + 50$? $60 + 40$? $20 + 60$?
4. How many cents are 20 cents and 70 cents?
5. Add 7 feet and 3 feet; 70 and 30.

*Write in figures and add:*

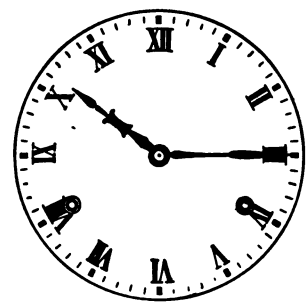
6. Twenty and forty.
7. Ten and seventy.
8. Thirty and ten.
9. Forty and thirty.
10. Sixty and thirty.
11. Seventy and twenty.
12. Sixty and forty.
13. Twenty and sixty.

## III. ROMAN NUMERALS

### 28. Roman Numerals

*Examples 1 to 5, oral — Examples 6 to 25, written*

1. Read the figures, or numerals, on the clock.
2. Which hand tells the hours? the minutes?
3. How long does it take the hour hand to pass from I to II? How long does it take the minute hand?
4. How long does it take the hour hand to pass around from XII to XII again? the minute hand?
5. What time is it by the clock in the picture? by the school clock?



The teacher should explain how to tell time, telling how many minutes there are in an hour.

| | | | |
|---|---|---|---|
| I = 1 | IV or IIII = 4 | VII = 7 | X = 10 |
| II = 2 | V = 5 | VIII = 8 | XI = 11 |
| III = 3 | VI = 6 | IX = 9 | XII = 12 |

*Write in Roman numerals:*

| | | | | |
|---|---|---|---|---|
| **6.** 2. | **8.** 6. | **10.** 5. | **12.** 9. | **14.** 4. |
| **7.** 7. | **9.** 8. | **11.** 3. | **13.** 7. | **15.** 11. |

*Write in common figures:*

| | | | | |
|---|---|---|---|---|
| **16.** VIII. | **18.** IX. | **20.** IV. | **22.** I. | **24.** II. |
| **17.** III. | **19.** V. | **21.** XI. | **23.** VII. | **25.** VI. |

## IV. ADDITION

Uniting two or more numbers in one number is called *addition.*

The numbers added are called *addends.*

The result of adding numbers is called the *sum.*

The sign of addition is +.

Numbers to be added, and the sum, are usually written one under another, as here shown.

$$\begin{array}{r} 2 \\ 6 \\ \hline 8 \end{array}$$

Numbers to be added, and the sum, may also be written in this way: $2 + 6 = 8$. We may read this, "2 and 6 are 8," or "2 plus 6 equals 8."

### 29. Adding 10's

*Examples 1 to 4, oral — Examples 5 to 13, written*

1. If one boy has 7 marbles and another has 3, how many marbles have they?

2. If a boy picks 4 quarts of berries and his sister picks 3 quarts, how many quarts have they?

3. If there are 7 sparrows on one tree and 2 sparrows on another, how many are on both trees?

4. If I see 5 boys and 3 girls, how many children do I see? Add 5 and 3; 5 tens and 3 tens.

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 2 | 3 | 4 | 20 | 30 | 20 | 60 | 10 | 30 |
| 3 | 4 | 1 | 10 | 40 | 20 | 10 | 40 | 30 |

### 30. Adding 1's

*Examples 1 to 4, oral — Examples 5 to 13, written*

1. When we count, "1, 2, 3, 4," what number do we add each time?

2. Add 1 to 10; to 20; to 30; to 40; to 50.

3. What numbers from 1 to 100 end in 1?

4. If you add 1 to a number that ends in 3, the sum will end in what number?

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 30 | 31 | 22 | 43 | 64 | 95 | 26 | 17 | 78 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

### 31. Adding 2's

*Examples 1 to 3, oral — Examples 4 to 16, written*

1. Count by 2's from 2 to 10.

2. What numbers from 1 to 100 end in 2?

30 + 2 = 32

3. If you add 2 to a number that ends in 4, the sum will end in what number?

*Copy and add:*

| 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|---|
| 6 | 36 | 8 | 58 | 9 | 79 | 59 | 38 | 89 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

**13.** 49 + 2. **14.** 37 + 2. **15.** 56 + 2. **16.** 98 + 2.

### 32. Adding 3's

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. Count by 3's from 3 to 30.
2. What numbers from 1 to 100 end in 3?
3. Add 3 to each number from 1 to 10.
4. If you spend 8 cents and 3 cents, how much do you spend in all? Add 18 and 3.

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 6 | 26 | 7 | 67 | 8 | 48 | 9 | 79 | 65 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

14. $75+3$. 15. $62+3$. 16. $88+3$. 17. $97+3$.

### 33. Adding 4's

*Examples 1 to 3, oral — Examples 4 to 16, written*

1. Count by 4's from 4 to 20.
2. What numbers from 1 to 100 end in 4?

$20 + 4 = 24$

3. How many cents are 8 cents and 4 cents? 18 cents and 4 cents? 28 cents and 4 cents?

*Copy and add:*

| 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|---|
| 5 | 6 | 7 | 8 | 9 | 10 | 26 | 47 | 58 |
| 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

13. $32+4$. 14. $43+4$. 15. $89+4$. 16. $96+4$.

### 34. Adding 5's

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. Count by 5's from 5 to 25.
2. What numbers from 1 to 100 end in 5?
3. Add 5 to each number from 1 to 10.
4. How much will a boy have who adds 5 cents to the 25 cents that he has in his bank?

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 4 | 5 | 6 | 7 | 8 | 9 | 10 | 26 | 47 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

14. $33+5$. 15. $42+5$. 16. $38+5$. 17. $95+5$.

### 35. Adding 6's

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. Count by 6's from 6 to 36.
2. What numbers from 1 to 100 end in 6?
3. Add 6 to each number from 1 to 10.
4. How many days are 4 days and 6 days? 14 days and 6 days? 54 days and 6 days?

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 35 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |

14. $42+6$. 15. $36+6$. 16. $18+6$. 17. $94+6$.

### 36. Adding 7's

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. Count by 7's from 7 to 28.
2. What numbers from 1 to 100 end in 7?
3. Add 7 to each number from 1 to 10.
4. If I have 3 marbles and you have 7, how many have we together? Add 3 and 7; 13 and 7.

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |

14. $11 + 7$. 15. $23 + 7$. 16. $65 + 7$. 17. $93 + 7$.

### 37. Adding 8's

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. Count by 8's from 8 to 48.
2. Add 8 to each number from 1 to 10.

$40 + 8 = 48$

3. Add 8 inches to 2 inches; 8 to 12; 8 to 22.
4. Add 8 cents to 3 cents; 8 to 13; 8 to 23.

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |

14. $12 + 8$. 15. $43 + 8$. 16. $77 + 8$. 17. $92 + 8$.

### 38. Adding 9's

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. Count by 9's from 0 to 90.

2. Add 9 to each number from 1 to 10.

3. How many feet are 8 feet and 9 feet? 38 feet and 9 feet?

4. Add 7 caps and 9 caps; 17 and 9; 67 and 9.

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |

14. $22 + 9$. 15. $54 + 9$. 16. $76 + 9$. 17. $91 + 9$.

### 39. Review

*Examples 1 to 11, oral — Examples 12 to 20, written*

1. How much is 27 cents and 7 cents? $57 + 7$?

2. How much is 56 pounds + 8 pounds?

*Add rapidly:*

| 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|---|---|---|---|
| 2 | 3 | 4 | 5 | 7 | 9 | 12 | 13 | 14 |
| 8 | 7 | 6 | 5 | 8 | 6 | 8 | 7 | 6 |

*Copy and add:*

| 12. | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. |
|---|---|---|---|---|---|---|---|---|
| 27 | 46 | 75 | 81 | 72 | 53 | 44 | 88 | 99 |
| 3 | 4 | 5 | 9 | 8 | 7 | 6 | 2 | 1 |

### 40. Addition Table

It is necessary to learn this *Addition Table* so as to tell at once the sum of any two given numbers. Also recite the table aloud, as the teacher tells you.

| | | |
|---|---|---|
| 1 + 0 = 1 | 2 + 0 = 2 | 3 + 0 = 3 |
| 1 + 1 = 2 | 2 + 1 = 3 | 3 + 1 = 4 |
| 1 + 2 = 3 | 2 + 2 = 4 | 3 + 2 = 5 |
| 1 + 3 = 4 | 2 + 3 = 5 | 3 + 3 = 6 |
| 1 + 4 = 5 | 2 + 4 = 6 | 3 + 4 = 7 |
| 1 + 5 = 6 | 2 + 5 = 7 | 3 + 5 = 8 |
| 1 + 6 = 7 | 2 + 6 = 8 | 3 + 6 = 9 |
| 1 + 7 = 8 | 2 + 7 = 9 | 3 + 7 = 10 |
| 1 + 8 = 9 | 2 + 8 = 10 | 3 + 8 = 11 |
| 1 + 9 = 10 | 2 + 9 = 11 | 3 + 9 = 12 |

### 41. Addition Table

| | | |
|---|---|---|
| 4 + 0 = 4 | 5 + 0 = 5 | 6 + 0 = 6 |
| 4 + 1 = 5 | 5 + 1 = 6 | 6 + 1 = 7 |
| 4 + 2 = 6 | 5 + 2 = 7 | 6 + 2 = 8 |
| 4 + 3 = 7 | 5 + 3 = 8 | 6 + 3 = 9 |
| 4 + 4 = 8 | 5 + 4 = 9 | 6 + 4 = 10 |
| 4 + 5 = 9 | 5 + 5 = 10 | 6 + 5 = 11 |
| 4 + 6 = 10 | 5 + 6 = 11 | 6 + 6 = 12 |
| 4 + 7 = 11 | 5 + 7 = 12 | 6 + 7 = 13 |
| 4 + 8 = 12 | 5 + 8 = 13 | 6 + 8 = 14 |
| 4 + 9 = 13 | 5 + 9 = 14 | 6 + 9 = 15 |

### 42. Addition Table

| | | |
|---|---|---|
| 7 + 0 = 7 | 8 + 0 = 8 | 9 + 0 = 9 |
| 7 + 1 = 8 | 8 + 1 = 9 | 9 + 1 = 10 |
| 7 + 2 = 9 | 8 + 2 = 10 | 9 + 2 = 11 |
| 7 + 3 = 10 | 8 + 3 = 11 | 9 + 3 = 12 |
| 7 + 4 = 11 | 8 + 4 = 12 | 9 + 4 = 13 |
| 7 + 5 = 12 | 8 + 5 = 13 | 9 + 5 = 14 |
| 7 + 6 = 13 | 8 + 6 = 14 | 9 + 6 = 15 |
| 7 + 7 = 14 | 8 + 7 = 15 | 9 + 7 = 16 |
| 7 + 8 = 15 | 8 + 8 = 16 | 9 + 8 = 17 |
| 7 + 9 = 16 | 8 + 9 = 17 | 9 + 9 = 18 |

This table in Exercises 40 to 42, at first found by counting objects and afterwards learned, is usually known to pupils before they begin using a book. It should now be reviewed thoroughly.

### 43. Review

*Examples 1 to 3, oral — Examples 4 to 15, written*

1. Add: 7 + 5; 6 + 8; 7 + 7; 8 + 9.
2. Add: 6 + 5; 5 + 8; 4 + 9; 9 + 9.
3. Add: 8 + 7; 4 + 3; 5 + 4; 4 + 8.

*Copy and add:*

| 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 2 | 1 | 2 | 1 | 7 | 1 | 1 |
| 2 | 3 | 0 | 3 | 2 | 3 | 1 | 0 | 1 |
| 3 | 0 | 6 | 3 | 2 | 0 | 1 | 6 | 7 |
| 4 | 2 | 2 | 3 | 3 | 8 | 1 | 6 | 7 |

13. 3 + 2 + 5 + 1. 14. 2 + 0 + 7 + 4. 15. 6 + 6 + 2 + 1.

### 44. Review

*Examples 1 to 9, oral — Examples 10 to 12, written*

**1.** How many books are 3 books and 7 books? 13 books and 7 books? 3 books and 17 books?

**2.** How many dolls are 4 dolls and 8 dolls?

**3.** How many desks are 6 desks and 7 desks? 16 desks and 7 desks? 6 desks and 17 desks?

*Name three numbers whose sum is:*

**4.** 13. **5.** 26. **6.** 31. **7.** 46. **8.** 65. **9.** 83.

**10.** If one boy earns 18 cents and another earns 9 cents, how much do they earn together?

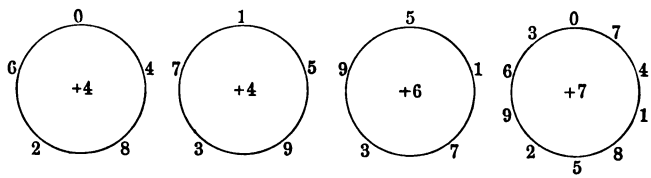
**11.** If you have read 68 pages of a book and have 7 more to read, how many pages are in the book?

**12.** If a boy weighs 47 pounds and his dog weighs 9 pounds, how much do they both weigh?

### 45. Review

*Examples 1 to 4, oral — Example 5, written*

1. Count by 4's from 0 to 40, pointing to the first circle, thus: 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 40.

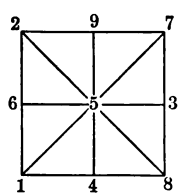



2. Count by 4's from 1 to 21, using the second circle.
3. Count by 6's from 5 to 35, using the third circle.
4. Count by 7's from 0 to 70, using the fourth circle.
5. Draw four circles for counting by other numbers.

### 46. Review

*Examples 1 and 2, oral — Examples 3 to 11, written*

1. As the teacher points to one of the outside numbers, when the square has been drawn on the blackboard, state quickly the sum of that and the inside number.




2. Do the same when the inside number is 7.

*Copy and add:*

| 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|---|---|---|---|
| 2 | 3 | 3 | 4 | 5 | 7 | 8 | 2 | 3 |
| 9 | 8 | 7 | 2 | 9 | 3 | 9 | 0 | 2 |
| 7 | 9 | 7 | 9 | 8 | 2 | 6 | 9 | 7 |

To add numbers of two figures, we write ones under ones and tens under tens. We then begin at the right and add each column by itself.

In adding 34 and 53 we find that the sum of the ones is 7, and the sum of the tens is 8. Then the sum of 34 and 53 is 87.

$$\begin{array}{r} 34 \\ 53 \\ \hline 87 \end{array}$$

Always *check* or *prove* the work by adding down as well as up.

### 47. Adding Two-figure Numbers

*Examples 1 to 11, oral — Examples 12 to 27, written*

1. How many quarts are 11 quarts and 8 quarts?
2. How many apples are 12 apples and 8 apples?
3. How many pears are 15 pears and 6 pears?

*Add rapidly:*

| **4.** | **5.** | **6.** | **7.** | **8.** | **9.** | **10.** | **11.** |
|---|---|---|---|---|---|---|---|
| 21 | 21 | 21 | 32 | 32 | 32 | 45 | 45 |
| 1 | 10 | 11 | 1 | 10 | 11 | 2 | 22 |

*Copy and add:*

| **12.** | **13.** | **14.** | **15.** | **16.** | **17.** | **18.** | **19.** |
|---|---|---|---|---|---|---|---|
| 22 | 32 | 51 | 52 | 24 | 33 | 60 | 71 |
| 31 | 40 | 12 | 26 | 35 | 26 | 29 | 12 |

| **20.** | **21.** | **22.** | **23.** | **24.** | **25.** | **26.** | **27.** |
|---|---|---|---|---|---|---|---|
| 12 | 32 | 28 | 31 | 26 | 52 | 32 | 41 |
| 21 | 12 | 10 | 22 | 10 | 14 | 20 | 22 |
| 23 | 25 | 21 | 34 | 21 | 12 | 37 | 36 |

### 48. Adding Two-figure Numbers

*Examples 1 to 9, oral — Examples 10 to 17, written*

1. Add 37 feet and 30 feet.

*Add:*

| 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|---|---|
| 30 | 31 | 35 | 40 | 41 | 45 | 52 | 63 |
| 20 | 20 | 20 | 30 | 30 | 30 | 40 | 20 |

| 10. | 11. | 12. | 13. | 14. | 15. | 16. | 17. |
|---|---|---|---|---|---|---|---|
| 11 | 12 | 11 | 22 | 61 | 53 | 75 | 87 |
| 11 | 12 | 12 | 30 | 10 | 12 | 10 | 10 |
| 20 | 30 | 13 | 43 | 14 | 24 | 11 | 2 |

### 49. Adding Two-figure Numbers

*Examples 1 to 5, oral — Examples 6 to 13, written*

1. What is the sum of 25 cents and 20 cents?
2. What is the sum of 34 cents and 10 cents?
3. Add 26 yards, 30 yards, and 10 yards.
4. Add 35 dollars, 30 dollars, and 10 dollars.
5. Add 20 books, 25 books, and 10 books.

*Copy and add:*

| 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|
| 12 | 13 | 22 | 21 | 32 | 16 | 30 | 12 |
| 11 | 10 | 30 | 15 | 14 | 21 | 40 | 11 |
| 13 | 20 | 17 | 22 | 10 | 32 | 16 | 21 |
| 20 | 15 | 10 | 30 | 23 | 20 | 13 | 33 |

### 50. Adding Two-figure Numbers

*Examples 1 and 2, oral — Examples 3 to 10, written*

1. What is the sum of 35 cents and 30 cents?

2. If I buy 27 yards of one kind of cloth and 20 yards of another kind, how many yards do I buy?

*Copy and add:*

| 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|---|
| 15 | 20 | 11 | 12 | 10 | 14 | 40 | 10 |
| 10 | 12 | 22 | 21 | 12 | 14 | 10 | 11 |
| 11 | 17 | 33 | 32 | 14 | 21 | 17 | 12 |
| 22 | 30 | 10 | 23 | 20 | 10 | 12 | 13 |
| 30 | 10 | 11 | 11 | 30 | 10 | 10 | 10 |

### 51. Adding Two-figure Numbers

*Examples 1 and 2, oral — Examples 3 to 10, written*

1. A boy has 47 apples and picks 30 more. How many apples has he then?

2. A farmer has 36 cows and buys 20 more. How many cows has he then?

*Copy and add:*

| 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|---|
| 20 | 25 | 16 | 13 | 14 | 13 | 11 | 15 |
| 20 | 30 | 40 | 12 | 14 | 13 | 11 | 10 |
| 20 | 20 | 2 | 11 | 30 | 13 | 11 | 20 |
| 20 | 13 | 11 | 21 | 20 | 20 | 22 | 33 |
| 19 | 11 | 20 | 31 | 11 | 10 | 33 | 11 |

## V. SUBTRACTION

### 52. Numbers below 10

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. If I take ○○○ from ○○○○○, how many circles are left?

2. How many circles must I add to 3 circles to make 5 circles?

3. How much must be added to 4 to make 10?

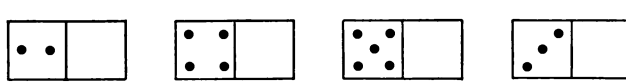
*Take the lower number from the upper one:*

| 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|---|---|
| 6 | 8 | 7 | 9 | 5 | 3 | 4 | 5 | 8 |
| 2 | 5 | 4 | 3 | 1 | 1 | 2 | 3 | 0 |

### 53. Numbers below 10

*Example 1, oral — Examples 2 to 9, written*

1. How many dots must be added in the right-hand square to make the number under the oblong?

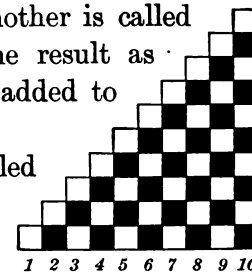


7 8 9 8

*Take the lower number from the upper one:*

| 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|---|---|
| 8 | 6 | 8 | 9 | 9 | 9 | 8 | 9 |
| 7 | 3 | 6 | 8 | 9 | 7 | 6 | 2 |

Taking one number from another is called *subtraction*. It brings the same result as finding what number must be added to the smaller to make the larger.




The result of subtraction is called the *difference* or *remainder*.

In subtraction we write the smaller number under the larger number, placing the difference beneath.

We may also write $10 - 6 = 4$, and we read this "10 *minus* 6 equals 4," or "10 *less* 6 is 4." "Minus" and "less" mean the same.

$$\begin{array}{r} 10 \\ 6 \\ \hline 4 \end{array}$$

### 54. Subtracting from 10

*Examples 1 to 15, oral — Examples 16 to 23, written*

1. Take 7 cubes from 10 cubes.
2. Take 3 cubes from 10 cubes.
3. Take 8 cubes from 10 cubes.

*Look at the picture above and tell how many cubes must be added to the following to make 10:*

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4.** | 4. | **6.** | 3. | **8.** | 8. | **10.** | 0. | **12.** | 6. | **14.** | 10. |
| **5.** | 5. | **7.** | 7. | **9.** | 1. | **11.** | 2. | **13.** | 9. | **15.** | $2+1$. |

*Copy and subtract:*

| **16.** | **17.** | **18.** | **19.** | **20.** | **21.** | **22.** | **23.** |
|---|---|---|---|---|---|---|---|
| 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| 2 | 4 | 6 | 7 | 9 | 8 | 5 | 3 |

### 55. Subtracting 1's

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. Take 1 from each number from 1 to 10.
2. Take 1 from each number from 10 to 20.
3. Count backwards from 10 to 1; from 20 to 10.
4. How much is 90 dollars − 1 dollar? 70 inches less 1 inch? 60 cubes less 1 cube?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 9 | 19 | 8 | 28 | 7 | 57 | 10 | 20 | 60 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

**14.** 52 − 1. **15.** 36 − 1. **16.** 85 − 1. **17.** 99 − 1.

### 56. Subtracting 2's

*Examples 1 to 5, oral — Examples 6 to 18, written*

1. Take 2 from 10; from 9; from 8; from 7.
2. Take 2 from 6; from 5; from 4; from 3.
3. Count backwards by 2's from 10 to 0.
4. How much is 10 − 2? 20 − 2? 50 − 2?
5. How much is 25 cents − 2 cents?

*Copy and subtract:*

| 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. |
|---|---|---|---|---|---|---|---|---|
| 5 | 16 | 37 | 28 | 19 | 10 | 30 | 11 | 21 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

**15.** 81 − 2. **16.** 80 − 2. **17.** 61 − 2. **18.** 91 − 2.

### 57. Subtracting 3's

*Examples 1 to 4, oral — Examples 5 to 18, written*

1. Take 3 from 10; from 9; from 8; from 7.
2. Take 3 from 6; from 5; from 4; from 3.
3. Count backwards by 3's from 15 to 0.
4. How much is $10-3$? $20-3$? $30-3$?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 9 | 10 | 50 | 11 | 21 | 41 | 12 | 22 | 32 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

14. $60-3$. 15. $71-3$. 16. $82-3$. 17. $90-3$.
18. How much is 40 cents $-$ 3 cents?

### 58. Subtracting 4's

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. What must I add to 4 to make 11?
2. What must I take from 12 to leave 4?
3. If a girl is 9 years old and her brother is 4 years younger, how old is her brother?
4. How much is $11-4$? $12-4$? $13-4$?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 10 | 20 | 11 | 21 | 12 | 32 | 13 | 53 | 83 |
| 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

14. $72-4$. 15. $61-4$. 16. $54-4$. 17. $75-4$.

### 59. Subtracting 5's

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. Count backwards by 5's from 25 to 0.
2. What must I add to 5 feet to make 11 feet?
3. What must I take from 12 to leave 5?
4. How much is $10-5$? $11-5$? $12-5$? $13-5$? $14-5$?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 10 | 20 | 11 | 31 | 12 | 47 | 13 | 58 | 19 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |

**14.** $44-5$. **15.** $55-5$. **16.** $76-5$. **17.** $88-5$.

### 60. Subtracting 6's

*Examples 1 to 4, oral — Examples 5 to 18, written*

1. Count backwards by 6's from 18 to 0.
2. How much is 12 cents $-$ 6 cents? $22-6$?
3. How much is 13 inches $-$ 6 inches? $23-6$?
4. What must I add to 6 feet to make 14 feet?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 10 | 20 | 11 | 21 | 12 | 32 | 13 | 43 | 14 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |

**14.** $54-6$. **15.** $15-6$. **16.** $75-6$. **17.** $16-6$.

**18.** How much is 80 cents $-$ 6 cents?

### 61. Subtracting 7's

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. Take 7 from each number from 7 to 20.
2. How many boys are 20 boys − 7 boys?
3. If from 11 cents we take 7 cents, how much is left?
4. How much is 7 + 5? 12 − 7? 7 + 6? 13 − 7?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 10 | 20 | 11 | 31 | 12 | 58 | 13 | 69 | 14 |
| 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |

14. 34 − 7. 15. 15 − 5. 16. 25 − 7. 17. 86 − 7.

### 62. Subtracting 8's

*Examples 1 to 4, oral — Examples 5 to 18, written*

1. How much is 4 cents and 8 cents? 12 − 8?
2. How much is 5 inches and 8 inches? 13 − 8?
3. How much is 6 feet and 8 feet? 14 − 8?
4. How much is 7 + 8? 15 − 8? 8 + 8? 16 − 8?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |

14. 30 − 8. 15. 52 − 8. 16. 86 − 8. 17. 99 − 8.
18. How much is 39 inches − 8 inches?

### 63. Subtracting 9's

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. Add 9 and 7. How much is 16 – 9?
2. Add 9 and 6. How much is 15 – 9?
3. How much is 13 cents – 9 cents? 12 – 9?
4. If I have 14 marbles and lose 9, how many marbles are left?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |

14. 31 – 9. 15. 43 – 9. 16. 55 – 9. 17. 69 – 9.

### 64. Review

*Examples 1 to 5, oral — Examples 6 to 15, written*

1. How much is 11 cubes – 9 cubes? 21 – 9?
2. How much is 12 desks – 9 desks? 32 – 9?
3. How much is 13 inches – 8 inches? 33 – 8?
4. What must be added to 7 to make 15?
5. What must be taken from 13 to make 7?

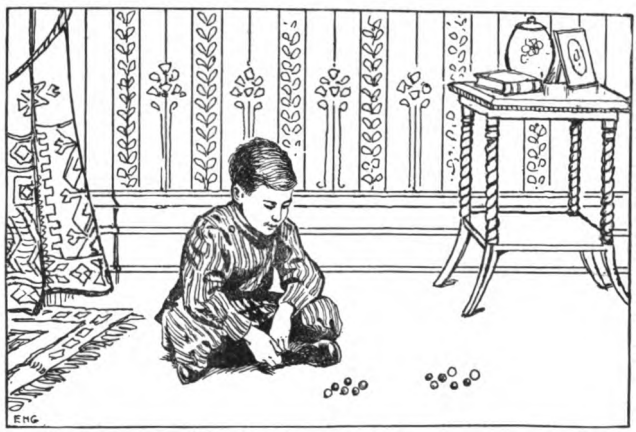
*Copy and subtract:*

| 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. |
|---|---|---|---|---|---|---|---|---|
| 21 | 32 | 43 | 54 | 65 | 76 | 55 | 43 | 51 |
| 7 | 8 | 6 | 5 | 9 | 8 | 6 | 4 | 3 |

15. How much is 81 yards – 9 yards?

### 65. Review

*Examples 1 to 8, oral — Examples 9 to 16, written*



1. If John adds 6 marbles to 7 marbles, how many marbles will he have?

2. If John takes 6 marbles from 13 marbles, how many marbles will he have left?

3. A lady cuts 7 yards from a piece of cloth containing 16 yards. How many yards are left?

4. What number must I add to 8 to make 15?

5. What number must I take from 15 to leave 8?

6. What number must I add to 7 to make 13?

7. What number must I take from 13 to leave 7?

8. What number must I add to 32 to make 40?

9. $38 - 6$. 11. $53 - 8$. 13. $82 - 4$. 15. $65 - 9$.

10. $41 - 5$. 12. $47 - 9$. 14. $74 - 6$. 16. $86 - 7$.

### 66. Review

*Examples 1 to 3, oral — Examples 4 to 6, written*

1. Subtract 3 pencils from 12 pencils.
2. Subtract 2 apples from 11 apples.
3. Subtract: $21-3$; $30-2$; $62-3$; $40-1$.

*Copy and complete:*

| 4. | | 5. | | 6. | |
|---|---|---|---|---|---|
| $1-1$ | $6-1$ | $2-2$ | $7-2$ | $3-3$ | $8-3$ |
| $2-1$ | $7-1$ | $3-2$ | $8-2$ | $4-3$ | $9-3$ |
| $3-1$ | $8-1$ | $4-2$ | $9-2$ | $5-3$ | $10-3$ |
| $4-1$ | $9-1$ | $5-2$ | $10-2$ | $6-3$ | $11-3$ |
| $5-1$ | $10-1$ | $6-2$ | $11-2$ | $7-3$ | $12-3$ |

### 67. Review

*Examples 1 to 3, oral — Examples 4 to 6, written*

1. Subtract 4 cents from 12 cents; 4 from 12.
2. Subtract 5 books from 14 books; 5 from 14.
3. Subtract 6 chairs from 13 chairs; 6 from 13.

*Copy and complete:*

| 4. | | 5. | | 6. | |
|---|---|---|---|---|---|
| $4-4$ | $9-4$ | $5-5$ | $10-5$ | $6-6$ | $11-6$ |
| $5-4$ | $10-4$ | $6-5$ | $11-5$ | $7-6$ | $12-6$ |
| $6-4$ | $11-4$ | $7-5$ | $12-5$ | $8-6$ | $13-6$ |
| $7-4$ | $12-4$ | $8-5$ | $13-5$ | $9-6$ | $14-6$ |
| $8-4$ | $13-4$ | $9-5$ | $14-5$ | $10-6$ | $15-6$ |

### 68. Review

*Examples 1 to 3, oral — Examples 4 to 6, written*

1. From 15 cents take 7 cents.
2. From 20 men take 8 men.
3. From 21 dollars take 9 dollars.

*Copy and complete:*

| 4. | | 5. | | 6. | |
|---|---|---|---|---|---|
| 7 − 7 | 12 − 7 | 8 − 8 | 13 − 8 | 9 − 9 | 14 − 9 |
| 8 − 7 | 13 − 7 | 9 − 8 | 14 − 8 | 10 − 9 | 15 − 9 |
| 9 − 7 | 14 − 7 | 10 − 8 | 15 − 8 | 11 − 9 | 16 − 9 |
| 10 − 7 | 15 − 7 | 11 − 8 | 16 − 8 | 12 − 9 | 17 − 9 |
| 11 − 7 | 16 − 7 | 12 − 8 | 17 − 8 | 13 − 9 | 18 − 9 |

### 69. Review

*Examples 1 to 9, oral — Examples 10 to 21, written*

1. From 68 cents take 9 cents.

*Subtract rapidly:*

| 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|---|---|
| 25 | 53 | 37 | 62 | 19 | 44 | 66 | 31 |
| 9 | 7 | 8 | 6 | 4 | 5 | 9 | 8 |

*Copy and complete:*

| | | | | | |
|---|---|---|---|---|---|
| **10.** 17 − | = 9. | **14.** 13 − | = 3. | **18.** 19 − | = 9. |
| **11.** 12 − | = 4. | **15.** 11 − | = 5. | **19.** 14 − | = 7. |
| **12.** 11 − | = 6. | **16.** 15 − | = 9. | **20.** 16 − | = 7. |
| **13.** 16 − | = 8. | **17.** 13 − | = 7. | **21.** 15 − | = 8. |

To subtract numbers of two figures we write ones under ones and tens under tens. We begin at the right to subtract.

In subtracting 34 from 86 we subtract 4 from 6 and write the 2 under the ones. We then subtract 3 from 8 and write the 5 under the tens. Then the remainder is 52.

$$\begin{array}{r} 86 \\ 34 \\ \hline 52 \end{array}$$

We *check* the work by adding the remainder to the smaller number. The result should be the larger number.

Teachers may use either of the two common plans of subtraction, taking 4 from 6 or thinking of the number which added to 4 makes 6. The latter plan is more commonly used in business. The book is adapted to either plan.

### 70. Subtracting Two-figure Numbers

*Examples 1 to 10, oral — Examples 11 to 18, written*

1. How much is 75 dollars less 10 dollars?
2. How much is 100 dollars less 30 dollars?

*Subtract rapidly:*

| 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|---|
| 20 | 30 | 50 | 25 | 54 | 65 | 75 | 88 |
| 10 | 10 | 20 | 10 | 20 | 30 | 40 | 11 |

*Copy and subtract:*

| 11. | 12. | 13. | 14. | 15. | 16. | 17. | 18. |
|---|---|---|---|---|---|---|---|
| 42 | 63 | 78 | 86 | 43 | 68 | 72 | 96 |
| 10 | 12 | 34 | 26 | 21 | 35 | 51 | 43 |

### 71. Subtracting Two-figure Numbers

*Examples 1 to 6, oral — Examples 7 to 14, written*

1. If there are 23 pupils in a class and 11 of them are girls, how many are boys?

2. If there are 35 eggs in a basket and we take out 11, how many eggs are left?

3. 48−11=how many?
4. 56−11=how many?
5. 75−11=how many?
6. 84−11=how many?

*Copy and subtract:*

| 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. |
|---|---|---|---|---|---|---|---|
| 62 | 74 | 66 | 31 | 58 | 29 | 85 | 77 |
| 11 | 22 | 45 | 20 | 36 | 16 | 52 | 33 |

### 72. Subtracting Two-figure Numbers

*Examples 1 to 3, oral — Examples 4 to 19, written*

1. Subtract rapidly: 65 − 10; 19 − 11; 61 − 40.
2. Subtract rapidly: 42 − 30; 76 − 50; 23 − 20.
3. From 75 cents take 10 cents and 5 cents.

*Copy and subtract:*

| 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|---|---|---|
| 74 | 36 | 71 | 79 | 25 | 82 | 68 | 63 |
| 22 | 23 | 41 | 62 | 13 | 60 | 47 | 23 |

| 12. | 13. | 14. | 15. | 16. | 17. | 18. | 19. |
|---|---|---|---|---|---|---|---|
| 47 | 55 | 66 | 89 | 61 | 77 | 30 | 32 |
| 24 | 25 | 44 | 65 | 30 | 42 | 20 | 30 |

## VI. MEASURES

### 73. Length

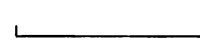
*Examples 1 to 4, oral — Examples 5 to 12, written*

1. How many feet are there in 1 yard?

2. How many feet are there in 1 yard and 2 feet?

3. How many feet are there in 2 yards? in 3 yards?

4. How many inches are there in 1 foot? in 1 foot and 8 inches?




*Add the following:*

| 5. | 6. | 7. | 8. |
|---|---|---|---|
| 12 feet | 34 inches | 42 yards | 61 feet |
| 27 feet | 22 inches | 23 yards | 30 feet |

*Subtract:*

| 9. | 10. | 11. | 12. |
|---|---|---|---|
| 63 feet | 75 inches | 57 yards | 68 feet |
| 21 feet | 10 inches | 22 yards | 30 feet |

We have learned the following table of length:

**12 inches = 1 foot**

**3 feet = 1 yard**

We write *in.* for inch or inches, *ft.* for foot or feet, *yd.* for yard or yards. Thus we write 2 ft. 6 in. for 2 feet and 6 inches.

Pupils should have much exercise in the use of the various measures. They should make such use of the foot rule and yardstick as to be able to remember clearly their approximate lengths.

### 74. Money

*Examples 1 to 5, oral — Examples 6 to 13, written*

1. How many cents in a nickel?
2. Name something that costs a nickel.
3. How many cents in a dime?
4. Name something that costs a dime.
5. How many nickels in a dime?

*Add the following:*

| 6. | 7. | 8. | 9. |
|---|---|---|---|
| 37 cents | 65 cents | 50 cents | 32 cents |
| 42 cents | 31 cents | 25 cents | 47 cents |

*Subtract:*

| 10. | 11. | 12. | 13. |
|---|---|---|---|
| 48 cents | 75 cents | 96 cents | 86 cents |
| 24 cents | 25 cents | 75 cents | 34 cents |

We have learned the following table of money:

**5 cents = 1 nickel**
**10 cents = 1 dime**
**10 dimes = 1 dollar**

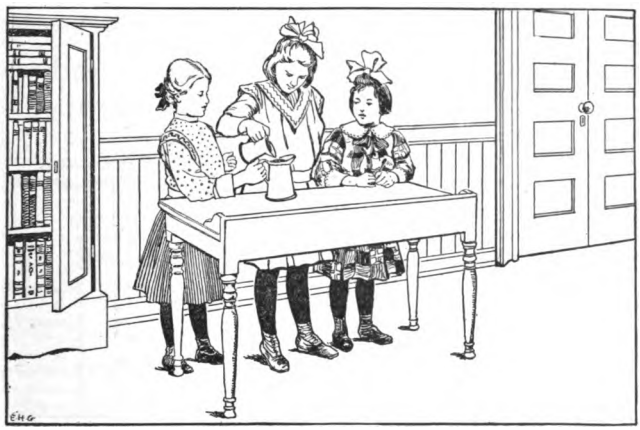
We write *ct.* or ¢ for both cent and cents, and $5 for 5 dollars.

The children should be told that a denomination applied to the first number of a column applies to every number that follows, and that the denomination should be repeated in the answer, as here shown.

| | |
|---|---|
| $42 | 23 ft. |
| 11 | 12 |
| 4 | 43 |
| $57 | 78 ft. |

### 75. Liquid Measure

*Examples 1 to 4, oral — Examples 5 to 8, written*



1. How many pints in a quart?
2. How many pints in 2 quarts?
3. Name something that is sold by the pint.
4. Name something that is sold by the quart.

*Subtract:*

| 5. | 6. | 7. | 8. |
|---|---|---|---|
| \$48 | 73 ft. | 63 quarts | 75 pints |
| 15 | 21 | 12 | 25 |

We have learned that

**2 pints = 1 quart**

We write *pt.* for pint or pints, and *qt.* for quart or quarts.

## 76. Weight

*Examples 1 to 4, oral — Examples 5 to 8, written*

1. How many ounces in a pound?
2. Name something that is sold by the pound.
3. Name something that is sold by the ounce.
4. How many ounces in 1 pound and 4 ounces?

*Add the following:*

| 5. | 6. | 7. | 8. |
|---|---|---|---|
| 70 qt. | 12 qt. | $46 | 25 ounces |
| 15 | 21 | 23 | 12 |

We have learned that

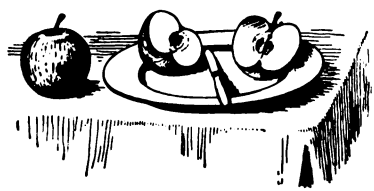
**16 ounces = 1 pound**

We write *oz.* for ounce or ounces, and *lb.* for pound or pounds.

## VII. FRACTIONS

### 77. Half of an Object

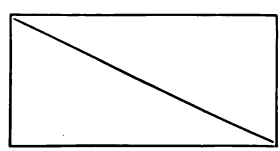
*Examples 1 to 6, oral — Examples 7 to 9, written*



1. Into how many equal parts has this apple been divided?

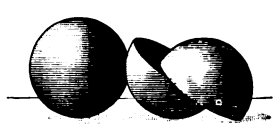
2. Each of these equal parts is called what part of the apple?

3. This rectangle has been cut into how many equal parts?



4. Each of these equal parts is called what part of the rectangle?

5. To take half of this globe, into how many equal parts must I divide it?



6. What do you mean by one half of anything?

7. Draw a line 1 in. long and divide it into halves. How long is each half?

8. Draw a line 2 in. long and divide it into halves. How long is each half?

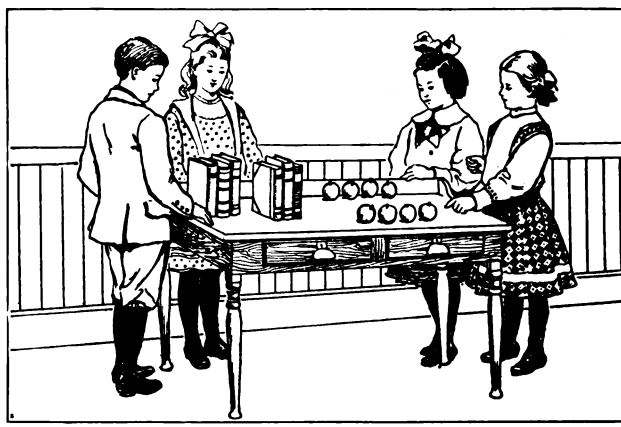
9. Draw 3 squares 1 in. on a side and divide them by lines into halves in different ways.

We write one half in this way: $\frac{1}{2}$.

Paper folding, drawing, cutting of clay cubes, breaking of crayons, and similar devices should be used whenever necessary.

### 78. Half of a Group

*Examples 1 to 6, oral — Examples 7 and 8, written*



1. Into how many equal parts has this group of 6 books been divided? Each part is called what part of all the books?

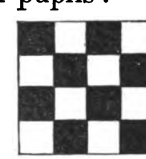
2. How many apples are $\frac{1}{2}$ of these 8 apples?

3. How many pupils are $\frac{1}{2}$ of these 4 pupils?

4. How many cents are $\frac{1}{2}$ of 6¢?

5. How many dollars are $\frac{1}{2}$ of \$8?

6. How many squares are $\frac{1}{2}$ of these 16 squares?



7. Draw 8 marks and separate them into halves.

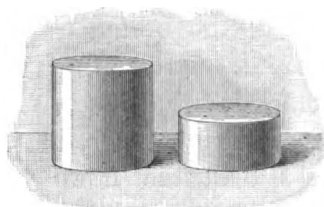
8. Make 14 small stars on paper and draw circles around half of them.

Children at this time have not had much work in division. Therefore the idea of *half of a group*, which is different from that of *half of an object*, must be brought out by use of illustrative material.

### 79. Half as Large

*Examples 1 to 7, oral — Examples 8 to 11, written*

**1.** The large block is how many times as large as the small one?



**2.** The small block is what part as large as the large one?

**3.** If the large block is 2 in. high, how high is the small one?

**4.** If the large block is 4 in. high, how high is the small one?

**5.** If a man is 6 ft. tall and his son is half as tall, how tall is his son?

**6.** If a table is 6 ft. long and is half as wide, how wide is the table?

**7.** If one stick is twice as long as another, the short stick is what part as long as the other?

**8.** Draw a line on paper and draw another line that is half as long.

**9.** Draw a line 2 in. long and draw another line that is half as long.

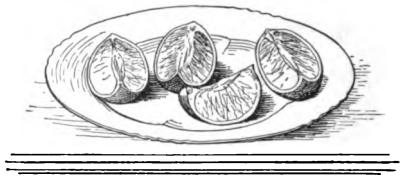
**10.** Draw a square on paper and draw another square that is half as long on each side.

**11.** Draw a circle on paper and draw another circle that is half as wide.

This exercise brings out the third idea of a fraction. First (page 45) came the idea of *half of an object;* then came (page 46) *half of a group of objects;* now comes the idea of *half as large.*

### 80. Fourth of an Object

*Examples 1 to 6, oral — Examples 7 to 11, written*



1. This orange has been divided into 4 equal parts. Each is what part of the orange?

2. A quarter of a dollar is what part of a dollar?

3. Tell me how many quarters of an orange equal half an orange.

4. What two names are there for one of the 4 equal parts of anything?

5. What is meant by $\frac{1}{4}$? How many books are $\frac{1}{4}$ of 4 books?

6. If a line is 4 in. long, how long is a line that has a quarter of this length?

7. Draw a line 2 in. long and mark off $\frac{1}{4}$ of it.

8. Draw a line 4 in. long and mark off $\frac{1}{2}$ of it and also $\frac{1}{4}$ of it.

9. Draw a square 1 in. on a side and divide it into fourths.

10. Draw a circle and divide it into halves; then divide each half into halves.

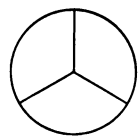
11. Draw a line 1 in. long and divide it into halves; then divide each half into halves. Do you see that half of a half is a quarter of the whole?

It is not expected that in this review much facility in fractions will be developed. The children have this work in Grades I and II, but the subject is better treated in the regular work of Grade III.

### 81. One Third

*Examples 1 to 8, oral — Examples 9 to 14, written*

**1.** This circle has been divided into how many equal parts?



**2.** Each of these equal parts is called what part of the circle?

**3.** If a line is divided into three equal parts, each is called what part of the line?

**4.** What is one of the three equal parts of anything called?

**5.** How many feet are there in a yard? Then 1 ft. is what part of a yard?

**6.** What is meant by $\frac{1}{3}$? How much is $\frac{1}{3}$ of \$3?

**7.** How much is $\frac{1}{3}$ of 3 in.? $\frac{1}{3}$ of 3 lb.?

**8.** If a line is 3 yd. long, how long is a line that is $\frac{1}{3}$ of this length?

**9.** Draw a line 3 in. long and mark off $\frac{1}{3}$ of it.

**10.** Draw a line 1 in. long. Then draw it so that it is $\frac{1}{2}$ in. longer. Mark off $\frac{1}{3}$ of the whole line.

**11.** Here are 6 stars separated into 3 equal groups. How many stars are $\frac{1}{3}$ of 6 stars?

* * *
* * *

**12.** Draw 9 stars and separate them into 3 equal groups. How many stars are $\frac{1}{3}$ of 9 stars?

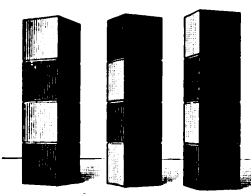
**13.** Draw 12 stars and separate them into 2 equal groups. How many stars are $\frac{1}{2}$ of 12 stars?

**14.** Draw 12 stars and separate them into 3 equal groups. How many stars are $\frac{1}{3}$ of 12 stars?

### 82. Review

*Examples 1 to 5, oral — Examples 6 and 7, written*

1. How many feet are there in $\frac{1}{3}$ yd.?
2. How many pints are there in $\frac{1}{2}$ qt.?
3. How many inches are there in $\frac{1}{2}$ ft.?
4. How many inches are there in $\frac{1}{3}$ ft.?
5. There are 12 things in a dozen. How many cubes are there in $\frac{1}{3}$ of a dozen cubes?



6. How many eggs are there in $\frac{1}{3}$ of a dozen eggs?
7. How many eggs are there in $\frac{1}{4}$ of a dozen eggs?

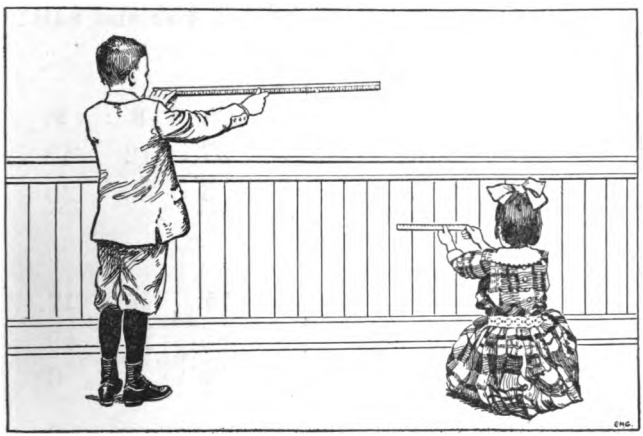
### 83. Review

*Examples 1 to 6, oral — Examples 7 to 9, written*

1. How many eggs are $\frac{1}{2}$ of a dozen eggs?
2. How many oranges are $\frac{1}{3}$ of a dozen oranges?
3. How many knives are $\frac{1}{4}$ of a dozen knives?
4. How many dollars are $\frac{1}{2}$ of \$16?
5. How many feet are $\frac{1}{4}$ of 16 ft.?
6. How many pounds are $\frac{1}{3}$ of 9 lb.?
7. Draw a line 1 in. long and mark off $\frac{1}{2}$ of $\frac{1}{2}$ of it.
8. Draw a line 1 in. long and mark off $\frac{1}{4}$ of it. Is this the same length as the line found in Ex. 7?
9. Draw 10 stars and separate them into 2 equal groups. How many stars are $\frac{1}{2}$ of 10 stars?

### 84. Review

*Examples 1 to 4, oral — Examples 5 to 12, written*



**1.** If these children find the room to be 7 yd. long, how many feet long is the room?

**2.** If they find the room to be 21 ft. wide, how many yards wide is the room?

**3.** A yard is how many feet? A foot is what part of a yard?

**4.** How many thirds of a yard are there in 1 yd.? How many thirds of an apple are there in an apple?

*Copy, make the dots, and complete:*

**5.** $\frac{1}{2}$ of 4 dots =

**6.** $\frac{1}{2}$ of 6 dots =

**7.** $\frac{1}{2}$ of 8 dots =

**8.** $\frac{1}{2}$ of 10 dots =

**9.** $\frac{1}{3}$ of 6 dots =

**10.** $\frac{1}{3}$ of 9 dots =

**11.** $\frac{1}{4}$ of 8 dots =

**12.** $\frac{1}{4}$ of 12 dots =

### 85. Review of Whole Numbers and Fractions

*Examples 1 to 17, oral — Examples 18 to 36, written*

1. How much is \$25 and \$10? \$35 and \$10?

*Add rapidly:*

| 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|---|---|
| 20 | 34 | 26 | 41 | 15 | 37 | 12 | 42 |
| 12 | 10 | 20 | 30 | 40 | 3 | 30 | 20 |

*Subtract rapidly:*

| 10. | 11. | 12. | 13. | 14. | 15. | 16. | 17. |
|---|---|---|---|---|---|---|---|
| 36 | 42 | 31 | 48 | 73 | 85 | 26 | 49 |
| 20 | 30 | 10 | 20 | 3 | 40 | 5 | 6 |

18. Find $\frac{1}{2}$ of 4; of 8; of 10; of 12; of 14.
19. Find $\frac{1}{4}$ of 8; of 12; of 16; of 4 cents.
20. Find $\frac{1}{3}$ of 6; of 9; of 12; of 3 cents.

*Copy and add:*

| 21. | 22. | 23. | 24. | 25. | 26. | 27. | 28. |
|---|---|---|---|---|---|---|---|
| 10 | 22 | 41 | 56 | 29 | 13 | 14 | 32 |
| 20 | 30 | 20 | 10 | 10 | 13 | 25 | 33 |
| 21 | 14 | 12 | 10 | 20 | 13 | 10 | 10 |
| 33 | 12 | 11 | 12 | 30 | 20 | 10 | 11 |

*Copy and subtract:*

| 29. | 30. | 31. | 32. | 33. | 34. | 35. | 36. |
|---|---|---|---|---|---|---|---|
| 63 | 85 | 39 | 41 | 96 | 32 | 77 | 44 |
| 21 | 32 | 24 | 11 | 75 | 12 | 45 | 23 |

# CHAPTER II

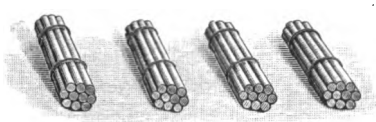
## NUMBERS TO 10,000

### I. READING AND WRITING NUMBERS

#### 1. Numbers to 1000

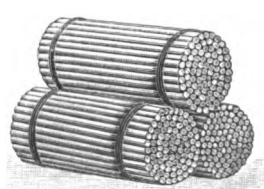
*Examples 1 to 7, oral — Example 8, written*

**1.** Here are 4 bundles of 10 splints each. How many splints do you see in all?



Ten 10's make *one hundred*. We write one hundred and two hundred thus: 100; 200.

**2.** Each of these 3 bundles contains as many splints as 10 of the bundles of Ex. 1. How many splints are there in each bundle?



We read 352, "three hundred fifty-two." We read 407, "four hundred seven."

*Read these numbers:*

**3.** 700. **4.** 820. **5.** 926. **6.** 420. **7.** 703.

**8.** Write in words: 206; 709; 527; 642; 834.

### 2. Numbers to 1000

*Examples 1 to 14, oral — Examples 15 to 18, written*

1. Read aloud: 275; 365; 499; 999; 827.

*Read these numbers:*

2. 723. 4. 298. 6. 888. 8. 707. 10. 630.
3. 496. 5. 964. 7. 351. 9. 909. 11. 590.

*State the sum of:*

12. 800 + 60 + 7. 13. 100 + 70. 14. 600 + 90.

*Write in figures:*

15. Seven hundred. 17. Five hundred fifty-five.
16. Nine hundred. 18. Eight hundred eight.

### 3. Numbers to 1000

*Examples 1 to 9, oral — Examples 10 to 13, written*

1. Read aloud: 404; 407; 101; 808; 763.

*Read these numbers:*

2. 999. 3. 620. 4. 505. 5. 345. 6. 800.

*State the sum of:*

7. 600 + 35. 8. 900 + 63. 9. 800 + 4.

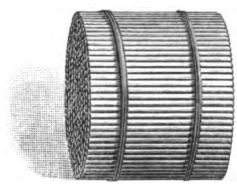
*Write the sum of:*

10. 300 + 3. 11. 700 + 9. 12. 700 + 32.
13. Write in words: 555; 101; 321; 123; 909.

### 4. Thousands

*Examples 1 to 9, oral — Examples 10 to 20, written*

**1.** Here is a bundle with 10 hundred splints. We call 10 hundred *one thousand.* How many splints in 2 such bundles?



**2.** We write one thousand thus: 1000. Read these numbers: 2000; 3000; 4000.

**3.** Count by thousands from 1 thousand to 10 thousand.

**4.** How many hundreds are there in 1000? in 2000? in 3000?

*Read these numbers:*

**5.** 5000. **6.** 6000. **7.** 4000. **8.** 7000. **9.** 2000.

*Write in figures:*

**10.** Seven thousand.
**11.** Nine thousand.
**12.** Six thousand.
**13.** Eight thousand.

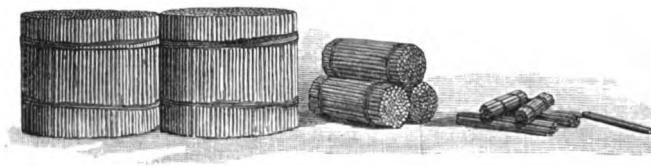
**14.** Write all of the thousands from 1 thousand to 9 thousand.

*Add the following:*

| 15. | 16. | 17. | 18. | 19. | 20. |
|---|---|---|---|---|---|
| 1000 | 2000 | 3000 | 5000 | 4000 | 1000 |
| 1000 | 1000 | 2000 | 3000 | 1000 | 4000 |
| 2000 | 3000 | 1000 | 1000 | 4000 | 3000 |

### 5. Numbers to 10,000

*Examples 1 to 14, oral — Examples 15 to 18, written*



2000 + 300 + 40 + 2

**1.** Here are 2000 splints + 300 splints + 40 splints + 2 splints. We write the sum thus: 2342. We read this number thus: two thousand three hundred forty-two. Read these numbers: 2427; 4620; 5307.

*Read aloud:*

**2.** 2348. **4.** 3949. **6.** 2640. **8.** 4605. **10.** 3092.
**3.** 3461. **5.** 8888. **7.** 3750. **9.** 5706. **11.** 4078.

**12.** If in 2345 we say that 5 is in units' place, 4 in tens' place, and 3 in hundreds' place, what place shall we say that 2 is in?

**13.** Name the four places in the number 7543.

**14.** We may read 1700, "1 thousand 7 hundred" or "17 hundred." State two ways of reading 2500.

*Write in figures:*

**15.** One thousand five hundred seventy-six.
**16.** Two thousand nine hundred fifty-three.
**17.** Nineteen hundred twelve.
**18.** Nine thousand nine hundred ninety-nine.

### 6. Numbers to 10,000

*Examples 1 to 9, oral — Examples 10 to 12, written*

1. Read aloud: 1301; 2022; 3303; 4444.

*Read aloud:*

2. Washington was born in 1732.
3. The battle of Bunker Hill was fought in 1775.
4. The Pilgrim Fathers landed in 1620.

5. 1913. 6. 1915. 7. 2400. 8. 2304. 9. 6666.

*Write in figures:*

10. Seven thousand seven.
11. Eight thousand eight hundred.
12. Six thousand seven hundred eighty.

### 7. Numbers to 10,000

*Examples 1 to 6, oral — Examples 7 to 14, written*

1. Read aloud: 1916; 2987; 4281; 7997.

*Read aloud:*

2. 1912. 3. 1917. 4. 4040. 5. 5005. 6. 6600.

*Write in figures:*

7. This year.
8. Nineteen hundred fifteen.
9. One thousand nine hundred sixteen.

*Write in words:*

10. 2007. 11. 2500. 12. 3200. 13. 3750. 14. 6232.

We have studied twelve Roman numerals on clocks. The tens, from ten to one hundred, are as follows:

| | |
|---|---|
| 10 = X | written X |
| 20 = X + X | written XX |
| 30 = X + X + X | written XXX |
| 40 = L − X | written XL |
| 50 = L | written L |
| 60 = L + X | written LX |
| 70 = L + X + X | written LXX |
| 80 = L + X + X + X | written LXXX |
| 90 = C − X | written XC |
| 100 = C | written C |

Other numbers are written thus:

| | |
|---|---|
| 19 = X + IX | written XIX |
| 45 = XL + V | written XLV |
| 86 = LXXX + VI | written LXXXVI |
| 99 = XC + IX | written XCIX |

### 8. Roman Numerals

*Examples 1 to 5, oral — Examples 6 to 11, written*

1. Read aloud: XLIX; XCII; LXXXVIII.

*Read:*

2. XVI. 3. XXV. 4. XLVI. 5. LXIX.

*Write in Roman numerals:*

6. 37. 7. 49. 8. 63. 9. 94. 10. 77. 11. 84.

## II. ADDITION

Uniting two or more numbers in one number is called *addition*.

For other definitions see page 16.

We add 42, 30, and 25 as here shown, adding first the ones, which are called the *units*, and then the tens.

```
 42
 30
 25
 97
```

We add 75 and 62 as here shown. The sum of the units is 7, and the sum of the tens is 13, the total sum being 137.

```
 75
 62
137
```

### 9. Adding Two-figure Numbers

*Examples 1 to 9, oral — Examples 10 to 25, written*

1. Add 50 cents and 10 cents.

*Add:*

| 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|---|---|
| 81 | 32 | 41 | 37 | 69 | 22 | 35 | 42 |
| 5 | 7 | 20 | 30 | 20 | 31 | 22 | 21 |

*Copy and add:*

| 10. | 11. | 12. | 13. | 14. | 15. | 16. | 17. |
|---|---|---|---|---|---|---|---|
| 22 | 43 | 95 | 97 | 87 | 75 | 78 | 77 |
| 57 | 33 | 10 | 20 | 41 | 30 | 30 | 50 |

| 18. | 19. | 20. | 21. | 22. | 23. | 24. | 25. |
|---|---|---|---|---|---|---|---|
| 68 | 90 | 96 | 96 | 82 | 67 | 86 | 72 |
| 31 | 10 | 12 | 30 | 26 | 41 | 42 | 61 |

We may add 68 and 57 in either of the following ways, but the second one is always used because it is shorter. The first way explains the second.

In the second plan we think of 7 + 8 as 15, and we write the units, 5, under units, reserving 1 (ten) to add to the tens.

68
57
15 sum of units
11 sum of tens
125 sum of both

68
57
125

We then think of 5 + 6 (tens) as 11 (tens) which, with the 1 (ten) from the 15, makes 12 (tens). The sum is 125.

### 10. Adding Two-figure Numbers

*Examples 1 to 9, oral — Examples 10 to 17, written*

1. 7 horses and 61 horses are how many?
2. 8 flies and 16 flies are how many?
3. 27 roses and 30 roses are how many?
4. 35 apples and 20 apples are how many?
5. 24 eggs and 10 eggs are how many?
6. 20 boys and 16 boys are how many?

*Add:*

7. 30 + 10. 8. 30 + 17. 9. 32 + 17.

*Copy and add:*

| 10. | 11. | 12. | 13. | 14. | 15. | 16. | 17. |
|---|---|---|---|---|---|---|---|
| 30 | 31 | 37 | 56 | 39 | 27 | 45 | 62 |
| 48 | 48 | 48 | 47 | 86 | 59 | 55 | 78 |

### 11. Adding Two-figure Numbers

*Examples 1 to 8, oral — Examples, 9 to 15, written*

1. Add: 22 + 6; 23 + 3; 23 + 3 + 3.

*Add:*

| 2. | 3. | 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|---|---|
| 32 | 33 | 34 | 46 | 59 | 69 | 125 |
| 7 | 7 | 7 | 8 | 3 | 8 | 5 |

*Copy and add:*

| 9. | 10. | 11. | 12. | 13. | 14. | 15. |
|---|---|---|---|---|---|---|
| 57 | 57 | 63 | 75 | 66 | 59 | 47 |
| 20 | 27 | 29 | 15 | 24 | 28 | 36 |

### 12. Adding Two-figure Numbers

*Examples 1 to 3, oral — Examples 4 to 10, written*

1. The score in a game was 2, 5, 0, 3, 4. What was the total score?

2. A boy has 35¢ in a bank. If he puts in 50¢ more, how much will he have?

3. One boy weighs 48 lb. and another 40 lb. How much do they together weigh?

*Add:*

| 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|
| 26 | 48 | 72 | 65 | 27 | 32 | 87 |
| 34 | 52 | 28 | 37 | 65 | 59 | 16 |

### 13. Adding Two-figure Numbers

*Examples 1 to 8, oral — Examples 9 to 14, written*

1. These girls have bought goods costing 37¢ and 20¢. How much is the total?

2. If they buy goods at 42¢ and 9¢, find the total.

*Find the total amounts on these purchases:*

| 3. | 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|---|
| 27¢ | 36¢ | 42¢ | 42¢ | 42¢ | 38¢ |
| 40 | 9 | 8 | 18 | 28 | 12 |

*Copy and add:*

| 9. | 10. | 11. | 12. | 13. | 14. |
|---|---|---|---|---|---|
| 36 | 36 | 59 | 38 | 41 | 39 |
| 44 | 47 | 29 | 37 | 29 | 46 |

### 14. Adding Two-figure Numbers

*Examples 1 to 5, oral — Examples 6 to 14, written*

1. There are 31 days in March and 30 days in April. How many days are there in both together?

2. If you pay 25¢ for a book, 5¢ for a pencil, and 10¢ for some paper, how much do you pay for all?

*Add:*

3. 27 + 20. 4. \$40 + \$60. 5. 37 ft. + 20 ft.

*Copy and add:*

6. \$56 + \$35.
7. \$28 + \$49.
8. \$59 + \$27.
9. 32 ft. + 39 ft.
10. 37 ft. + 45 ft.
11. 64 ft. + 36 ft.
12. 29¢ + 48¢.
13. 36¢ + 35¢.
14. 64¢ + 28¢.

### 15. Adding Two-figure Numbers

*Examples 1 to 4, oral — Examples 5 to 11 written*

1. How many yards are 17 yd. and 11 yd.?

2. How many pounds are 27 lb. and 40 lb.?

3. How many pins are 26 pins and 8 pins?

4. Add: \$42 + \$8; \$42 + \$18; 43 + 7; 43 + 17; 55 + 5; 55 + 15.

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|---|---|
| 17 | 15 | 39 | 53 | 48 | 29 | 65 |
| 26 | 36 | 21 | 21 | 17 | 42 | 15 |
| 32 | 48 | 36 | 19 | 35 | 29 | 20 |

We add larger numbers in the same way as smaller ones, adding first the units, then the tens, then the hundreds, and so on. Thus find the sum of 148 + 263 + 409.

$$\begin{array}{r} 148 \\ 263 \\ 409 \\ \hline 820 \end{array}$$

The sum of the units is 20. Since this is 2 tens + 0 units, we write 0 under units and add 2 to the next column. The sum of the tens, with this 2, is 12, or 1 hundred and 2 tens, and we write 2 under tens and add 1 to the next column. The sum of the hundreds, with this 1, is 8, and this we write under hundreds. Hence the sum is 820.

### 16. Adding Three-figure Numbers

*Examples 1 to 5, oral — Examples 6 to 13, written*

1. How much is \$100 + \$40?
2. How much is \$200 + \$55?
3. How much is \$100 + \$200?
4. How much is 200 ft. + 300 ft. + 50 ft.?
5. Add 100 + 200 + 300 + 60 + 6.

*Copy and add:*

| 6. | 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|---|
| 106 | 243 | 129 | 267 | 182 | 302 |
| 302 | 364 | 208 | 346 | 199 | 269 |
| 109 | 109 | 411 | 109 | 208 | 197 |

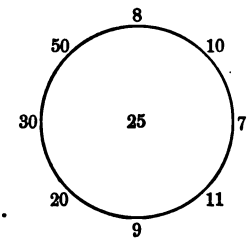
12. 27 + 36 + 49 + 53.

13. 36 + 92 + 89 + 70.

### 17. Adding Three-figure Numbers

*Examples 1 and 2, oral — Examples 3 to 6, written*

1. After the teacher has copied this circle on the blackboard add the number within to the number outside, to which the teacher points.




*Add:*

2. 300 + 400; 320 + 60.
3. 125 + 106 + 317 + 62.
4. 236 + 92 + 129 + 87.
5. 408 + 69 + 72 + 251 + 200.
6. 149 + 200 + 51 + 44 + 227.

### 18. Adding Three-figure Numbers

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. How many apples are 50 apples and 60 apples?
2. How much is a bill for $30 worth of potatoes and $70 worth of wheat?
3. How much is a bill for $125, $62, $38, $175, and $100?

*Copy and add, checking the results:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| 125 | 209 | 108 | 196 | 296 | 212 |
| 63 | 79 | 296 | 98 | 109 | 156 |
| 108 | 68 | 129 | 32 | 127 | 189 |
| 272 | 320 | 300 | 109 | 169 | 225 |
| 36 | 192 | 75 | 269 | 79 | 142 |

### 19. Adding Three-figure Numbers

*Examples 1 to 7, oral — Examples 8 to 13, written*

1. If you have \$6 in the bank and put in \$16 more, how much will you have?

*Add:*

| 2. | 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|---|
| 8 | 18 | 28 | 68 | 88 | 98 |
| 3 | 3 | 3 | 3 | 3 | 3 |

| 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|
| 136 | 257 | 339 | 172 | 289 | 237 |
| 242 | 162 | 149 | 487 | 290 | 629 |
| 439 | 198 | 263 | 392 | 499 | 436 |

### 20. Adding Three-figure Numbers

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. Add 5 to each of these numbers: 17, 27, 37.
2. Add 6 to each of these numbers: 16, 26, 36.
3. Add 7 to each of these numbers: 19, 29, 39.

*Add:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| 27 | 128 | 130 | 124 | 128 | 450 |
| 32 | 254 | 292 | 232 | 372 | 280 |
| 48 | 126 | 487 | 148 | 541 | 329 |
| 76 | 193 | 163 | 360 | 629 | 406 |
| 51 | 237 | 158 | 259 | 300 | 509 |

In adding numbers of more than three figures we proceed as with smaller numbers. Thus to add 4296 and 3758 we write the numbers in the usual way, with units under units, tens under tens, and so on.

$$\begin{array}{r} 4296 \\ 3758 \\ \hline 8054 \end{array}$$

Then $8 + 6 = 14$, and we write the 4 under units, and add the 1 to the tens.

The sum of the tens is 14, which with the 1 from the 14 units makes 15 tens. We write the 5 under tens, and add the 1 to the hundreds.

The sum of the hundreds is 9, which with the 1 from the 15 tens makes 10 hundreds. We write the 0 under hundreds, and add the 1 to the thousands.

The sum of the thousands is now $1 + 3 + 4$, or 8.

Therefore the sum of 4296 and 3758 is 8054.

### 21. Adding Four-figure Numbers

*Examples 1 to 4, oral — Examples 5 to 9, written*

1. Add $1000 + 2000 + 3000 + 1000$.
2. Add $5000 + 2000 + 1000 + 1000$.
3. Add $2000 + 1000 + 100 + 10 + 1$.
4. Add $2000 + 1000 + 200 + 30 + 4$.

*Add:*

| 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|
| 2460 | 4269 | 3129 | 2087 | 1929 |
| 3171 | 1706 | 1476 | 3162 | 2006 |
| 2205 | 1970 | 2963 | 2929 | 3129 |

### 22. Adding Four-figure Numbers

*Example 1, oral — Examples 2 to 6, written*

1. Add: $8+2+6+4$; $4+6+1+9$.

*Copy and add:*

| 2. | 3. | 4. | 5. | 6. |
|---|---|---|---|---|
| 2876 | 4927 | 5276 | 7148 | 3469 |
| 4963 | 3462 | 1983 | 2096 | 4298 |

In adding, try to add by groups. Thus in adding this column think of 7 and 3 as 10, and of 8 and 2 as 10. Then read the column thus: 10, 20, 29.

9
2
8
7
3

### 23. Adding Four-figure Numbers

*Examples 1 to 9, oral — Examples 10 to 14, written*

1. How old will you be 7 years from now?

*Add:*

| 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|---|---|
| 6 | 8 | 7 | 9 | 7 | 4 | 3 | 4 |
| 4 | 3 | 2 | 8 | 3 | 6 | 5 | 8 |
| 6 | 7 | 3 | 2 | 7 | 4 | 5 | 2 |

| 10. | 11. | 12. | 13. | 14. |
|---|---|---|---|---|
| 1126 | 1078 | 1211 | 1462 | 3112 |
| 2741 | 1914 | 2007 | 2073 | 2209 |
| 1089 | 2096 | 3643 | 1927 | 1791 |

### 24. Adding Four-figure Numbers

*Examples 1 to 5, oral — Examples 6 to 8, written*

**1.** If one boy picks 17 qt. of berries and another picks 9 qt., how many quarts do both pick?

*Add rapidly:*

**2.** $27+7$. **3.** $37+7$. **4.** $247+7$. **5.** $3007+7$.

**6.** One load of hay weighs 2247 lb. and another weighs 1986 lb. How much do both weigh?

**7.** A man saved \$2743 in one year and \$3628 the next year. How much did he save in all?

**8.** A man paid \$1575 for a lot and \$5865 for building a house. How much did both cost?

### 25. Adding Four-figure Numbers

*Examples 1 to 4, oral — Examples 5 and 6, written*

**1.** If a boy earns 27¢ to-day and 30¢ to-morrow, how much does he earn in both days?

*Add rapidly:*

**2.** $1550+50$. **3.** $2575+25$. **4.** $3250+250$.

**5.** A triangular lot is 1476 ft. on the first side, 1597 ft. on the second, and 1729 ft. on the third. How far is it around the lot?

**6.** A man saved the following amounts in six years: \$1755, \$1175, \$1436, \$1865, \$780, \$975. What was the total amount saved?

### 26. Adding Four-figure Numbers

*Examples 1 and 2, oral — Examples 3 to 6, written*

1. If there are 5000 people in one village and 4000 people in another village, how many are there in both villages?

2. If a man has saved $3000 and then saves $2000 more, how much will he have?

3. If one load of hay weighs 2250 lb. and another weighs 2375 lb., how much do the two loads weigh?

4. If one load of coal weighs 2475 lb. and another weighs 2325 lb., how much do the two loads weigh?

5. Add 2496 + 3974 + 987 + 863 + 37 + 63.

6. Add 1809 + 2291 + 873 + 287 + 76 + 24.

### 27. Adding Four-figure Numbers

*Examples 1 and 2, oral — Examples 3 to 9, written*

1. If a farm is worth $4000 and the buildings and stock are worth $1000, what is the total value?

2. If a man has $2000 in the bank and adds $1000 more, how much will he have?

3. If a man saved $1175 last year and saves $1670 this year, how much does he save in both years?

*Add the following:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| 2468 | 2937 | 4286 | 2793 | 6262 | 4175 |
| 1796 | 4163 | 3197 | 3207 | 2738 | 5824 |

## III. SUBTRACTION

In subtracting one number from another the larger number is called the *minuend*, the smaller number is called the *subtrahend*, and the result is called the *difference* or *remainder*.

From 67 take 42.

The difference between 7 and 2 is 5, which is written under units. The difference between 6 (tens) and 4 (tens) is 2 (tens), which is written under tens. Hence the remainder is 25.

| | |
|---|---|
| 67 | minuend |
| 42 | subtrahend |
| 25 | remainder |

From 62 take 47.

In subtracting units $2-7$ is impossible, so we take 1 ten from 6 tens and put it with the 2 units, making 12 units. Then $12-7=5$, and this 5 is written under units. Then 5 (tens) $-$ 4 (tens) $=$ 1 (ten), and this 1 is written under tens. Hence the remainder is 15.

| |
|---|
| 62 |
| 47 |
| 15 |

This shows the process more completely:

$$\begin{aligned} 62 &= 50 + 12 \\ 47 &= 40 + \ 7 \\ \hline & \ 10 + \ 5 = 15 \end{aligned}$$

The work in addition is checked by adding in the opposite direction.

The work in subtraction is checked by adding the subtrahend and the remainder. If the sum is the minuend, the work should be correct.

### 28. Subtracting Two-figure Numbers

*Examples 1 to 8, oral — Examples 9 to 15, written*

1. A man is 39 years old and his son is 9 years old. How much older is the father than the son?

*Subtract:*

| 2. | 3. | 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|---|---|
| 37 | 48 | 72 | 89 | 54 | 39 | 67 |
| 6 | 5 | 2 | 6 | 2 | 8 | 7 |

| 9. | 10. | 11. | 12. | 13. | 14. | 15. |
|---|---|---|---|---|---|---|
| 52 | 71 | 86 | 41 | 54 | 70 | 83 |
| 36 | 42 | 39 | 27 | 36 | 19 | 68 |

### 29. Subtracting Two-figure Numbers

*Examples 1 to 3, oral — Examples 4 to 10, written*

1. Subtract 3 from every number between 12 and 62 that ends in 2.

2. Subtract 4 from every number between 11 and 61 that ends in 1.

3. Subtract 5 from every number between 13 and 63 that ends in 3.

*Copy, subtract, and check:*

| 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|
| $92 | $75 | 32 in. | 49 | 71 | 63 | 96 |
| 27 | 59 | 17 | 29 | 23 | 48 | 69 |

### 30. Subtracting Two-figure Numbers

*Examples 1 to 5, oral — Examples 6 to 12, written*

1. If this room is 30 ft. long and 22 ft. wide, it is how much longer than wide?

*Complete the following:*

2. $\$17 - \$9 =$
3. $\$35 - \$8 =$
4. 32 ft. $-$ $= 22$ ft.
5. 47 in. $-$ $= 17$ in.

*Copy, subtract, and check:*

| 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|
| 78 | 62 | 40 | 82 | 91 | 70 | 42 |
| 29 | 37 | 19 | 76 | 83 | 38 | 29 |

### 31. Subtracting Two-figure Numbers

*Examples 1 to 3, oral — Examples 4 to 10, written*

1. A lady bought 18¢ worth of sugar and gave 25¢. How much change was due?

2. If you buy a pencil for 4¢ and some paper for 5¢, how much change is due from 25¢?

3. How much is $50¢ - 20¢$? $50¢ - 15¢$? $70 - 30$? $70 - 25$? $80 - 50$? $80 - 55$?

*Copy, subtract, and check:*

| 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|
| 92 | 93 | 81 | 35 | 40 | 82 | 97 |
| 76 | 69 | 28 | 19 | 27 | 48 | 69 |

Let us now consider numbers of three figures. We will take 346 from 624.

Subtracting first the units, $4 - 6$ is impossible, so we take 1 ten from 2 tens and put it with the 4 units, making 14 units. Then $14 - 6 = 8$, and this 8 is written under units.

$$\begin{array}{r} 624 \\ 346 \\ \hline 278 \end{array}$$

Then taking the tens, $1 - 4$ is impossible, so we take 1 hundred from 6 hundreds and put it with the 1 ten, making 11 tens. Then 11 (tens) $-$ 4 (tens) $=$ 7 (tens), and this 7 is written under tens.

Then taking the hundreds, 5 (hundreds) $-$ 3 (hundreds) $=$ 2 (hundreds), and this 2 is written under hundreds.

Hence the remainder is 278.

We check the result by adding 346 and 278, the sum being 624, the minuend.

$$\begin{array}{r} 346 \\ 278 \\ \hline 624 \end{array}$$

This shows the process more completely:

$$\begin{array}{rl} 624 = 600 + 20 + 4 & = 500 + 110 + 14 \\ 346 = 300 + 40 + 6 & = \underline{300 + \ 40 + \ 6} \\ & \quad 200 + \ 70 + \ 8 = 278 \end{array}$$

*Study the following examples:*

| | | | | |
|---|---|---|---|---|
| 474 | 474 | 474 | 474 | 582 |
| 374 | 384 | 368 | 408 | 396 |
| 100 | 90 | 106 | 66 | 186 |
| 875 | 875 | 875 | 875 | 911 |
| 175 | 385 | 367 | 307 | 399 |
| 700 | 490 | 508 | 568 | 512 |

### 32. Subtracting Three-figure Numbers

*Examples 1 to 6, oral — Examples 7 to 11, written*

1. How much greater is \$825 than \$300?

*Subtract:*

| 2. | 3. | 4. | 5. | 6. |
|---|---|---|---|---|
| 265 | 347 | 468 | 529 | \$750 |
| 100 | 20 | 5 | 200 | 50 |

*Copy, subtract, and check:*

| 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|
| 674 | 392 | 441 | 629 | 723 |
| 357 | 146 | 159 | 463 | 459 |

### 33. Subtracting Three-figure Numbers

*Examples 1 to 3, oral — Examples 4 to 8, written*

1. A man had \$625 in the bank and drew out \$200. How much money had he left?

2. A man owned 275 acres of land and sold 50 acres. How much had he left?

3. There are 365 days in the year. If 200 of these are school days, how many are not school days?

*Copy, subtract, and check:*

| 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|
| \$750 | \$625 | \$925 | \$850 | \$975 |
| 325 | 275 | 750 | 775 | 590 |

Required from 307 to subtract 129.

As before, $7 - 9$ is impossible, and we cannot take 1 ten from 0 tens. We therefore take 1 ten from 30 tens, or 300, leaving 29 tens. Then $17 - 9 = 8$, and this 8 is written under units. Then 9 (tens) $-$ 2 (tens) $=$ 7 (tens), and this 7 is written under tens. Then 2 (hundreds) $-$ 1 (hundred) $=$ 1 (hundred), and this 1 is written under hundreds. Hence the result is 178.

$$\begin{array}{r} 307 \\ 129 \\ \hline 178 \end{array}$$

This shows the process more completely:

$$\begin{array}{rl} 307 = & 200 + 90 + 17 \\ 129 = & 100 + 20 + \ 9 \\ \hline & 100 + 70 + \ 8 = 178 \end{array}$$

*Check*

$$\begin{array}{r} 129 \\ 178 \\ \hline 307 \end{array}$$

### 34. Subtracting Three-figure Numbers

*Examples 1 to 6, oral — Examples 7 to 16, written*

1. $205 - 105$.
2. $306 - 104$.
3. $\$406 - \$6$.
4. $\$105 - \$75$.
5. $\$608 - \$8$.
6. $\$505 - \$50$.

*Copy, subtract, and check:*

| 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|
| 205 | 502 | 702 | 907 | $507 |
| 120 | 62 | 96 | 639 | 128 |

| 12. | 13. | 14. | 15. | 16. |
|---|---|---|---|---|
| 308 | 607 | 805 | 706 | $908 |
| 260 | 68 | 236 | 238 | 127 |

Required from 600 to subtract 125.

As before, $0 - 5$ is impossible, and we cannot take 1 ten from 0 tens. We therefore take 1 ten from 60 tens, or 600, leaving 59 tens. Then $10 - 5 = 5$, and this 5 is written under units. Then 9 (tens) $-$ 2 (tens) = 7 (tens), and this 7 is written under tens. Then 5 (hundreds) $-$ 1 (hundred) = 4 (hundreds), and this 4 is written under hundreds. Hence the result is 475.

$$\begin{array}{r} 600 \\ 125 \\ \hline 475 \end{array}$$

This shows the process more completely:

$$\begin{array}{l} 600 = 500 + 90 + 10 \\ 125 = \underline{100 + 20 + \ 5} \\ \qquad 400 + 70 + \ 5 = 475 \end{array}$$

*Check*

$$\begin{array}{r} 125 \\ 475 \\ \hline 600 \end{array}$$

### 35. Subtracting Three-figure Numbers

*Examples 1 to 6, oral — Examples 7 to 11, written*

1. How much is \$900 $-$ \$300? \$700 $-$ \$100?

*Subtract:*

| 2. | 3. | 4. | 5. | 6. |
|---|---|---|---|---|
| 700 | 600 | 800 | 400 | 300 |
| 400 | 50 | 25 | 10 | 20 |

*Copy, subtract, and check:*

| 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|
| 500 | \$400 | \$800 | \$700 | \$600 |
| 125 | 167 | 107 | 209 | 396 |

### 36. Subtracting Three-figure Numbers

*Examples 1 and 2, oral — Examples 3 to 10, written*

1. A playground that is 200 ft. long and 50 ft. wide is how much longer than wide?

2. A kite string that is 500 ft. long loses 100 ft. of its length in some telegraph wires. How much is left?

*Copy, subtract, and check:*

| 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|
| 280 | $550 | 906 ft. | 107 in. | 675 |
| 196 | 375 | 329 | 89 | 499 |

8. $320 - 175$. 9. $603 - 486$. 10. $700 - 195$.

### 37. Subtracting Three-figure Numbers

*Examples 1 to 3, oral — Examples 4 and 5, written*

1. A man earns $900 a year and spends $800. How much does he save?

2. An automobile starts on a trip of 700 mi. After it has gone 50 mi. how far has it to go?

3. A flying machine is 800 ft. from the earth. It glides down 600 ft. How high is it then?

4. A flying machine goes up 425 ft. above the earth. It then glides down 130 ft. and then ascends 75 ft. How far is it then from the earth?

5. A man buys an automobile for $750 and some tools for $29. What change is due from $800?

### 38. Subtracting Four-figure Numbers

*Examples 1 to 8, oral — Examples 9 to 14, written*

1. From 50¢ take 10¢; take 20¢.
2. From 25¢ take 10¢; take 15¢; take 20¢.

*Subtract:*

| 3. | 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|---|
| 11 | 21 | 31 | 41 | 51 | 91 |
| 2 | 2 | 2 | 2 | 2 | 2 |

| 9. | 10. | 11. | 12. | 13. | 14. |
|---|---|---|---|---|---|
| 600 | 700 | 350 | 575 | 2700 | 5400 |
| 200 | 400 | 250 | 175 | 1700 | 3400 |

### 39. Subtracting Four-figure Numbers

*Examples 1 to 9, oral — Examples 10 to 15, written*

1. How many dollars are \$85 – \$7?
2. How many feet are 45 ft. – 7 ft.?
3. How many apples are 35 apples – 7 apples?

*Subtract:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| 37 | 48 | 59 | 590 | 590 | 599 |
| 8 | 9 | 10 | 100 | 190 | 199 |

| 10. | 11. | 12. | 13. | 14. | 15. |
|---|---|---|---|---|---|
| 5200 | 3700 | 5600 | 8200 | 7275 | 8645 |
| 200 | 700 | 2600 | 4200 | 75 | 245 |

In subtracting numbers of four figures we proceed as with numbers of three figures, as already shown. Thus, to take 2759 from 4826 we proceed thus: $6 - 9$ is impossible, but $16 - 9 = 7$.

$$\begin{array}{r} 4826 \\ 2759 \\ \hline 2067 \end{array}$$

We have now used 1 from the 2 tens, and we have $1 - 5$, which is impossible. But $11 - 5 = 6$.

We have now used 1 from the 8 hundreds, so we have $7 - 7 = 0$.

We then have $4 - 2 = 2$.

Hence the result is 2067.

Similarly, to subtract 1725 from 5000 we proceed as follows: $10-5=5$, $9-2=7$, $9-7=2$, $4-1=3$.

$$\begin{array}{r} 5000 \\ 1725 \\ \hline 3275 \end{array}$$

### 40. Subtracting Four-figure Numbers

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. How much is $\$150 - \$50$?

2. A man has $\$275$ and spends $\$75$. How much has he left?

3. A school has 250 pupils, and 40 are in the third grade. How many pupils are in the rest of the school?

*Copy and subtract:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| 2475 | 3765 | 4819 | 3742 | 4263 | 3928 |
| 1250 | 1846 | 2734 | 2164 | 2796 | 2939 |

### 41. Subtracting Four-figure Numbers

*Examples 1 to 7, oral — Examples 8 to 13, written*

1. Subtract: 2300 − 200; 2300 − 300; 2300 − 400.

*Subtract rapidly:*

| 2. | 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|---|
| 4300 | 3700 | 5800 | 6300 | 7500 | 5000 |
| 200 | 500 | 1800 | 1200 | 2400 | 500 |

*Copy and subtract:*

| 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|
| 2962 | 3786 | 5692 | 8727 | 9356 | 2937 |
| 1478 | 2197 | 3296 | 2739 | 6473 | 1299 |

### 42. Subtracting Four-figure Numbers

*Examples 1 to 4, oral — Examples 5 to 10, written*

1. How many years from 1912 to 1920?
2. How many days from May 15 to May 23?
3. How much is 50 − 25? 500 − 250? 5000 − 2500? $5000 − $2500? 5000 ft. − 2500 ft.?
4. A man earns $1700 and spends $250 and $50. How much has he left?

*Copy and subtract:*

| 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|
| 7000 | 8000 | 6000 | 9000 | 5090 | 8080 |
| 2746 | 3979 | 2037 | 3070 | 2999 | 303 |

### 43. Review of Subtraction

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. How many years from 1900 to this year?
2. How many years from 1800 to 1900?
3. How many years from 1800 to this year?
4. How many years from 1776 to this year?
5. If a man has $2000 in the bank and draws out $725, how much has he left?
6. In a certain city there are 1360 children in school, 216 being in the third grade. How many pupils are not in the third grade?
7. $2000 - 976$. 8. $3001 - 829$. 9. $8765 - 5678$.

### 44. Review of Subtraction

*Examples 1 to 3, oral — Examples 4 to 6, written*

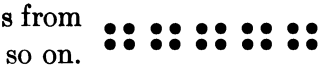
1. If there were 5000 people in a town ten years ago, and there are now 5275, what is the increase?
2. If a man earned $1200 last year and will earn $1500 this year, how much is the increase?
3. If a man spent $975 last year and will spend $925 this year, how much is the decrease?
4. In a library there are 1215 books, 576 having pictures. How many do not have pictures?
5. There are 1325 men marching, and 960 of these wear uniforms. How many do not wear uniforms?
6. In an orchard of 1130 trees, 975 are apple trees. How many are not apple trees?

## IV. MULTIPLICATION AND DIVISION TABLES

### 45. Table of 2's

*Examples 1 to 13, oral — Examples 14 to 20, written*

**1.** Count these dots by 2's from 2 to 20, thus: 2, 4, 6, and so on.



**2.** State the sum of each of these columns of 2's, thus: 2, 4, and so on.

**3.** Read each column in this way: one 2 is 2, two 2's are 4, and so on.

**4.** We write 3 times 2 in this way: $3 \times 2$. How do we read $4 \times 2$?

$$\begin{array}{ccccc} & & & & 2 \\ & & & 2 & 2 \\ & & 2 & 2 & 2 \\ & 2 & 2 & 2 & 2 \\ \underline{2} & \underline{2} & \underline{2} & \underline{2} & \underline{2} \end{array}$$

**5.** Read and learn:

| | |
|---|---|
| $1 \times 2 = 2$ | $6 \times 2 = 12$ |
| $2 \times 2 = 4$ | $7 \times 2 = 14$ |
| $3 \times 2 = 6$ | $8 \times 2 = 16$ |
| $4 \times 2 = 8$ | $9 \times 2 = 18$ |
| $5 \times 2 = 10$ | $10 \times 2 = 20$ |

The words "multiply" and "product" should be explained orally.

*State rapidly the results:*

| | | | |
|---|---|---|---|
| **6.** $4 \times 2$. | **8.** $6 \times 2$. | **10.** $3 \times 2$. | **12.** $5 \times 2$. |
| **7.** $7 \times 2$. | **9.** $9 \times 2$. | **11.** $8 \times 2$. | **13.** $2 \times 2$. |

**14.** Write ten columns of 2's, as in Ex. 2, from one 2 to ten 2's. Add each column.

*Write the results:*

| | | |
|---|---|---|
| **15.** $2 + 2 + 2$; $3 \times 2$. | **17.** $6 \times 2$. | **19.** $7 \times 2$. |
| **16.** $2 + 2 + 2 + 2$; $4 \times 2$. | **18.** $8 \times 2$. | **20.** $5 \times 2$. |

### 46. Table of 2's

*Examples 1 to 7, oral — Examples 8 to 16, written*

1. At 2¢ each, what will 3 tablets cost?
2. At 2¢ each, what will 4 pencils cost?
3. At 2¢ each, what will 7 postage stamps cost?

*At 2¢ each, find the cost of:*

4. 5 penholders.
5. 8 spools of thread.
6. 6 apples.
7. 9 postage stamps.

*Copy and complete:*

| | | | | | |
|---|---|---|---|---|---|
| 8. | $2 \times \quad = 4$. | 11. | $\times 2 = 12$. | 14. | $2 \times 2 =$ |
| 9. | $3 \times \quad = 6$. | 12. | $\times 2 = 14$. | 15. | $7 \times 2 =$ |
| 10. | $4 \times \quad = 8$. | 13. | $\times 2 = 16$. | 16. | $9 \times 2 =$ |

### 47. Table of 2's

*Examples 1 to 7, oral — Examples 8 to 17, written*

1. At 2¢ each, find the cost of 10 picture cards.

*At 2¢ each, find the cost of:*

2. 6 pears.
3. 5 tarts.
4. 7 yards of braid.
5. 4 pictures.
6. 9 calendars.
7. 8 newspapers.

*Copy and complete:*

| | | | | | |
|---|---|---|---|---|---|
| 8. | $5 \times \quad = 10$. | 11. | $6 \times \quad = 12$. | 14. | $\times 2 = 4$. |
| 9. | $7 \times \quad = 14$. | 12. | $8 \times \quad = 16$. | 15. | $\times 2 = 18$. |
| 10. | $9 \times \quad = 18$. | 13. | $10 \times \quad = 20$. | 16. | $\times 2 = 10$. |

17. How many gloves in 9 pairs of gloves?

### 48. Division Table of 2's

*Examples 1 to 7, oral — Examples 8 to 11, written*

1. How many 2's do you see in 4?
2. How many 2's do you see in 6?
3. How many 2's do you see in 8? 
4. How many 2's do you see in 10?
5. To divide 4 dots by 2 dots means to see how many times 2 dots are contained in 4 dots. How many times is this?
6. We write 8 divided by 2 in this way: $8 \div 2$. How do we read $10 \div 2$? How do we read $12 \div 2$?
7. Read and learn:

| | |
|---|---|
| $2 \div 2 = 1$ | $12 \div 2 = 6$ |
| $4 \div 2 = 2$ | $14 \div 2 = 7$ |
| $6 \div 2 = 3$ | $16 \div 2 = 8$ |
| $8 \div 2 = 4$ | $18 \div 2 = 9$ |
| $10 \div 2 = 5$ | $20 \div 2 = 10$ |

This table, being merely the inverse of the multiplication table, is easily learned in connection with it. Division may be indicated in three ways. For example, $20 \div 2$ may be written $2\overline{)20}$ or $\frac{1}{2}$ of 20. The words "divide" and "quotient" should be explained orally. Show by using objects that because $2 \times 3 = 6$ we have both $6 \div 2 = 3$, and $6 \div 3 = 2$, and that $\frac{1}{2}$ of 6 has the same value as $6 \div 2$.

8. We may show that $6 \div 2 = 3$ by placing 6 dots in this way: . Show in this way that $12 \div 2 = 6$.
9. In the same way show what $14 \div 2$ equals.
10. Show what $16 \div 2$ and $16 \div 8$ equal.
11. Show what $18 \div 2$ and $18 \div 9$ equal.

### 49. Dividing by 2

*Examples 1 to 11, oral — Examples 12 to 24, written*

1. At 2¢ each, how many postage stamps can be bought for 8¢?

*State how many 2-cent stamps can be bought for:*

2. 2¢. 4. 6¢. 6. 10¢. 8. 16¢. 10. 18¢.
3. 4¢. 5. 8¢. 7. 12¢. 9. 20¢. 11. 14¢.

*Copy and complete:*

12. $2 \div \quad = 1$. 15. $\quad \div 2 = 2$. 18. $12 \div 2 =$
13. $6 \div \quad = 3$. 16. $\quad \div 2 = 4$. 19. $20 \div 2 =$
14. $12 \div \quad = 6$. 17. $\quad \div 2 = 8$. 20. $14 \div 2 =$

21. $\frac{1}{2}$ of 6 = 22. $2\overline{)16}$ 23. $2\overline{)12}$ 24. $2\overline{)14}$

### 50. Dividing by 2

*Examples 1 to 4, oral — Examples 5 to 13, written*

1. Name something that can be bought for 2¢. How many could you buy for 10¢?

2. Name something else that can be bought for 2¢. How many could you buy for 18¢?

3. How many quarts in 2 pt.? in 6 pt.?

4. Divide 20 ft. by 2; 22 in. by 2; 40¢ by 2.

*Copy and complete:*

5. $\frac{1}{2}$ of 14 = 8. $2\overline{)8}$ 11. $18 \div 2 =$
6. $\frac{1}{2}$ of 20 = 9. $2\overline{)10}$ 12. $16 \div 2 =$
7. $\frac{1}{2}$ of 12 = 10. $2\overline{)18}$ 13. $10 \div 2 =$

### 51. Dividing by 2

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. There are 18 boys in a game, the same number on each side. How many are on each side?

2. How many quarts of milk in 10 pt. of milk?

3. It is 16 miles from here to a certain place. How many miles in half the distance?

*Copy and complete:*

| | | | | | |
|---|---|---|---|---|---|
| **4.** $18 \div 2 =$ | **7.** $14 \div$ | $= 7.$ | **10.** | $\div 2 = 6.$ |
| **5.** $16 \div 2 =$ | **8.** $12 \div$ | $= 6.$ | **11.** | $\div 2 = 4.$ |
| **6.** $10 \div 2 =$ | **9.** $20 \div$ | $= 10.$ | **12.** | $\div 2 = 7.$ |

Teachers should give the simple tests for divisibility by 2, 3, 5, 9, and 10 in connection with the respective tables, as shown in the Appendix, if the course of study demands them.

### 52. Dividing by 2

*Examples 1 to 5, oral — Examples 6 to 9, written*

1. Add 2 to 3; $\frac{1}{2}$ of 4 to $\frac{1}{2}$ of 6.
2. Add 4 to 2; $\frac{1}{2}$ of 8 to $\frac{1}{2}$ of 4.
3. Add $\frac{1}{2}$ of 6 to $\frac{1}{2}$ of 6; $\frac{1}{2}$ of 6 to $\frac{1}{2}$ of 10.
4. Add $\frac{1}{2}$ of 8 to $\frac{1}{2}$ of 6; $\frac{1}{2}$ of 8 to $\frac{1}{2}$ of 12.
5. Add $\frac{1}{2}$ of 10 to $\frac{1}{2}$ of 2; $\frac{1}{2}$ of 10 to $\frac{1}{2}$ of 20.

*Copy and complete:*

6. $\frac{1}{2}$ of 2, $\frac{1}{2}$ of 4, and $\frac{1}{2}$ of 10 are
7. $\frac{1}{2}$ of 4, $\frac{1}{2}$ of 8, and $\frac{1}{2}$ of 14 are
8. $\frac{1}{2}$ of 6, $\frac{1}{2}$ of 10, and $\frac{1}{2}$ of 18 are
9. $\frac{1}{2}$ of 8, $\frac{1}{2}$ of 12, and $\frac{1}{2}$ of 20 are

### 53. Table of 3's

*Examples 1 to 12, oral — Examples 13 to 29, written*

**1.** State the sum of each of these columns of 3's, thus: 3, 6, and so on.

**2.** Count by 3's from 3 to 30.

**3.** How many are $3 \times 3$? $4 \times 3$?

**4.** Read and learn:

$$\begin{array}{ccccc} & & & & 3 \\ & & & 3 & 3 \\ & & 3 & 3 & 3 \\ & 3 & 3 & 3 & 3 \\ \underline{3} & \underline{3} & \underline{3} & \underline{3} & \underline{3} \end{array}$$

| | |
|---|---|
| $1 \times 3 = 3$ | $6 \times 3 = 18$ |
| $2 \times 3 = 6$ | $7 \times 3 = 21$ |
| $3 \times 3 = 9$ | $8 \times 3 = 24$ |
| $4 \times 3 = 12$ | $9 \times 3 = 27$ |
| $5 \times 3 = 15$ | $10 \times 3 = 30$ |

*State rapidly the results:*

**5.** $2 \times 3$. **7.** $7 \times 3$. **9.** $9 \times 3$. **11.** $6 \times 3$.
**6.** $4 \times 3$. **8.** $5 \times 3$. **10.** $3 \times 3$. **12.** $8 \times 3$.

**13.** Write ten columns of 3's, as in Ex. 1, from one 3 to ten 3's. Add each column.

*Write the results:*

**14.** $4 \times 3$ and 2.
**15.** $5 \times 3$ and 7.
**16.** $8 \times 3$ and 9.
**17.** $7 \times 3$ and 1.
**18.** $6 \times 3$ and 6.
**19.** $2 \times 3$ and 4.
**20.** $3 \times 3$ and 2.
**21.** $2 \times 3$ and 1.
**22.** $4 \times 3$ and 3.
**23.** $5 \times 3$ and 2.
**24.** $7 \times 3$ and 4.
**25.** $6 \times 3$ and 3.
**26.** $9 \times 3$ and 7.
**27.** $8 \times 3$ and 6.
**28.** $5 \times 3$ and 1.
**29.** $9 \times 3$ and 5.

### 54. Table of 3's

*Examples 1 to 4, oral — Examples 5 to 19, written*

1. At 3¢ each, what will 2 oranges cost?
2. At 3¢ each, what will 5 pencils cost?
3. At 3¢ each, what will 8 bananas cost?
4. At 3¢ each, what will 9 penholders cost?

*Copy and complete:*

| | | | | | |
|---|---|---|---|---|---|
| 5. | $2 \times \quad = 6$. | 10. | $\times 3 = 12$. | 15. | $7 \times 3 =$ |
| 6. | $3 \times \quad = 9$. | 11. | $\times 3 = 15$. | 16. | $9 \times 3 =$ |
| 7. | $4 \times \quad = 12$. | 12. | $\times 3 = 30$. | 17. | $4 \times 3 =$ |
| 8. | $5 \times \quad = 15$. | 13. | $\times 3 = 24$. | 18. | $2 \times 3 =$ |
| 9. | $7 \times \quad = 21$. | 14. | $\times 3 = 18$. | 19. | $3 \times 3 =$ |

### 55. Table of 3's

*Examples 1 to 6, oral — Examples 7 to 18, written*

1. At 3¢ each, what will 8 eggs cost?
2. At 3¢ a yard, what will 9 yd. of ribbon cost?

*At 3¢ each, find the cost of:*

3. 9 tablets.
4. 7 newspapers.
5. 8 pencils.
6. 6 papers of pins.

*Copy and complete:*

| | | | | | |
|---|---|---|---|---|---|
| 7. | $8 \times \quad = 24$. | 11. | $\times 3 = 21$. | 15. | $3 \times 3$ and $4 =$ |
| 8. | $7 \times \quad = 21$. | 12. | $\times 3 = 24$. | 16. | $6 \times 3$ and $2 =$ |
| 9. | $9 \times \quad = 27$. | 13. | $\times 3 = 30$. | 17. | $5 \times 3$ and $5 =$ |
| 10. | $6 \times \quad = 18$. | 14. | $\times 3 = 18$. | 18. | $8 \times 3$ and $1 =$ |

### 56. Division Table of 3's

*Examples 1 to 16, oral — Examples 17 to 25, written*

1. How many 3's do you see in 6?
2. How many 3's do you see in 9? /// /// ///
3. How many 3's are there in 12? in 15? in 18?

*State rapidly the results:*

4. $21 \div 3$. 5. $24 \div 3$. 6. $27 \div 3$. 7. $30 \div 3$.

8. Read and learn:

| | |
|---|---|
| $3 \div 3 = 1$ | $18 \div 3 = 6$ |
| $6 \div 3 = 2$ | $21 \div 3 = 7$ |
| $9 \div 3 = 3$ | $24 \div 3 = 8$ |
| $12 \div 3 = 4$ | $27 \div 3 = 9$ |
| $15 \div 3 = 5$ | $30 \div 3 = 10$ |

*State rapidly the results:*

9. $\frac{1}{3}$ of 15. 11. $18 \div 3$. 13. $3\overline{)9}$ 15. $3\overline{)12}$
10. $\frac{1}{3}$ of 30. 12. $12 \div 3$. 14. $3\overline{)6}$ 16. $3\overline{)21}$

*Copy and complete:*

17. $\div 3 = 9$. 19. $\div 3 = 6$. 21. $\div 3 = 8$.
18. $\div 3 = 7$. 20. $\div 3 = 5$. 22. $\div 3 = 4$.

23. At 3¢ each, how many bananas can be bought for 27¢?

24. At 3¢ each, how many pencils can be bought for 21¢?

25. At 3¢ each, how many oranges can be bought for 30¢?

### 57. Dividing by 3

*Examples 1 to 7, oral — Examples 8 to 15, written*

1. At 3¢ each, how many cakes can be bought for 12¢?

*At 3¢ each, tell how many things can be bought for:*

2. 6¢. 3. 15¢. 4. 9¢. 5. 21¢. 6. 27¢. 7. 24¢.

*Copy and complete:*

8. $27 \div \quad = 9$. 10. $\div 3 = 6$. 12. $24 \div 3 =$
9. $15 \div \quad = 5$. 11. $\div 3 = 8$. 13. $21 \div 3 =$

14. How many yards in 3 ft.? in 21 ft.? in 30 ft.?

15. How many yards of braid, at 3¢ a yard, can be bought for 18¢?

### 58. Dividing by 3

*Examples 1 to 3, oral — Examples 4 to 11, written*

1. It is 27 in. around a triangle, and the sides are all equal. How long is each side?

2. If 3 sheep cost $24, what does each one cost?

3. If a freight train goes a mile in 3 minutes, how many miles will it go in 30 minutes?

*Copy and complete:*

4. $\frac{1}{3}$ of 12 and $\frac{1}{3}$ of 15 =
5. $\frac{1}{3}$ of 12 and $\frac{1}{3}$ of 24 =
6. $\frac{1}{3}$ of 27 and $\frac{1}{2}$ of 18 =
7. $\frac{1}{3}$ of 30 and $\frac{1}{2}$ of 20 =
8. $\frac{1}{3}$ of 12 and 2 =
9. $\frac{1}{3}$ of 15 and 1 =
10. $\frac{1}{3}$ of 24 and 2 =
11. $\frac{1}{3}$ of 21 and 1 =

### 59. Table of 4's

*Examples 1 to 12, oral — Examples 13 to 29, written*

1. State the sum of each of these columns of 4's, thus: 4, 8, and so on.
2. Count by 4's from 4 to 40.
3. How many are $3 \times 4$? $5 \times 4$?
4. Read and learn:

$$\begin{array}{r} 4 \\ 4\ \ 4 \\ 4\ \ 4\ \ 4 \\ 4\ \ 4\ \ 4\ \ 4 \\ \underline{4\ \ 4\ \ 4\ \ 4\ \ 4} \end{array}$$

| | |
|---|---|
| $1 \times 4 = 4$ | $6 \times 4 = 24$ |
| $2 \times 4 = 8$ | $7 \times 4 = 28$ |
| $3 \times 4 = 12$ | $8 \times 4 = 32$ |
| $4 \times 4 = 16$ | $9 \times 4 = 36$ |
| $5 \times 4 = 20$ | $10 \times 4 = 40$ |

*State rapidly the results:*

**5.** $3 \times 4$. **7.** $6 \times 4$. **9.** $9 \times 4$. **11.** $8 \times 4$.
**6.** $5 \times 4$. **8.** $4 \times 4$. **10.** $7 \times 4$. **12.** $10 \times 4$.

**13.** Write ten columns of 4's, as in Ex. 1, from one 4 to ten 4's. Add each column.

*Write the results:*

**14.** $3 \times 4$ and 3.
**15.** $2 \times 4$ and 9.
**16.** $7 \times 4$ and 3.
**17.** $5 \times 4$ and 7.
**18.** $6 \times 4$ and 8.
**19.** $3 \times 4$ and 2.
**20.** $4 \times 4$ and 1.
**21.** $9 \times 4$ and 6.
**22.** $1 \times 4$ and 3.
**23.** $2 \times 4$ and 6.
**24.** $3 \times 4$ and 4.
**25.** $4 \times 4$ and 3.
**26.** $5 \times 4$ and 2.
**27.** $6 \times 4$ and 4.
**28.** $7 \times 4$ and 2.
**29.** $8 \times 4$ and 3.

### 60. Table of 4's

*Examples 1 to 6, oral — Examples 7 to 18, written*

1. There are 4 quarters in a dollar. How many quarters are there in \$5?

*State the number of quarters in:*

2. \$2. 3. \$4. 4. \$7. 5. \$9. 6. \$6.

*Copy and complete:*

| | | | | | |
|---|---|---|---|---|---|
| 7. | $5 \times$ $= 20$. | 11. | $\times 4 = 8$. | 15. | $3 \times 4 =$ |
| 8. | $6 \times$ $= 24$. | 12. | $\times 4 = 12$. | 16. | $9 \times 4 =$ |
| 9. | $9 \times$ $= 36$. | 13. | $\times 4 = 20$. | 17. | $6 \times 4 =$ |
| 10. | $7 \times$ $= 28$. | 14. | $\times 4 = 36$. | 18. | $5 \times 4 =$ |

### 61. Table of 4's

*Examples 1 to 8, oral — Examples 9 to 23, written*

1. At 4¢ each, what will 7 oranges cost?
2. At 4¢ each, what will 9 bananas cost?

*State the cost, at 4¢ each, of this number of things:*

3. 7. 4. 6. 5. 8. 6. 9. 7. 4. 8. 3.

*Copy and complete:*

| | | | | | |
|---|---|---|---|---|---|
| 9. | $2 \times$ $= 8$. | 14. | $\times 4 = 4$. | 19. | $5 \times 4$ and $1 =$ |
| 10. | $3 \times$ $= 12$. | 15. | $\times 4 = 16$. | 20. | $9 \times 4$ and $3 =$ |
| 11. | $4 \times$ $= 16$. | 16. | $\times 4 = 24$. | 21. | $6 \times 4$ and $5 =$ |
| 12. | $8 \times$ $= 32$. | 17. | $\times 4 = 32$. | 22. | $8 \times 4$ and $6 =$ |
| 13. | $10 \times$ $= 40$. | 18. | $\times 4 = 40$. | 23. | $3 \times 4$ and $7 =$ |

### 62. Division Table of 4's

*Examples 1 to 14, oral — Examples 15 to 33, written*

1. How many 4's are there in 4? in 8? in 12? in 16? in 20? in 40?

*State rapidly the results:*

2. $20 \div 4$. 3. $24 \div 4$. 4. $28 \div 4$. 5. $32 \div 4$.

6. Read and learn:

| | |
|---|---|
| $4 \div 4 = 1$ | $24 \div 4 = 6$ |
| $8 \div 4 = 2$ | $28 \div 4 = 7$ |
| $12 \div 4 = 3$ | $32 \div 4 = 8$ |
| $16 \div 4 = 4$ | $36 \div 4 = 9$ |
| $20 \div 4 = 5$ | $40 \div 4 = 10$ |

*State rapidly the results:*

7. $\frac{1}{4}$ of 36. 9. $16 \div 4$. 11. $4\overline{)8}$ 13. $4\overline{)20}$
8. $\frac{1}{4}$ of 40. 10. $44 \div 4$. 12. $4\overline{)12}$ 14. $4\overline{)16}$

*Copy and complete:*

15. $24 \div \quad = 6$. 20. $\frac{1}{4}$ of $8 =$ 25. $4\overline{)28}$
16. $20 \div \quad = 5$. 21. $\frac{1}{4}$ of $12 =$ 26. $4\overline{)24}$
17. $16 \div \quad = 4$. 22. $\frac{1}{4}$ of $20 =$ 27. $4\overline{)36}$
18. $32 \div \quad = 8$. 23. $\frac{1}{4}$ of $24 =$ 28. $4\overline{)32}$
19. $36 \div \quad = 9$. 24. $\frac{1}{4}$ of $32 =$ 29. $4\overline{)40}$

30. $\frac{1}{4}$ of 8, and $\frac{1}{4}$ of 40, and $5 =$
31. $\frac{1}{4}$ of 36, and $\frac{1}{4}$ of 28, and $2 =$
32. $\frac{1}{2}$ of 8, and $\frac{1}{4}$ of 32, and $3 =$
33. $\frac{1}{2}$ of 16, and $\frac{1}{3}$ of 24, and $\frac{1}{4}$ of $36 =$

### 63. Table of 5's

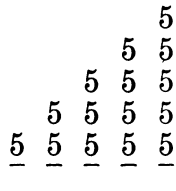
*Examples 1 to 12, oral — Examples 13 to 29, written*

1. State the sum of each of these columns of 5's, thus: 5, 10, and so on.

2. Count by 5's from 5 to 50.

3. How many are $4 \times 5$? $3 \times 5$?

4. Read and learn:



| | |
|---|---|
| $1 \times 5 = 5$ | $6 \times 5 = 30$ |
| $2 \times 5 = 10$ | $7 \times 5 = 35$ |
| $3 \times 5 = 15$ | $8 \times 5 = 40$ |
| $4 \times 5 = 20$ | $9 \times 5 = 45$ |
| $5 \times 5 = 25$ | $10 \times 5 = 50$ |

*State rapidly the results:*

| | | | |
|---|---|---|---|
| **5.** $4 \times 5$. | **7.** $3 \times 5$. | **9.** $6 \times 5$. | **11.** $5 \times 5$. |
| **6.** $7 \times 5$. | **8.** $9 \times 5$. | **10.** $2 \times 5$. | **12.** $10 \times 5$. |

**13.** Write ten columns of 5's, as in Ex. 1, from one 5 to ten 5's. Add each column.

*Write the results:*

| | |
|---|---|
| **14.** $5 + 5$; $2 \times 5$. | **22.** $2 \times 5$ and 7. |
| **15.** $3 \times 5$ and 2. | **23.** $6 \times 5$ and 4. |
| **16.** $4 \times 5$ and 3. | **24.** $4 \times 5$ and 2. |
| **17.** $6 \times 5$ and 7. | **25.** $8 \times 5$ and 3. |
| **18.** $9 \times 5$ and 2. | **26.** $9 \times 5$ and 4. |
| **19.** $7 \times 5$ and 1. | **27.** $5 \times 5$ and 7. |
| **20.** $6 \times 5$ and 3. | **28.** $7 \times 5$ and 4. |
| **21.** $2 \times 5$ and 8. | **29.** $3 \times 5$ and 6. |

### 64. Table of 5's

*Examples 1 to 7, oral — Examples 8 to 19, written*

1. There are 5¢ in a nickel. How many cents in 7 nickels?

*State the number of cents in this number of nickels:*

**2.** 3. **3.** 5. **4.** 9. **5.** 8. **6.** 6. **7.** 4.

*Copy and complete:*

| | | | |
|---|---|---|---|
| **8.** $2 \times \quad = 10$. | **12.** $\times 5 = 5$. | **16.** $3 \times 5 =$ |
| **9.** $3 \times \quad = 15$. | **13.** $\times 5 = 15$. | **17.** $4 \times 5 =$ |
| **10.** $8 \times \quad = 40$. | **14.** $\times 5 = 35$. | **18.** $6 \times 5 =$ |
| **11.** $9 \times \quad = 45$. | **15.** $\times 5 = 30$. | **19.** $7 \times 5 =$ |

### 65. Table of 5's

*Examples 1 to 8, oral — Examples 9 to 23, written*

1. At 5¢ each, what will 3 glasses of soda water cost?
2. At 5¢ each, what will 6 glasses of lemonade cost?

*State the cost, at 5¢ each, of this number of things:*

**3.** 7. **4.** 9. **5.** 2. **6.** 8. **7.** 5. **8.** 10.

*Copy and complete:*

| | | |
|---|---|---|
| **9.** $5 \times \quad = 25$. | **14.** $\times 5 = 10$. | **19.** $5 \times 5$ and $6 =$ |
| **10.** $7 \times \quad = 35$. | **15.** $\times 5 = 45$. | **20.** $8 \times 5$ and $4 =$ |
| **11.** $4 \times \quad = 20$. | **16.** $\times 5 = 50$. | **21.** $6 \times 5$ and $5 =$ |
| **12.** $6 \times \quad = 30$. | **17.** $\times 5 = 25$. | **22.** $7 \times 5$ and $2 =$ |
| **13.** $8 \times \quad = 40$. | **18.** $\times 5 = 20$. | **23.** $10 \times 5$ and $7 =$ |

### 66. Division Table of 5's

*Examples 1 to 14, oral — Examples 15 to 28, written*

1. How many 5's are there in 5? in 10? in 15? in 20? in 30? in 45?

*State rapidly the results:*

2. $40 \div 5$. 3. $30 \div 5$. 4. $15 \div 5$. 5. $45 \div 5$.

6. Read and learn:

| | |
|---|---|
| $5 \div 5 = 1$ | $30 \div 5 = 6$ |
| $10 \div 5 = 2$ | $35 \div 5 = 7$ |
| $15 \div 5 = 3$ | $40 \div 5 = 8$ |
| $20 \div 5 = 4$ | $45 \div 5 = 9$ |
| $25 \div 5 = 5$ | $50 \div 5 = 10$ |

*State rapidly the results:*

7. $15 \div 5$. 9. $10 \div 5$. 11. $5\overline{)20}$ 13. $5\overline{)25}$
8. $30 \div 5$. 10. $50 \div 5$. 12. $5\overline{)35}$ 14. $5\overline{)45}$

*Copy and complete:*

15. $35 \div \quad = 7$. 18. $\quad \div 5 = 4$. 21. $15 \div 5 =$
16. $45 \div \quad = 9$. 19. $\quad \div 5 = 9$. 22. $40 \div 5 =$
17. $20 \div \quad = 4$. 20. $\quad \div 5 = 6$. 23. $35 \div 5 =$

24. $10 \div 5$ and $15 \div 5 =$
25. $16 \div 4$ and $25 \div 5 =$
26. $15 \div 3$, and $20 \div 4$, and $30 \div 5 =$
27. \$45 is how many times \$5?
28. How many 5-yard strips can be made from 45 yd. of cloth?

### 67. Table of 6's

*Examples 1 to 12, oral — Examples 13 to 24, written*

**1.** State the sum of each of these columns of 6's, thus: 6, 12, and so on.

**2.** Count by 6's from 6 to 60.

**3.** How many are $3 \times 6$? $5 \times 6$? $7 \times 6$? $2 \times 6$?

$$\begin{array}{r} 6 \\ 6\ 6 \\ 6\ 6\ 6 \\ 6\ 6\ 6\ 6 \\ \underline{6\ 6\ 6\ 6\ 6} \end{array}$$

**4.** Read and learn:

| | |
|---|---|
| $1 \times 6 = 6$ | $6 \times 6 = 36$ |
| $2 \times 6 = 12$ | $7 \times 6 = 42$ |
| $3 \times 6 = 18$ | $8 \times 6 = 48$ |
| $4 \times 6 = 24$ | $9 \times 6 = 54$ |
| $5 \times 6 = 30$ | $10 \times 6 = 60$ |

*State rapidly the results:*

**5.** $5 \times 6$. **7.** $7 \times 6$. **9.** $3 \times 6$. **11.** $4 \times 6$.

**6.** $9 \times 6$. **8.** $2 \times 6$. **10.** $6 \times 6$. **12.** $8 \times 6$.

**13.** Write ten columns of 6's, as in Ex. 1, from one 6 to ten 6's. Add each column.

*Write the results:*

**14.** $6 + 6$; $2 \times 6$.

**15.** $7 \times 6$ and 2.

**16.** $5 \times 6$ and 7.

**17.** $3 \times 6$ and 9.

**18.** $4 \times 6$ and 7.

**19.** $6 \times 6$ and 2.

**20.** $8 \times 6$ and 3.

**21.** $9 \times 6$ and 1.

**22.** $7 \times 6$ and 4.

**23.** $6 \times 6$ and 5.

**24.** At \$6 for each chair, how much will 4 rocking-chairs and a \$5 table cost?

### 68. Table of 6's

*Examples 1 to 4, oral — Examples 5 to 16, written*

1. At 6¢ a quart, what will 5 qt. of milk cost?
2. At 6¢ a yard, what will 8 yd. of calico cost?
3. At 6¢ apiece, what will 9 oranges cost?
4. At 6¢ a bunch, what will 6 bunches of celery cost?

*Copy and complete:*

| | | | | | |
|---|---|---|---|---|---|
| **5.** | $3 \times \quad = 18.$ | **9.** | $\times 6 = 12.$ | **13.** | $4 \times 6 =$ |
| **6.** | $5 \times \quad = 30.$ | **10.** | $\times 6 = 24.$ | **14.** | $8 \times 6 =$ |
| **7.** | $7 \times \quad = 42.$ | **11.** | $\times 6 = 42.$ | **15.** | $7 \times 6 =$ |
| **8.** | $9 \times \quad = 54.$ | **12.** | $\times 6 = 48.$ | **16.** | $2 \times 6 =$ |

### 69. Table of 6's

*Examples 1 to 4, oral — Examples 5 to 15, written*

1. How much is $7 \times 6$ in.? $7 \times 6$ ft.? $7 \times \$6$?
2. At \$6 each, what will 9 sheep cost?
3. At \$6 each, what will 8 dictionaries cost?
4. At \$6 each, what will 10 desks cost?

*Copy and complete:*

| | | | |
|---|---|---|---|
| **5.** | $2 \times 6$ and $3 =$ | **10.** | $7 \times 6$ and $3 =$ |
| **6.** | $3 \times 6$ and $5 =$ | **11.** | $5 \times 6$ and $6 =$ |
| **7.** | $7 \times 6$ and $6 =$ | **12.** | $4 \times 6$ and $3 =$ |
| **8.** | $8 \times 6$ and $7 =$ | **13.** | $6 \times 6$ and $9 =$ |
| **9.** | $9 \times 6$ and $8 =$ | **14.** | $8 \times 6$ and $5 =$ |

**15.** $2 \times 6$, and $3 \times 6$, and $4 \times 6 =$

### 70. Division Table of 6's

*Examples 1 to 14, oral — Examples 15 to 27, written*

**1.** How many 6's are there in 6? in 12? in 18? in 24? in 30? in 42? in 60?

*State rapidly the results:*

**2.** $24 \div 6$. **3.** $30 \div 6$. **4.** $42 \div 6$. **5.** $36 \div 6$.

**6.** Read and learn:

| | |
|---|---|
| $6 \div 6 = 1$ | $36 \div 6 = 6$ |
| $12 \div 6 = 2$ | $42 \div 6 = 7$ |
| $18 \div 6 = 3$ | $48 \div 6 = 8$ |
| $24 \div 6 = 4$ | $54 \div 6 = 9$ |
| $30 \div 6 = 5$ | $60 \div 6 = 10$ |

*State rapidly the results:*

**7.** $12 \div 6$. **8.** $24 \div 6$. **9.** $30 \div 6$. **10.** $48 \div 6$. **11.** $6\overline{)36}$ **12.** $6\overline{)60}$ **13.** $6\overline{)18}$ **14.** $6\overline{)42}$

*Copy and complete:*

**15.** $36 \div \quad = 6$. **16.** $48 \div \quad = 8$. **17.** $54 \div \quad = 9$. **18.** $\quad \div 6 = 3$. **19.** $\quad \div 6 = 7$. **20.** $\quad \div 6 = 4$. **21.** $30 \div 6 =$ **22.** $12 \div 6 =$ **23.** $60 \div 6 =$

**24.** $24 \div 6$ and $36 \div 6 =$

**25.** $30 \div 6$ and $54 \div 6 =$

**26.** $16 \div 2$, and $24 \div 3$, and $28 \div 4$, and $35 \div 5$, and $42 \div 6 =$

**27.** At 6¢ a pound, how many pounds of sugar can you buy for 48¢?

### 71. Table of 7's

*Examples 1 to 6, oral — Examples 7 to 18, written*

1. State the sum of each of these columns of 7's, thus: 7, 14, and so on.

2. Count by 7's from 7 to 70.

3. How many are $4 \times 7$? $6 \times 7$?

4. Read and learn:

| | |
|---|---|
| $1 \times 7 = 7$ | $6 \times 7 = 42$ |
| $2 \times 7 = 14$ | $7 \times 7 = 49$ |
| $3 \times 7 = 21$ | $8 \times 7 = 56$ |
| $4 \times 7 = 28$ | $9 \times 7 = 63$ |
| $5 \times 7 = 35$ | $10 \times 7 = 70$ |

5. At \$7 each, what will 9 tables cost?

6. At 7¢ a quart, what will 8 qt. of berries cost?

7. Write ten columns of 7's, as in Ex. 1, from one 7 to ten 7's. Add each column.

*Write the results:*

8. $7+7$; $2 \times 7$.
9. $7+7+7$; $3 \times 7$.
10. $4 \times 7$ and 2.
11. $6 \times 7$ and 6.
12. $7 \times 7$ and 7.
13. $9 \times 7$ and 1.
14. $3 \times 7$ and 4.
15. $5 \times 7$ and 2.

16. What is the cost of 6 tables at \$7 each?

17. What is the cost of 7 desks at \$3 each, and a teacher's desk at \$7?

18. What is the cost of 9 yd. of calico at 7¢ a yard, and 2 yd. of trimming at 7¢ a yard?

### 72. Table of 7's

*Examples 1 to 3, oral — Examples 4 to 16, written*

1. At \$7 each, what will 6 coats cost?

2. At \$7 each, what will 7 cloaks cost?

3. There are 7 days in 1 week. How many days are there in 9 weeks?

*Copy and complete:*

| | | | | | |
|---|---|---|---|---|---|
| 4. | $\times 7 = 49$. | 8. | $\times 7 = 42$. | 12. | $9 \times 7 =$ |
| 5. | $\times 7 = 35$. | 9. | $\times 7 = 14$. | 13. | $7 \times 7 =$ |
| 6. | $\times 7 = 21$. | 10. | $\times 7 = 28$. | 14. | $5 \times 7 =$ |
| 7. | $\times 7 = 70$. | 11. | $\times 7 = 56$. | 15. | $8 \times 7 =$ |

16. $6 \times 7$, and $3 \times 7$, and $4 \times 7 =$

### 73. Table of 7's

*Examples 1 to 9, oral — Examples 10 to 19, written*

1. How many days in 7 weeks? in 5 weeks?

*State rapidly the results:*

| | | | |
|---|---|---|---|
| 2. $2 \times 7$. | 4. $4 \times 7$. | 6. $3 \times 7$. | 8. $5 \times 7$. |
| 3. $7 \times 7$. | 5. $8 \times 7$. | 7. $6 \times 7$. | 9. $9 \times 7$. |

*Copy and complete:*

| | |
|---|---|
| 10. 8 weeks = days. | 15. $6 \times 7$ and $2 =$ |
| 11. $3 \times 7$ and $5 =$ | 16. $7 \times 7$ and $6 =$ |
| 12. $4 \times 6$ and $9 =$ | 17. $9 \times 7$ and $8 =$ |
| 13. $3 \times 5$ and $2 =$ | 18. $3 \times 7$ and $6 =$ |
| 14. $2 \times 4$ and $5 =$ | 19. $5 \times 7$ and $7 =$ |

### 74. Division Table of 7's

*Examples 1 to 15, oral — Examples 16 to 30, written*

1. How many 7's are there in $7+7+7$? in 21?
2. How many 7's are there in 28? in 35? in 42?

*State rapidly the results:*

3. $70 \div 7$. 4. $63 \div 7$. 5. $14 \div 7$. 6. $49 \div 7$.

7. Read and learn:

| | |
|---|---|
| $7 \div 7 = 1$ | $42 \div 7 = 6$ |
| $14 \div 7 = 2$ | $49 \div 7 = 7$ |
| $21 \div 7 = 3$ | $56 \div 7 = 8$ |
| $28 \div 7 = 4$ | $63 \div 7 = 9$ |
| $35 \div 7 = 5$ | $70 \div 7 = 10$ |

*State rapidly the results:*

8. $35 \div 7$. 10. $63 \div 7$. 12. $7\overline{)14}$ 14. $7\overline{)56}$
9. $70 \div 7$. 11. $28 \div 7$. 13. $7\overline{)42}$ 15. $7\overline{)49}$

*Copy and complete:*

16. $\quad \div 7 = 2$. 19. $\quad \div 7 = 5$. 22. $28 \div 7 =$
17. $\quad \div 7 = 8$. 20. $\quad \div 7 = 7$. 23. $63 \div 7 =$
18. $\quad \div 7 = 6$. 21. $\quad \div 7 = 3$. 24. $70 \div 7 =$

25. $35 \div 7$ and $42 \div 7 =$
26. $36 \div 6$ and $49 \div 7 =$
27. $25 \div 5$, and $30 \div 6$, and $63 \div 7 =$
28. $48 \div 4$, and $48 \div 6$, and $49 \div 7 =$
29. $24 \div 2$, and $35 \div 5$, and $14 \div 7 =$
30. $35 \div 5$, and $28 \div 4$, and $42 \div 6 =$

### 75. Table of 8's

*Examples 1 to 5, oral — Examples 6 to 18, written*

1. State the sum of each of these columns of 8's, thus: 8, 16, and so on.

2. Count by 8's from 8 to 80.

3. How many 8's do you see in the column that makes 24? in the one that makes 40?

| | | | | |
|---|---|---|---|---|
| | | | | 8 |
| | | | 8 | 8 |
| | | 8 | 8 | 8 |
| | 8 | 8 | 8 | 8 |
| 8 | 8 | 8 | 8 | 8 |

4. Read and learn:

| | |
|---|---|
| $1 \times 8 = 8$ | $6 \times 8 = 48$ |
| $2 \times 8 = 16$ | $7 \times 8 = 56$ |
| $3 \times 8 = 24$ | $8 \times 8 = 64$ |
| $4 \times 8 = 32$ | $9 \times 8 = 72$ |
| $5 \times 8 = 40$ | $10 \times 8 = 80$ |

5. If each side of a triangle is 8 ft., how far is it around the triangle?

6. Write ten columns of 8's, as in Ex. 1, from one 8 to ten 8's. Add each column.

*Write the results:*

7. $6 \times 8$ and 4.
8. $3 \times 8$ and 9.
9. $7 \times 8$ and 4.
10. $3 \times 8$ and 3.
11. $2 \times 8$ and 7.
12. $4 \times 8$ and 3.
13. $5 \times 8$ and 8.
14. $8 \times 8$ and 9.

15. At 8¢ a quart, what will 8 qt. of milk cost?
16. How much is $2 \times 8$¢, and $3 \times 8$¢, and $4 \times 8$¢?
17. At 8¢ each, what will 9 tablets cost?
18. At 8¢ each, what will 7 tops cost?

### 76. Table of 8's

*Examples 1 to 3, oral — Examples 4 to 13, written*

1. There are 8 pt. in a gallon. How many pints in 7 gallons?

2. If each beam is 8 in. thick, how high will be a pile of 5 beams?

3. At 8¢ a quart, what will 9 qt. of berries cost?

*Copy and complete:*

| | | | | | |
|---|---|---|---|---|---|
| 4. | $\times 8 = 32$. | 7. | $\times 8 = 40$. | 10. | $2 \times 8 =$ |
| 5. | $\times 8 = 56$. | 8. | $\times 8 = 48$. | 11. | $8 \times 8 =$ |
| 6. | $\times 8 = 72$. | 9. | $\times 8 = 24$. | 12. | $5 \times 8 =$ |

13. $2 \times 8$, and $7 \times 8$, and $3 \times 8 =$

### 77. Table of 8's

*Examples 1 to 10, oral — Examples 11 to 14, written*

1. If each side of a square is 8 ft., how far is it around the square?

2. If a woman earns \$8 a week, how much will she earn in 7 weeks?

*State rapidly the results:*

| | | | | | |
|---|---|---|---|---|---|
| 3. | $4 \times 8$. | 5. | $3 \times 8$. | 7. | $9 \times 8$. | 9. | $6 \times 8$. |
| 4. | $7 \times 8$. | 6. | $5 \times 8$. | 8. | $8 \times 8$. | 10. | $10 \times 8$. |

*Copy and complete:*

11. $3 \times 8$ and $5 =$
12. $7 \times 8$ and $9 =$
13. $6 \times 8$ and $8 =$
14. $4 \times 8$ and $10 =$

### 78. Division Table of 8's

*Examples 1 to 16, oral — Examples 17 to 25, written*

1. How many 8's do you see in 16?
2. How many 8's do you see in 24?
3. How many 8's do you see in 32?

| | | | | |
|---|---|---|---|---|
| | | | | 8 |
| | | | 8 | 8 |
| | | 8 | 8 | 8 |
| 8 | 8 | 8 | 8 | 8 |
| 8 | 16 | 24 | 32 | |

*State rapidly the results:*

4. $32 \div 8$. 5. $40 \div 8$. 6. $24 \div 8$. 7. $80 \div 8$.

8. Read and learn:

| | |
|---|---|
| $8 \div 8 = 1$ | $48 \div 8 = 6$ |
| $16 \div 8 = 2$ | $56 \div 8 = 7$ |
| $24 \div 8 = 3$ | $64 \div 8 = 8$ |
| $32 \div 8 = 4$ | $72 \div 8 = 9$ |
| $40 \div 8 = 5$ | $80 \div 8 = 10$ |

*State rapidly the results:*

9. $32 \div 8$. 11. $72 \div 8$. 13. $8\overline{)80}$ 15. $8\overline{)16}$
10. $48 \div 8$. 12. $56 \div 8$. 14. $8\overline{)64}$ 16. $8\overline{)24}$

*Copy and complete:*

17. $\quad \div 8 = 4$. 19. $\quad \div 8 = 9$. 21. $40 \div 8 =$
18. $\quad \div 8 = 7$. 20. $\quad \div 8 = 3$. 22. $64 \div 8 =$

23. At \$8 each, how many rocking-chairs can be bought for \$72?

24. At 8¢ a quart, how many quarts of strawberries can be bought for 64¢?

25. At 8¢ a quart, how many quarts of milk can be bought for 56¢?

### 79. Table of 9's

*Examples 1 to 5, oral — Examples 6 to 16, written*

**1.** State the sum of each of these columns of 9's, thus: 9, 18, and so on.

**2.** Count by 9's from 9 to 90.

**3.** How many 9's do you see in the column that makes 36? in the one that makes 45?

$$\begin{array}{r} 9 \\ 9\ 9 \\ 9\ 9\ 9 \\ 9\ 9\ 9\ 9 \\ \underline{9\ 9\ 9\ 9\ 9} \end{array}$$

**4.** Read and learn:

| | |
|---|---|
| $1 \times 9 = 9$ | $6 \times 9 = 54$ |
| $2 \times 9 = 18$ | $7 \times 9 = 63$ |
| $3 \times 9 = 27$ | $8 \times 9 = 72$ |
| $4 \times 9 = 36$ | $9 \times 9 = 81$ |
| $5 \times 9 = 45$ | $10 \times 9 = 90$ |

**5.** If there are 9 boys in one ball team, how many are there in 4 teams?

**6.** Write ten columns of 9's, as in Ex. 1, from one 9 to ten 9's. Add each column.

*Write the results:*

**7.** $9 \times 9$ and 7.

**8.** $6 \times 9$ and 3.

**9.** $4 \times 9$ and 3.

**10.** $3 \times 9$ and 4.

**11.** $2 \times 9$ and 6.

**12.** $3 \times 9$ and 5.

**13.** $8 \times 9$ and 8.

**14.** $9 \times 9$ and 9.

**15.** How much is $2 \times 9¢$ and $5 \times 9¢$?

**16.** A man bought some sugar for $20¢$ and 3 packages of oatmeal at $9¢$ each. How much did he pay for all?

### 80. Table of 9's

*Examples 1 to 4, oral — Examples 5 to 13, written*

1. At 9¢ each, what will 9 pencils cost?

2. At 9¢ a gallon, what will 7 gallons of oil cost?

3. At 9¢ a quart, what will 6 qt. of strawberries cost?

4. At 9 children to a group, how many children in 8 groups?

*Copy and complete:*

| | | |
|---|---|---|
| 5. $3 \times 9 =$ | 8. $\times 9 = 18.$ | 11. $3 \times \quad = 27.$ |
| 6. $5 \times 9 =$ | 9. $\times 9 = 72.$ | 12. $5 \times \quad = 45.$ |
| 7. $4 \times 9 =$ | 10. $\times 9 = 36.$ | 13. $7 \times \quad = 63.$ |

### 81. Table of 9's

*Examples 1 to 10, oral — Examples 11 to 16, written*

1. If there are 9 desks in each row, how many desks are there in 6 rows?

2. If there are 9 roses in each vase, how many roses are there in 7 vases?

*State rapidly the results:*

| | | | |
|---|---|---|---|
| 3. $4 \times 9.$ | 5. $6 \times 9.$ | 7. $7 \times 9.$ | 9. $3 \times 9.$ |
| 4. $8 \times 9.$ | 6. $2 \times 9.$ | 8. $5 \times 9.$ | 10. $9 \times 9.$ |

*Copy and complete:*

| | | |
|---|---|---|
| 11. $9 \times 6 =$ | 13. $4 \times 8$ and $6 =$ | 15. $9 \times 8$ and $8 =$ |
| 12. $9 \times 8 =$ | 14. $7 \times 8$ and $3 =$ | 16. $5 \times 8$ and $2 =$ |

### 82. Division Table of 9's

*Examples 1 to 12, oral — Examples 13 to 22, written*

1. How many 9's are there in 18? in 27? in 36?

2. At \$9 each, how many coats can be bought for \$45?

3. At \$9 each, how many dresses can be bought for \$27?

*State rapidly the results:*

4. $18 \div 9$. 5. $27 \div 9$. 6. $36 \div 9$. 7. $42 \div 9$.

8. Read and learn:

| | |
|---|---|
| $9 \div 9 = 1$ | $54 \div 9 = 6$ |
| $18 \div 9 = 2$ | $63 \div 9 = 7$ |
| $27 \div 9 = 3$ | $72 \div 9 = 8$ |
| $36 \div 9 = 4$ | $81 \div 9 = 9$ |
| $45 \div 9 = 5$ | $90 \div 9 = 10$ |

*State rapidly the results:*

9. $72 \div 9$. 10. $81 \div 9$. 11. $9\overline{)54}$ 12. $9\overline{)90}$

*Copy and complete:*

13. $\quad \div 9 = 6$. 14. $\quad \div 9 = 5$. 15. $\quad \div 9 = 8$.

16. $27 \div 9$ and $36 \div 9 =$ 19. $18 \div 9$ and $63 \div 9 =$
17. $36 \div 9$ and $54 \div 9 =$ 20. $54 \div 9$ and $72 \div 9 =$
18. $45 \div 9$ and $27 \div 9 =$ 21. $63 \div 9$ and $81 \div 9 =$

22. In a certain school there are 54 boys, and the boys are all divided into baseball nines. How many nines are there?

### 83. Table of 10's

*Examples 1 to 3, oral — Examples 4 to 6, written*

1. Count by 10's from 10 to 100.

2. How many are three 10's? seven 10's?

3. Recite, "One 10 is 10, two 10's are 20," and so on to "ten 10's are 100."

4. Copy and complete this table:

| | | |
|---|---|---|
| $2 \times 10 =$ | $5 \times 10 =$ | $8 \times 10 =$ |
| $3 \times 10 =$ | $6 \times 10 =$ | $9 \times 10 =$ |
| $4 \times 10 =$ | $7 \times 10 =$ | $10 \times 10 =$ |

5. How much is $8 \times 10¢$ and $2¢$?

6. A girl bought 3 cans of soup at $10¢$ each, and a pound of figs for $20¢$. How much did she pay?

### 84. Table of 10's

*Examples 1 to 12, oral — Example 13, written*

1. At $10¢$ each, what will 9 pens cost?

*Recite the multiplication tables of:*

| | | | | |
|---|---|---|---|---|
| **2.** 1's. | **4.** 3's. | **6.** 5's. | **8.** 7's. | **10.** 9's. |
| **3.** 2's. | **5.** 4's. | **7.** 6's. | **9.** 8's. | **11.** 10's. |

12. There are $10¢$ in a dime. How many cents in 9 dimes? in 10 dimes?

13. Copy and complete this table:

| | | |
|---|---|---|
| $100 \div 10 =$ | $70 \div 10 =$ | $40 \div 10 =$ |
| $90 \div 10 =$ | $60 \div 10 =$ | $30 \div 10 =$ |
| $80 \div 10 =$ | $50 \div 10 =$ | $20 \div 10 =$ |

### 85. Review of the Multiplication Table

*Review these tables:*

| | | |
|---|---|---|
| $1 \times 2 = 2$ | $1 \times 3 = 3$ | $1 \times 4 = 4$ |
| $2 \times 2 = 4$ | $2 \times 3 = 6$ | $2 \times 4 = 8$ |
| $3 \times 2 = 6$ | $3 \times 3 = 9$ | $3 \times 4 = 12$ |
| $4 \times 2 = 8$ | $4 \times 3 = 12$ | $4 \times 4 = 16$ |
| $5 \times 2 = 10$ | $5 \times 3 = 15$ | $5 \times 4 = 20$ |
| $6 \times 2 = 12$ | $6 \times 3 = 18$ | $6 \times 4 = 24$ |
| $7 \times 2 = 14$ | $7 \times 3 = 21$ | $7 \times 4 = 28$ |
| $8 \times 2 = 16$ | $8 \times 3 = 24$ | $8 \times 4 = 32$ |
| $9 \times 2 = 18$ | $9 \times 3 = 27$ | $9 \times 4 = 36$ |
| $10 \times 2 = 20$ | $10 \times 3 = 30$ | $10 \times 4 = 40$ |

These tables should be reviewed frequently, pupils reciting aloud, individually and as a class, and writing the tables from time to time.

### 86. Review of the Multiplication Table

*Review these tables:*

| | | |
|---|---|---|
| $1 \times 5 = 5$ | $1 \times 6 = 6$ | $1 \times 7 = 7$ |
| $2 \times 5 = 10$ | $2 \times 6 = 12$ | $2 \times 7 = 14$ |
| $3 \times 5 = 15$ | $3 \times 6 = 18$ | $3 \times 7 = 21$ |
| $4 \times 5 = 20$ | $4 \times 6 = 24$ | $4 \times 7 = 28$ |
| $5 \times 5 = 25$ | $5 \times 6 = 30$ | $5 \times 7 = 35$ |
| $6 \times 5 = 30$ | $6 \times 6 = 36$ | $6 \times 7 = 42$ |
| $7 \times 5 = 35$ | $7 \times 6 = 42$ | $7 \times 7 = 49$ |
| $8 \times 5 = 40$ | $8 \times 6 = 48$ | $8 \times 7 = 56$ |
| $9 \times 5 = 45$ | $9 \times 6 = 54$ | $9 \times 7 = 63$ |
| $10 \times 5 = 50$ | $10 \times 6 = 60$ | $10 \times 7 = 70$ |

A perfect knowledge of the addition and multiplication tables is more important than any other part of arithmetic.

### 87. Review of the Multiplication Table

*Review these tables:*

| | | |
|---|---|---|
| $1 \times 8 = 8$ | $1 \times 9 = 9$ | $1 \times 10 = 10$ |
| $2 \times 8 = 16$ | $2 \times 9 = 18$ | $2 \times 10 = 20$ |
| $3 \times 8 = 24$ | $3 \times 9 = 27$ | $3 \times 10 = 30$ |
| $4 \times 8 = 32$ | $4 \times 9 = 36$ | $4 \times 10 = 40$ |
| $5 \times 8 = 40$ | $5 \times 9 = 45$ | $5 \times 10 = 50$ |
| $6 \times 8 = 48$ | $6 \times 9 = 54$ | $6 \times 10 = 60$ |
| $7 \times 8 = 56$ | $7 \times 9 = 63$ | $7 \times 10 = 70$ |
| $8 \times 8 = 64$ | $8 \times 9 = 72$ | $8 \times 10 = 80$ |
| $9 \times 8 = 72$ | $9 \times 9 = 81$ | $9 \times 10 = 90$ |
| $10 \times 8 = 80$ | $10 \times 9 = 90$ | $10 \times 10 = 100$ |

Oral reviews should be given frequently, covering all tables.

### 88. Review of the Division Table

*Examples 1 to 9, oral — Examples 10 to 17, written*

**1.** 72 ft. is how many times 9 ft.?

*State rapidly these results:*

**2.** $72 \div 9$. **4.** $49 \div 7$. **6.** $32 \div 8$. **8.** $45 \div 5$.
**3.** $48 \div 6$. **5.** $54 \div 9$. **7.** $90 \div 9$. **9.** $24 \div 3$.

*Write the division tables of:*

**10.** 3's. **12.** 5's. **14.** 7's. **16.** 9's.
**11.** 4's. **13.** 6's. **15.** 8's. **17.** 10's.

With such review as is necessary in Chapter I, and with such omissions of Chapter II as may be allowed when the classes know part of the multiplication table before studying a book, this may be taken as approximately the end of the first half of Grade III.

## V. MULTIPLICATION

We multiply a number of two figures by multiplying first the units and then the tens.

To multiply 21 by 3 we see that $3 \times 1 = 3$; and the 1 being units, we write the product under units. We then see that $3 \times 2 = 6$; and the 2 being tens, we write the product under tens. Hence the product is 63.

| | |
|---|---|
| 21 | multiplicand |
| 3 | multiplier |
| 63 | product |

In the same way we may multiply 40 by 2, and 53 by 3. Here $2 \times 0 = 0$, and $2 \times 4 = 8$. Also $3 \times 3 = 9$, and $3 \times 5 = 15$.

| 40 | 53 |
|---|---|
| 2 | 3 |
| 80 | 159 |

### 89. Multiplication

*Examples 1 to 8, oral — Examples 9 to 16, written*

1. What will 10 lb. of sugar cost at 5¢ a pound?

*State rapidly these products:*

| 2. | 3. | 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|---|---|
| 10 | 11 | 20 | 30 | 10 | 11 | 12 |
| 2 | 2 | 3 | 2 | 5 | 4 | 3 |

*Copy and multiply:*

| 9. | 10. | 11. | 12. | 13. | 14. | 15. |
|---|---|---|---|---|---|---|
| 23 | 21 | 42 | 50 | 32 | 41 | 31 |
| 2 | 4 | 2 | 2 | 4 | 5 | 6 |

16. How many are 2 times 72 children?

### 90. Multiplication

*Examples 1 to 7, oral — Examples 8 to 10, written*

1. If each of these boys has 10 marbles, how many have they in all?

2. If each of them should buy 10 more marbles, how many more would they all have?

3. If each of the three boys has 30¢, how much do they all have?

*State the answers rapidly:*

4. $2 \times 9$ and 3.
5. $3 \times 8$ and 4.
6. $5 \times 7$ and 6.
7. $9 \times 3$ and 5.

8. If each of the three boys has 23 marbles, how many have they in all?

9. If each has 33¢, how much have they in all?

10. If each weighs 42 lb., what do they all weigh?

This is one way to multiply 36 by 5. Here we see that $5 \times 6$ units are 30 units, and we write 30 so that 0 is under units. Then $5 \times 3$ tens are 15 tens, and we write 15 so that 5 is under tens. The total product is 180.

| | |
|---|---|
| 36 | |
| 5 | |
| 30 | $5 \times 6$ units |
| 15 | $5 \times 3$ tens |
| 180 | product |

The above shows the reasons, but a shorter way is always used. Here we see that $5 \times 6$ units are 30 units, and we write only the 0 under units, reserving the 3 tens to be added to the tens. Then $5 \times 3$ tens are 15 tens, which, with the 3 tens added, make 18 tens. We write 18 tens so that the 8 is in tens' place.

| |
|---|
| 36 |
| 5 |
| 180 |

### 91. Multiplication

*Examples 1 to 8, oral — Examples 9 to 15, written*

1. How much is $9 \times 70$ ft.?

*State rapidly these products:*

| 2. | 3. | 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|---|---|
| 20 | 30 | 60 | 90 | 80 | 50 | 40 |
| 5 | 4 | 3 | 2 | 2 | 5 | 6 |

*Copy and multiply:*

| 9. | 10. | 11. | 12. | 13. | 14. | 15. |
|---|---|---|---|---|---|---|
| 35 | 64 | 72 | 83 | 47 | 53 | 94 |
| 4 | 3 | 4 | 5 | 4 | 3 | 3 |

We multiply larger numbers in the same way as shown on page 115. Thus, to multiply 165 by 3 we have:

$$\begin{array}{r} 195 \\ \times\ 3 \\ \hline 585 \end{array}$$

$3 \times 5 = 15$. Write the 5 under units and add the 1 to the product of tens.

$3 \times 9 = 27$. These are tens. Adding the 1 ten, we have 28 tens. Write the 8 under tens and add the 2 to the product of hundreds.

$3 \times 1 = 3$. These are hundreds. Adding the 2 hundreds, we have 5 hundreds.

Hence the product is 585.

### 92. Multiplication

*Examples 1 to 7, oral — Examples 8 to 15, written*

1. At \$200 each, how much will 5 carriages cost?

*Multiply rapidly:*

| 2. | 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|---|
| 100 | 200 | 300 | 400 | 111 | 222 |
| 3 | 4 | 2 | 2 | 2 | 3 |

*Copy and multiply:*

| 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|
| 175 | 258 | 186 | 295 | 147 | 109 |
| 3 | 2 | 4 | 3 | 6 | 9 |

14. At \$135 each, how much will 6 horses cost?
15. At 225 lb. each, how much will 3 stoves weigh?

### 93. Multiplication

*Examples 1 to 10, oral — Examples 11 to 16, written*

1. How does $9 \times 8$ compare with $8 \times 9$?

*State rapidly the results:*

2. $5 \times 7$ in.
3. $4 \times 10$ ft.
4. $6 \times 11$ yd.
5. $8 \times 9$ lb.
6. $7 \times 8$ qt.
7. $3 \times 5$ pt.
8. $8 \times \$6$.
9. $9 \times 8$ oz.
10. $7 \times 6$ in.

*Copy and multiply:*

| 11. | 12. | 13. | 14. | 15. | 16. |
|---|---|---|---|---|---|
| 236 | 342 | 678 | 509 | 764 | 869 |
| 2 | 3 | 4 | 5 | 6 | 7 |

### 94. Multiplication

*Examples 1 to 4, oral — Examples 5 to 11, written*

1. At \$70 each, what will 6 wagons cost?

*Find the cost of:*

2. 7 oranges at 4¢ each.
3. 4 lb. of figs at 20¢ a pound.
4. 2 lb. of candy at 40¢ a pound.

*Copy and multiply:*

| 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|
| 297 | 308 | 776 | 847 | 1200 | 1089 |
| 4 | 5 | 6 | 7 | 8 | 9 |

11. Add $2 \times \$750$ and $3 \times \$225$.

We see that $5 \times 7 = 7 \times 5$, that $9 \times 6 = 6 \times 9$, and that $8 \times 3 = 3 \times 8$. In the same way we may exchange the numbers of the multiplicand and multiplier without changing the product.

Thus $5 \times 9 = 9 \times 5$, and $5 \times \$9 = 9 \times \$5$.

If 1 dictionary costs \$6, what will 48 dictionaries cost? Instead of multiplying \$6 by 48 it is easier to multiply \$48 by 6, the result being the same.

### 95. Multiplication

*Examples 1 to 5, oral — Examples 6 to 10, written*

1. If 1 table costs \$6, what will 8 tables cost?
2. If 1 ton of coal costs \$6, what will 9 tons cost?
3. If 1 dozen bottles of maple sirup cost \$6, what will 8 dozen bottles cost?
4. If 1 box of oatmeal crackers costs \$4, what will 11 boxes cost?
5. If 1 dozen boxes of comb honey cost \$3, what will 6 dozen boxes cost?
6. If 1 desk costs \$4, what will 36 desks cost?
7. If 1 dozen cans of soup cost \$2, what will 48 dozen cans cost?
8. If 1 dozen jars of meat extract cost \$8, what will 36 dozen jars cost?
9. If 1 dozen cans of lobster cost \$3, what will 24 dozen cans cost?
10. If 1 dozen cans of French peas cost \$4, what will 72 dozen cans cost?

To multiply 235 by 11, we first multiply 235 by 1 (unit) and then by 1 (ten), and add the products.

Multiplying first by 1, we have 235, which we write so that 5 comes under units.

We then multiply by 1 (ten), and we have 235 (tens), which we write so that 5 comes under tens.

The product is then 2585.

The usual work is shown at the left, the explanation at the right.

| | |
|---|---|
| 235 | 235 |
| 11 | $11 = 10 + 1$ |
| 235 | $235 = 1 \times 235$ |
| 235 | $2350 = 10 \times 235$ |
| 2585 | $2585 = 11 \times 235$ |

### 96. Multiplying by 11

*Examples 1 to 7, oral — Examples 8 to 17, written*

**1.** If you have 11¢ and I have 3 times as much, how much have I?

**2.** If one notebook costs 5¢, what will 11 notebooks cost?

*Multiply:*

**3.** $3 \times 11$. **4.** $5 \times 11$. **5.** $7 \times 11$. **6.** $9 \times 11$. **7.** $1 \times 11$.

*Copy and multiply by 11:*

**8.** 222. **10.** 606. **12.** 700. **14.** 511. **16.** 229.
**9.** 345. **11.** 501. **13.** 721. **15.** 199. **17.** 356.

To multiply 326 by 12, we first multiply 326 by 2 and then by 1 (ten), and add the products.

Multiplying 326 by 2, we have 652, which we write so that 2 comes under units.

Multiplying by 1 (ten), we have 326 (tens), which we write so that 6 comes under tens.

The product is then 3912.

The usual work is shown at the left, the explanation at the right.

| | |
|---|---|
| 326 | 326 |
| 12 | $12 = 10 + 2$ |
| 652 | $652 = 2 \times 326$ |
| 326 | $3260 = 10 \times 326$ |
| 3912 | $3912 = 12 \times 326$ |

### 97. Multiplying by 12

*Examples 1 to 3, oral — Examples 4 to 10, written*

1. At 2¢ each, what will a dozen bananas cost?
2. At 3¢ each, what will a dozen pencils cost?
3. At 4¢ each, what will a dozen oranges cost?
4. At $125 each, what will 12 horses cost?
5. At $72 each, what will 12 cows cost?
6. At $145 each, what will 12 carriages cost?
7. At $425 each, what will 12 building lots cost?
8. At $725 each, what will 12 automobiles cost?
9. At $135 each, what will 12 horses cost?
10. At $175 a month, what will a man earn in 12 months?

## VI. DIVISION

We have learned that $10 \div 2$ means that we are to find how many 2's there are in 10. We write $10 \div 2 = 5$, and we read this, "Ten divided by 2 equals 5."

The number divided is called the *dividend*. In this example 10 is the dividend.

The number by which we divide is called the *divisor*. In this example 2 is the divisor.

The result in division is called the *quotient*.

We usually write the work in division as $2\overline{)10}$ in this example. 5

We have learned that $\frac{1}{2}$ of 10 equals $10 \div 2$.

Some teachers prefer to write the quotient above, as in long division. This may be done if desired, but it is not the business custom.

### 98. Division

*Examples 1 to 7, oral — Examples 8 to 10, written*

**1.** What is the quotient of $15 \div 5$? of $30 \div 3$?

| **2.** | **3.** | **4.** | **5.** | **6.** | **7.** |
|---|---|---|---|---|---|
| $\frac{1}{2}$ of 20. | $\frac{1}{3}$ of 33. | $\frac{1}{4}$ of 36. | $3\overline{)24}$ | $8\overline{)64}$ | $6\overline{)42}$ |

**8.** At \$3 each, how many school desks can be bought for \$24?

**9.** At \$7 each, how many rocking-chairs can be bought for \$49?

**10.** At \$8 each, how many teachers' desks can be bought for \$48?

To divide 693 by 3, we divide first the hundreds, then the tens, and then the units.

Dividing, we have 231.

$$3\overline{)693}\quad 231$$

To tell if the work is correct we may *check* it by multiplying the quotient by the divisor. Here we have $3 \times 231 = 693$, so the work is right.

In the same way we may divide 360 by 3, the quotient being 120.

$$3\overline{)360}\quad 120$$

### 99. Division

*Examples 1 to 10, oral — Examples 11 to 22, written*

1. How many times is \$8 contained in \$64?

2. At \$3 each, how many school desks can be bought for \$24?

3. At \$4 a yard, how many yards of velvet can be bought for \$28?

4. At 3 miles an hour, how many hours will it take to walk 21 miles?

*State the results rapidly:*

| 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|
| $\frac{1}{4}$ of 32. | $\frac{1}{2}$ of 24. | $6\overline{)48}$ | $8\overline{)56}$ | $5\overline{)45}$ | $7\overline{)49}$ |

*Copy and divide:*

| 11. | 12. | 13. | 14. | 15. | 16. |
|---|---|---|---|---|---|
| $2\overline{)444}$ | $2\overline{)200}$ | $3\overline{)363}$ | $2\overline{)204}$ | $4\overline{)488}$ | $4\overline{)408}$ |
| **17.** | **18.** | **19.** | **20.** | **21.** | **22.** |
| $5\overline{)550}$ | $6\overline{)606}$ | $4\overline{)840}$ | $9\overline{)900}$ | $3\overline{)960}$ | $8\overline{)880}$ |

To divide 43 by 5, we see that 5 is not contained in the 4 of tens' place. We then pass to the units, and we see that 5 is contained in 43, because $5 \times 8 = 40$. Therefore the quotient is 8, and there is a *remainder* of 3.

$5\overline{)43}$

8, with 3 remainder

The dividend always equals the product of the divisor and quotient, with the remainder added.

### 100. Division with a Remainder

*Examples 1 to 10, oral — Examples 11 to 17, written*

1. How many quarts in 2 pt.? in 4 pt.? in 10 pt.?

2. How many quarts, and how many pints over, in 3 pt.? in 5 pt.?

3. How many yards in 3 ft.? in 6 ft.? in 12 ft.?

4. How many yards, and how many feet over, in 4 ft.? in 5 ft.? in 10 ft.?

*State the quotients and remainders:*

| 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|
| $3\overline{)10}$ | $7\overline{)15}$ | $4\overline{)18}$ | $5\overline{)28}$ | $6\overline{)43}$ | $9\overline{)20}$ |

*Copy and divide:*

| 11. | 12. | 13. | 14. | 15. | 16. |
|---|---|---|---|---|---|
| $5\overline{)56}$ | $4\overline{)47}$ | $4\overline{)83}$ | $6\overline{)61}$ | $8\overline{)883}$ | $7\overline{)778}$ |

17. How many times can we take 5 marbles out of a bag of 37 marbles, and how many will remain?

To divide 438 by 5, we see that 5 is not contained in the 4 of hundreds' place. We then pass to the tens, and we see that 5 is contained in 43, the quotient being 8 and the remainder 3. This remainder being tens, we add 3 tens to the 8 units and divide 38 by 5. The quotient is 7 and the remainder is 3. Hence the whole quotient is 87 and the remainder is 3.

$5\overline{)438}$

87, with 3 remainder

This may be explained like this:

$$5\overline{)40 \text{ tens} + 35 \text{ units} + 3}$$

$$8 \text{ tens} + 7 \text{ units}, \quad 3 \text{ remainder}$$

### 101. Division with a Remainder

*Examples 1 to 7, oral — Examples 8 to 25, written*

1. How many times is \$7 contained in \$14?

| 2. | 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|---|
| $5\overline{)555}$ | $4\overline{)444}$ | $8\overline{)800}$ | $7\overline{)140}$ | $6\overline{)126}$ | $9\overline{)270}$ |

*Copy and divide:*

| 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|
| $3\overline{)303}$ | $5\overline{)550}$ | $6\overline{)120}$ | $8\overline{)160}$ | $9\overline{)189}$ | $7\overline{)147}$ |
| **14.** | **15.** | **16.** | **17.** | **18.** | **19.** |
| $4\overline{)200}$ | $7\overline{)284}$ | $5\overline{)350}$ | $6\overline{)372}$ | $9\overline{)828}$ | $8\overline{)257}$ |
| **20.** | **21.** | **22.** | **23.** | **24.** | **25.** |
| $3\overline{)287}$ | $7\overline{)527}$ | $5\overline{)427}$ | $6\overline{)573}$ | $4\overline{)233}$ | $9\overline{)893}$ |

### 102. Division with a Remainder

*Examples 1 to 7, oral — Examples 8 to 17, written*

1. What is the quotient and the remainder of $25¢ \div 6¢$?

| 2. | 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|---|
| 4)23 | 8)33 | 7)45 | 5)52 | 9)85 | 7)71 |

*Copy and divide:*

| 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|
| 2)127 | 2)225 | 3)333 | 3)242 | 5)127 |

| 13. | 14. | 15. | 16. | 17. |
|---|---|---|---|---|
| 5)238 | 7)221 | 7)342 | 8)433 | 9)275 |

### 103. Division with a Remainder

*Examples 1 and 2, oral — Examples 3 to 17, written*

1. Divide $18¢$ equally among 9 boys.
2. Divide \$16 equally among 8 men.

*Copy and divide:*

| 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|
| 2)331 | 2)327 | 2)555 | 3)421 | 3)565 |

| 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|
| 4)126 | 5)742 | 5)329 | 6)226 | 7)428 |

| 13. | 14. | 15. | 16. | 17. |
|---|---|---|---|---|
| 7)504 | 7)735 | 9)333 | 4)561 | 2)1234 |

### 104. Division

*Examples 1 to 5, oral — Examples 6 to 25, written*

1. At 6¢ a quart, how many quarts of berries can be bought for 66¢?

2. $2\overline{)84}$ 3. $3\overline{)69}$ 4. $4\overline{)124}$ 5. $5\overline{)100}$

*Copy and divide:*

| | | | |
|---|---|---|---|
| 6. $263 \div 2$. | 11. $148 \div 4$. | 16. $126 \div 6$. | 21. $236 \div 8$. |
| 7. $421 \div 2$. | 12. $232 \div 4$. | 17. $336 \div 6$. | 22. $334 \div 8$. |
| 8. $535 \div 2$. | 13. $341 \div 4$. | 18. $444 \div 6$. | 23. $426 \div 8$. |
| 9. $672 \div 2$. | 14. $428 \div 4$. | 19. $565 \div 6$. | 24. $535 \div 8$. |
| 10. $758 \div 2$. | 15. $535 \div 4$. | 20. $624 \div 6$. | 25. $632 \div 8$. |

### 105. Division

*Examples 1 to 3, oral — Examples 4 to 19, written*

1. At \$2 a yard, how many yards of velvet can be bought for \$60? for \$66?

2. At 2¢ apiece, how many pencils can be bought for 20¢? for 30¢?

3. At \$3 apiece, how many chairs can be bought for \$36? for \$39?

*Copy and divide:*

| | | | |
|---|---|---|---|
| 4. $123 \div 3$. | 8. $829 \div 4$. | 12. $357 \div 7$. | 16. $720 \div 9$. |
| 5. $342 \div 3$. | 9. $635 \div 5$. | 13. $826 \div 8$. | 17. $702 \div 9$. |
| 6. $421 \div 3$. | 10. $882 \div 6$. | 14. $933 \div 8$. | 18. $630 \div 9$. |
| 7. $758 \div 4$. | 11. $926 \div 6$. | 15. $244 \div 9$. | 19. $603 \div 9$. |

### 106. Review

*Examples 1 to 7, oral — Examples 8 to 13, written*

1. Add rapidly: $27+6$; $43+9$; $86+5$; $127+10$.

2. $35-7$.
3. $42-6$.
4. $31-8$.
5. $143-20$.
6. $235-35$.
7. $450-40$.

*Copy and add:*

| 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|
| 126 | $375 | 264 ft. | 127 | 440 | 231 |
| 130 | 424 | 142 | 348 | 720 | 169 |
| 107 | 819 | 383 | 273 | 800 | 342 |
| 56 | 902 | 296 | 780 | 365 | 958 |

### 107. Review

*Examples 1 to 4, oral — Examples 5 to 16, written*

1. Multiply rapidly: $2\times20$; $3\times30$; $4\times21$; $2\times31$.

*Subtract:*

| 2. | 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|---|
| 482 | 639 | 507 | 641 | 802 | 790 |
| 100 | 400 | 207 | 358 | 596 | 299 |

*Copy and multiply:*

| 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|
| 129 | 109 | 326 | 249 | 165 | 109 |
| 6 | 9 | 3 | 2 | 5 | 6 |

14. $8\times222$.
15. $7\times333$.
16. $9\times999$.

### 108. Review

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. If we play store, and I buy goods worth 7¢, 17¢, and 10¢, what is the amount of my purchases?

2. If you buy goods worth 6¢, 16¢, and 10¢, what is the amount of your purchases?

3. If I buy 14¢ worth of goods and pay 25¢, what change is due me?

*Copy and add these amounts of our purchases:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| 22¢ | 15¢ | 15¢ | 27¢ | 30¢ | 32¢ |
| 15 | 18 | 4 | 12 | 15 | 18 |
| 15 | 12 | 16 | 8 | 5 | 15 |
| 9 | 13 | 23 | 11 | 16 | 8 |
| 26 | 2 | 7 | 29 | 24 | 17 |

### 109. Review of Division

*Examples 1 to 7, oral — Examples 8 to 23, written*

1. Divide 30 marbles into 3 equal groups.

*Read aloud, giving the missing numbers:*

2. $40 \div \quad = 20.$
3. $50 \div \quad = 10.$
4. $77 \div \quad = 11.$
5. $81 \div 9 =$
6. $72 \div 8 =$
7. $63 \div 7 =$

*Copy and divide:*

| | | | |
|---|---|---|---|
| 8. $2\overline{)2000}$ | 12. $7\overline{)3990}$ | 16. $4\overline{)1116}$ | 20. $9\overline{)1116}$ |
| 9. $3\overline{)2100}$ | 13. $8\overline{)7520}$ | 17. $5\overline{)1115}$ | 21. $2\overline{)7716}$ |
| 10. $4\overline{)2440}$ | 14. $9\overline{)8910}$ | 18. $6\overline{)1116}$ | 22. $3\overline{)8883}$ |
| 11. $5\overline{)2555}$ | 15. $2\overline{)1112}$ | 19. $7\overline{)1134}$ | 23. $4\overline{)3248}$ |

### 110. Review of Division

*Examples 1 to 4, oral — Examples 5 to 20, written*

1. \$72 is how many times \$9?
2. \$64 is how many times \$8?
3. \$45 is how many times \$5?
4. How many handfuls of 9 marbles each could you take from a bag of 54 marbles?

*Copy and divide:*

| | | | |
|---|---|---|---|
| 5. $2\overline{)5072}$ | 9. $7\overline{)5005}$ | 13. $4\overline{)5424}$ | 17. $2\overline{)7890}$ |
| 6. $3\overline{)6072}$ | 10. $8\overline{)4968}$ | 14. $6\overline{)5424}$ | 18. $3\overline{)5463}$ |
| 7. $4\overline{)6072}$ | 11. $9\overline{)4968}$ | 15. $7\overline{)5467}$ | 19. $4\overline{)9872}$ |
| 8. $5\overline{)8115}$ | 12. $2\overline{)3018}$ | 16. $8\overline{)7776}$ | 20. $5\overline{)8965}$ |

### 111. Review of Division

*Examples 1 to 7, oral — Examples 8 to 19, written*

1. How many times can a 4-quart measure be filled from 36 qt. of milk?

*Read aloud, giving the missing numbers:*

2. $24 \div 2 =$
3. $27 \div 3 =$
4. $24 \div 4 =$
5. $35 \div \quad = 7.$
6. $72 \div \quad = 8.$
7. $81 \div \quad = 9.$

*Copy and divide:*

8. $2\overline{)126}$
9. $3\overline{)255}$
10. $4\overline{)372}$
11. $6\overline{)546}$
12. $7\overline{)511}$
13. $8\overline{)768}$
14. $2\overline{)1234}$
15. $3\overline{)1233}$
16. $4\overline{)3248}$
17. $6\overline{)7224}$
18. $7\overline{)8134}$
19. $8\overline{)9768}$

### 112. Review of Division

*Examples 1 to 5, oral — Examples 6 to 8, written*

1. How many chairs at \$3 each cost \$27?
2. How many books at \$2 each cost \$20?
3. How many hats at \$4 each cost \$36?
4. How many coats at \$9 each cost \$72?
5. How many yards of braid at 8¢ each can be bought for 88¢?
6. How many coats at \$9 each cost \$1170?
7. How many tables at \$7 each cost \$1008?
8. How many posts 8 yd. apart are there in a fence 336 yd. long, counting one at each end?

## VII. PRACTICAL PROBLEMS

### 113. The School

*Examples 1 to 5, oral — Examples 6 to 12, written*

1. How many school days in 1 week?
2. How many school days in 5 weeks?
3. How many school days in 10 weeks?
4. How many hours are you in school in the forenoon? in the afternoon? all day?
5. How many hours are you in school each day? in 5 days?
6. How many hours are you in school each day? how many minutes?
7. How many minutes are you in school each week?
8. If you solve 20 examples each school day, how many do you solve in a week?
9. If you pay 35¢ for an arithmetic, 30¢ for a reader, and 10¢ for a notebook, how much do you pay for all three?
10. If the school pays \$7 for some books, \$2 for some crayon, and \$27 for some chairs, how much does it pay for all?
11. If the school pays \$9 for maps, \$36 for desks, \$18 for tables, \$6 for window shades, and \$86 for coal, how much does it pay for all?
12. A school has a playground 126 ft. long and 68 ft. wide. Draw a plan of the playground. How many feet around the playground?

### 114. Marketing

*Examples 1 to 5, oral — Examples 6 to 13, written*

1. If Mary finds that eggs are 40¢ a dozen, how much must she pay for 2 dozen eggs?

2. If butter is 30¢ a pound, how much must she pay for 2 lb. of butter?

3. If oranges are 5¢ apiece, how much must she pay for 4 oranges?

4. If cheese is 20¢ a pound, how much must she pay for 3 lb. of cheese?

5. Mary bought 2 lb. of baking powder at 40¢ a pound. How much did she pay?

6. How much must she pay for 3 lb. of figs at 18¢ a pound?

7. How much must she pay for 2 qt. of sirup at 46¢ a quart?

8. How much must she pay for 3 lb. of crackers at 27¢ a pound?

9. How much must she pay for 3 lb. of raisins at 29¢ a pound?

10. If she goes to the market and buys 4 lb. of meat at 24¢ a pound, how much must she pay?

11. If she buys 27¢ worth of lard and gives the dealer 50¢, how much change is due her?

12. If she makes purchases amounting to 16¢, 28¢, and 47¢, how much is the total?

13. If she has 81¢ and spends 36¢, how much has she left?

### 115. Making Change

*Examples 1 to 9, oral — Examples 10 to 34, written*

1. How much is $10 - 5$? $10¢ - 5¢$? $\$10 - \$5$?

2. If you buy $5¢$ worth of candy, how much change do you get from $10¢$?

3. If a man buys \$5 worth of groceries, how much change does he get from \$10?

4. If you buy a 2-cent postage stamp, how much change do you get from $5¢$?

5. If you buy $3¢$ worth of gum, how much change do you get from $10¢$?

6. If you buy $20¢$ worth of paper, how much change do you get from $25¢$?

7. How much is $10 - 7$? 10 tens $-$ 7 tens? $100 - 70$? $\$1 - 70¢$?

8. If you buy $70¢$ worth of meat, how much change do you get from \$1?

9. If you buy $60¢$ worth of groceries, how much change do you get from \$1?

*Find the change due from \$1 on purchases of:*

| | | | | |
|---|---|---|---|---|
| **10.** $50¢$. | **13.** $75¢$. | **16.** $48¢$. | **19.** $19¢$. | **22.** $8¢$. |
| **11.** $30¢$. | **14.** $55¢$. | **17.** $72¢$. | **20.** $17¢$. | **23.** $6¢$. |
| **12.** $20¢$. | **15.** $35¢$. | **18.** $66¢$. | **21.** $13¢$. | **24.** $9¢$. |

*Find the change due from 50¢ on purchases of:*

| | | | | |
|---|---|---|---|---|
| **25.** $25¢$. | **27.** $45¢$. | **29.** $28¢$. | **31.** $17¢$. | **33.** $8¢$. |
| **26.** $30¢$. | **28.** $35¢$. | **30.** $36¢$. | **32.** $19¢$. | **34.** $6¢$. |

### 116. Purchases at the Grocer's

*Examples 1 to 10, oral — Examples 11 to 18, written*

1. What does 6 lb. of sugar cost at 5¢ a pound?

*Find the cost of:*

2. 2 dozen eggs at 40¢ a dozen.
3. 8 lb. of crackers at 8¢ a pound.
4. 2 lb. of tea at 40¢ a pound.
5. 5 lb. of prunes at 7¢ a pound.
6. 6 lb. of starch at 9¢ a pound.
7. 8 lb. of rice at 8¢ a pound.
8. $\frac{1}{2}$ lb. of figs at 20¢ a pound.
9. 7 lb. of crackers at 10¢ a pound.
10. 3 loaves of bread at 8¢ a loaf.
11. 2 lb. of coffee at 35¢ a pound.
12. 4 lb. of raisins at 12¢ a pound.
13. 2 lb. of tea at 48¢ a pound.
14. 2 dozen eggs at 47¢ a dozen.
15. $\frac{1}{2}$ dozen oranges at 60¢ a dozen.
16. $\frac{1}{2}$ dozen bananas at 36¢ a dozen.

*Find the total cost in each example:*

17. 2 lb. of sugar at 6¢ a pound;
    3 lb. of prunes at 8¢ a pound;
    5 lb. of rice at 8¢ a pound.
18. 3 lb. of starch at 9¢ a pound;
    2 lb. of crackers at 12¢ a pound;
    $\frac{1}{2}$ dozen oranges at 40¢ a dozen.

### 117. Groups of Things

*Examples 1 to 8, oral — Examples 9 to 20, written*

1. How many pairs of shoes in 8 shoes?
2. How many pairs of gloves in 20 gloves?
3. How many pairs of mittens in 16 mittens?
4. How many pairs of shoes in 40 shoes?
5. How many pairs of socks in 60 socks?
6. How many sets of 4 horseshoes in 16 horseshoes?
7. How many windows of 4 panes each can be filled from 24 panes?
8. How many windows of 6 panes each can be filled from 48 panes?

*Find the number of pairs in:*

9. 428 shoes.
10. 364 gloves.
11. 532 socks.
12. 674 mittens.
13. 518 overshoes.
14. 716 skates.

*Find the number of sets of 4 horseshoes in:*

15. 372 horseshoes.
16. 516 horseshoes.

*Find the number of sets of half a dozen chairs in:*

17. 252 chairs.
18. 324 chairs.

*Find the number of freight cars, having 8 wheels each, that can be supplied from:*

19. 656 wheels.
20. 976 wheels.

### 118. The Farm

*Examples 1 to 6, oral — Examples 7 to 12, written*

1. How many sheep are 20 sheep and 30 sheep?

2. How many cows are 70 cows less 20 cows?

3. A horse cost $125 and was sold for $5 more. For how much was it sold?

4. A horse cost $130 and was sold for $10 less. For how much was it sold?

5. A wagon costs $75 and the buyer pays all but $10. How much does he pay, and how much does he still owe?

6. A farmer has to build 60 ft. of fence. He has built 40 ft. of it. How much has he yet to build?

7. A farmer has 396 trees in an orchard. He has sprayed $\frac{1}{4}$ of them to keep the worms off. How many trees has he sprayed?

8. A farmer has 84 cows and decides to sell $\frac{1}{4}$ of them. How many cows does he sell?

9. If a farm wagon costs $65, and the horses cost $325, and the harness costs $60, how much do they all cost together?

10. A pine tree on a farm is 75 ft. high, and this is 5 times as high as a young cherry tree. How high is the cherry tree?

11. A square field is 66 ft. on each side. How far is it around the field?

12. It is 288 ft. around a certain square field. What is the length of each side?

## VIII. MEASURES

### Table of Length

**12 inches (in.) = 1 foot (ft.)**
**3 feet = 1 yard (yd.)**

This table was studied on page 41, and is now reviewed.

### 119. Table of Length

*Examples 1 to 7, oral — Examples 8 to 19, written*

1. How many feet in 1 yd.? in 2 yd.? in $\frac{1}{3}$ yd.?
2. How many inches in 1 ft.? in 3 ft.? in $\frac{1}{2}$ ft.?
3. How many yards in 3 ft.? in 6 ft.? in 9 ft.?
4. How many feet are 12 ft. and 10 ft.?
5. How many yards are 15 yd. − 9 yd.?
6. How many feet in 3 yd.? in 9 yd.?
7. If a schoolroom is 18 ft. wide, how many yards wide is it?

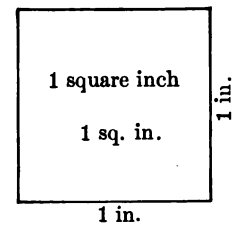
*Copy and add:*

| 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|
| 27 ft. | 49 ft. | 27 in. | 30 in. | 52 yd. | 54 yd. |
| 32 | 67 | 42 | 48 | 28 | 60 |
| 48 | 33 | 36 | 62 | 36 | 72 |
| 61 | 96 | 94 | 31 | 90 | 80 |
| 93 | 81 | 21 | 93 | 21 | 31 |

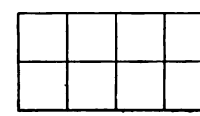
*Copy and divide:*

| 14. | 15. | 16. | 17. | 18. | 19. |
|---|---|---|---|---|---|
| 4)120 | 4)125 | 7)630 | 7)654 | 9)270 | 9)280 |

A square that is 1 in. on a side is a *square inch*. A square that is 1 ft. on a side is a square foot. A square that is 1 yd. on a side is a square yard. We write 1 square inch like this: 1 sq. in.




If a rectangle is 4 in. long and 2 in. wide, its area is 8 sq. in. There are 2 rows, with 4 sq. in. in a row; that is, there are 2 × 4 sq. in. We say that such a rectangle is 2 in. by 4 in.



### 120. Square Inches

*Examples 1 to 6, oral — Examples 7 to 12, written*

1. If a rectangle is 3 in. long and 2 in. wide, how many square inches has it?

2. If a schoolroom is 10 yd. long and 7 yd. wide, how many square yards has it?

*Find the areas of rectangles as follows:*

3. 2 in. by 8 in.
4. 3 in. by 10 in.
5. 7 ft. by 8 ft.
6. 9 ft. by 10 ft.
7. 9 ft. by 37 ft.
8. 8 ft. by 29 ft.
9. 9 ft. by 27 ft.
10. 7 ft. by 19 ft.

11. Find the area of a floor 19 ft. by 11 ft.

12. If a playground is 48 yd. long and 9 yd. wide, how many square yards has it?

A square that is 3 ft. on a side contains $3 \times 3$ square feet, or 9 square feet.

A square that is 12 in. on a side contains $12 \times 12$ sq. in., or 144 sq. in.

**144 square inches (sq. in.) = 1 square foot (sq. ft.)**
**9 square feet = 1 square yard (sq. yd.)**

### 121. Square Measure

*Examples 1 to 3, oral — Examples 4 to 16, written*

1. How many square feet in 3 sq. yd.?
2. How many square yards in 18 sq. ft.?
3. A strip of carpet is 9 yd. long and 1 yd. wide. How many square yards has it?

*Find the number of square feet in a rectangle that is:*

4. 9 ft. by 38 ft.
5. 8 ft. by 46 ft.
6. 7 ft. by 29 ft.
7. 8 ft. by 34 ft.
8. 11 ft. by 64 ft.
9. 11 ft. by 48 ft.
10. 12 ft. by 25 ft.
11. 12 ft. by 36 ft.

*Find the number of square inches in:*

12. 2 sq. ft.
13. 5 sq. ft.
14. 11 sq. ft.

15. The top of a box is a square that is 11 in. on each side. What is the area of the top?
16. A pane of glass is 11 in. by 12 in. What is its area?

TABLE OF MONEY

**10 cents (¢ or ct.) = 1 dime (d.)**
**10 dimes = 1 dollar ($)**
**100 cents = 1 dollar**

The 5-cent piece is often called a nickel.

Since there are 100 cents in $1, we may write $2 for 200¢, $3 for 300¢, and so on.

### 122. Table of Money

*Examples 1 and 2, oral — Examples 3 to 8, written*

1. How many cents in $2? in $3? in $9?
2. How many dollars in 100¢? in 200¢? in 600¢?

*Copy and subtract:*

| 3. | 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|---|
| $825 | $675 | $525 | $620 | $700 | $900 |
| 120 | 105 | 275 | 245 | 125 | 637 |

### 123. Table of Money

*Examples 1 to 5, oral — Examples 6 to 11, written*

1. How many cents in $5? in $8? in $10?
2. How many dollars in 300¢? in 500¢? in 900¢? in 1000¢?

3. $29 + $38.
4. $40 + $65.
5. $96 + $99.
6. 9 × $755.
7. 11 × $863.
8. 12 × $675.
9. $2772 ÷ 4.
10. $3115 ÷ 5.
11. $4050 ÷ 9.

We write \$2 and 25¢ thus: \$2.25. The point placed between dollars and dimes is a *decimal point.*

We work with such numbers in the usual way:

| | | | |
|---|---|---|---|
| \$2.25 | \$8.21 | \$2.25 | 5)\$11.25 |
| +5.96 | −5.96 | ×5 | \$ 2.25 |
| \$8.21 | \$2.25 | \$11.25 | |

We write \$0.35 for no dollars and 35 cents, and we read it "thirty-five cents."

### 124. Table of Money

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. Read these: \$3.75, \$4.50, \$12.60, \$6.25.
2. Read these: \$1.05, \$125.50, \$275.60, \$2000, \$2000.00, \$300.00, \$100.01.
3. Read these: 25¢, \$0.25, \$0.75, \$0.10, \$0.05, \$0.90, \$0.99, \$0.01, \$0.12½.

*Write in figures:*

4. Two dollars and one cent.
5. Three dollars and fifteen cents.
6. Seven dollars and eighty-five cents.
7. Five hundred ten dollars and six cents.
8. Add \$3.75 and \$4.67.
9. From \$275.50 take \$168.49.
10. Multiply \$3.85 by 7.
11. Divide \$27.75 by 5.
12. Add \$2.60, \$4.75, \$9.27, and \$0.25.

### 125. Table of Money

*Examples 1 to 4, oral — Examples 5 to 11, written*

1. Add \$300 and \$250; \$700 and \$300.
2. From \$75 take \$50; from \$750 take \$500.
3. Multiply \$200 by 4; by 3; by 5.
4. Divide \$14 by 7; \$140 by 7; \$35 by 7.

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|
| \$275.50 | \$335.48 | \$426.75 | \$595.00 | \$278.50 |
| 127.60 | 276.93 | 39.85 | 486.75 | 986.75 |

10. \$1275.50 − \$396.75.
11. \$6480.00 − \$575.50.

### 126. Table of Money

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. If you spend \$0.50 and \$0.50, how much do you spend in all?
2. What will 2 books cost at \$0.50 each?
3. What will 5 notebooks cost at \$0.10 each?

*Copy and multiply:*

| 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|
| \$125.05 | \$225.75 | \$365.50 | \$725.30 | \$925.60 |
| 5 | 2 | 4 | 6 | 7 |

9. Divide \$125.75 by 5.
10. Divide \$217.14 by 7.
11. 8)\$656.40
12. 9)\$345.60

### 127. Liquid Measure

*Examples 1 to 3, oral — Examples 4 to 13, written*

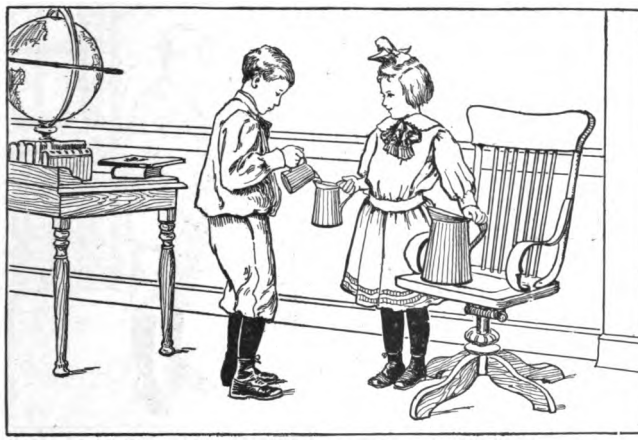


TABLE OF LIQUID MEASURE

**4 gills (gi.) = 1 pint (pt.)**
**2 pints = 1 quart (qt.)**
**4 quarts = 1 gallon (gal.)**

1. In the picture, which is the gallon measure?
2. Which are the quart and pint measures?
3. How many pints in 2 qt.? in 4 qt.?

*Express as quarts:*

**4.** 1 gal. **5.** 2 gal. **6.** $\frac{1}{2}$ gal. **7.** 6 pt. **8.** 8 pt.

*Express as gallons, or as gallons and quarts:*

**9.** 4 qt. **10.** 5 qt. **11.** 7 qt. **12.** 16 qt. **13.** 18 qt.

### 128. Dry Measure

*Examples 1 to 7, oral — Examples 8 to 14, written*

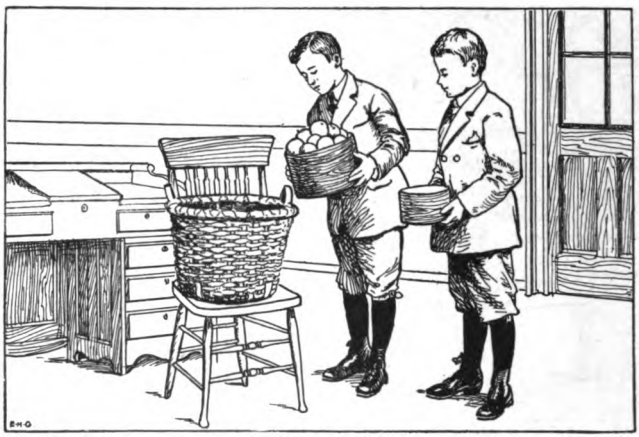


TABLE OF DRY MEASURE

**2 pints (pt.) = 1 quart (qt.)**
**8 quarts = 1 peck (pk.)**
**4 pecks = 1 bushel (bu.)**

1. How many pints in 1 qt.? in 8 qt.? in 1 pk.?
2. How many quarts in 1 pk.? in 4 pk.? in 1 bu.?
3. How many pecks in 1 bu.? in 3 bu.? in 6 bu.?

*Express as quarts:*

**4.** 4 pt. **6.** 2 pk. **8.** 2 bu. **10.** 23 pk. **12.** 28 bu.
**5.** 10 pt. **7.** 9 pk. **9.** 16 pk. **11.** 4 bu. **13.** 125 bu.

**14.** If a man feeds his horse 8 qt. of oats a day, how long will a bushel of oats last?

### 129. Review

*Examples 1 to 4, oral — Examples 5 to 14, written*

1. What measures are used in selling milk? in selling oil? in selling molasses?

2. What measures are used in selling wheat? in selling potatoes? in selling corn?

3. Name something that is sold by the gallon and something that is sold by the bushel.

4. When a man buys 10 bu. of potatoes, how many pecks does he buy?

*Express as bushels:*

5. 4 pk. 7. 8 pk. 9. 12 pk. 11. 16 pk. 13. 32 qt.
6. 40 pk. 8. 32 pk. 10. 120 pk. 12. 160 pk. 14. 64 pt.

### 130. Review

*Examples 1 to 3, oral — Examples 4 to 8, written*

1. How much is \$1.50 and \$0.50?

2. How much change is due from \$2 when you buy goods costing \$1.50?

3. What will $\frac{1}{2}$ yd. of cloth cost at \$1.20 a yard?

*Add:*

| 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|
| \$2.50 | \$3.48 | \$4.29 | \$2.96 | \$3.25 |
| 3.75 | 2.64 | 3.60 | 0.35 | 4.75 |
| 1.60 | 1.96 | 1.75 | 4.68 | 6.48 |
| 2.82 | 5.80 | 2.50 | 5.00 | 7.52 |

TABLE OF WEIGHT

**16 ounces (oz.) = 1 pound (lb.)**

We write 1 pound and 4 ounces thus: 1 lb. 4 oz.

### 131. Table of Weight

*Examples 1 to 5, oral — Examples 6 to 12, written*

1. Name something that is sold by the pound.
2. How many ounces in 1 lb.? in 1 lb. 4 oz.?

*Find the number of ounces in:*

3. 1 lb. 6 oz.
4. 1 lb. 10 oz.
5. 1 lb. 11 oz.
6. 5 lb. 8 oz.
7. 7 lb. 9 oz.
8. 9 lb. 4 oz.
9. 6 lb. 12 oz.
10. 4 lb. 2 oz.
11. 3 lb. 3 oz.
12. At 5¢ an ounce, what will 1 lb. of candy cost? what will 2 lb. cost?

### 132. Table of Weight

*Examples 1 to 6, oral — Examples 7 to 13, written*

1. If 1 lb. of butter costs 40¢, what does $\frac{1}{2}$ lb. cost?
2. If 2 lb. of dates cost 16¢, what does 1 lb. cost?
3. If 3 lb. of prunes cost 24¢, what does 1 lb. cost?

*Find the number of ounces in:*

4. $\frac{1}{2}$ lb.
5. $\frac{1}{4}$ lb.
6. 1 lb. 2 oz.
7. 8 lb. 4 oz.
8. 6 lb. 7 oz.
9. 1 lb. 14 oz.
10. 10 lb. 7 oz.
11. 11 lb. 6 oz.
12. 12 lb. 9 oz.
13. If 3 lb. of raisins cost 96¢, what is the price per pound? what will 5 lb. cost?

TABLE OF TIME

**60 minutes (min.) = 1 hour (hr.)**
**24 hours = 1 day (da.)**
**7 days = 1 week (wk.)**

We write 2 hours and 40 minutes thus: 2 hr. 40 min. We write 2 o'clock and 40 min., or 40 min. past 2 in the same way. The letters A.M. mean forenoon, and P.M. afternoon.

### 133. Table of Time

*Examples 1 to 3, oral — Examples 4 to 21, written*

**1.** Close your eyes when the teacher taps with the pencil. Keep them closed, but raise your hand when you think that a minute has passed.

**2.** How many hours in 1 da.? in 1 da. 6 hr.?

**3.** How many minutes in 1 hr.? in 1 hr. 10 min.?

*Find the number of minutes in:*

**4.** 2 hr. **5.** 4 hr. **6.** 5 hr. **7.** 7 hr. **8.** 6 hr. **9.** 9 hr. **10.** $\frac{1}{2}$ hr. **11.** $\frac{1}{3}$ hr. **12.** $\frac{1}{4}$ hr. **13.** 12 hr.

*Find the number of days in:*

**14.** 12 wk. **15.** 12 wk. 2 da. **16.** 24 wk. 5 da.

*Find the number of weeks in:*

**17.** 7 da. **18.** 14 da. **19.** 63 da. **20.** 91 da.

**21.** How many minutes from 9 hr. 45 min. to 10 hr. 5 min.? to 11 hr. 45 min.? to noon?

### 134. Review

*Examples 1 to 7, oral — Examples 8 to 14, written*

1. Subtract rapidly: \$135 − \$30; \$3.75 − \$1.75.

*Divide rapidly:*

| 2. | 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|---|
| 4)20 | 4)\$200 | 5)30 | 5)\$300 | 2)22 | 2)\$220 |

*Copy and add:*

| 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|
| \$4.75 | \$2.96 | \$3.48 | \$2.78 | \$4.29 | \$53.70 |
| 2.36 | 4.87 | 5.09 | 1.96 | 3.76 | 29.60 |

14. \$374.81 + \$278.16 + \$392.14 + \$27.96.

### 135. Review

*Examples 1 and 2, oral — Examples 3 to 8, written*

We count some things by dozens. A dozen is 12 things. We write 1 dozen thus: 1 doz.

1. How many are $\frac{1}{2}$ doz. eggs? $1\frac{1}{2}$ doz. eggs?
2. How many are $\frac{1}{4}$ doz. oranges? $1\frac{1}{4}$ doz. oranges?

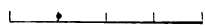
*Copy and add:*

| 3. | 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|---|
| \$1.27 | \$2.50 | \$1.29 | \$5.75 | \$3.00 | \$20.50 |
| 1.62 | 1.96 | 0.62 | 0.15 | 0.48 | 1.95 |
| 3.20 | 7.87 | 4.08 | 0.26 | 0.79 | 1.86 |
| 0.48 | 4.42 | 2.09 | 0.35 | 1.09 | 10.75 |

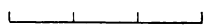
## IX. FRACTIONS

We shall now study more about fractions.

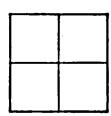
This line is 1 in. long. It is divided into 4 equal parts. Each part is $\frac{1}{4}$ of the line, or $\frac{1}{4}$ of an inch. This is written $\frac{1}{4}$ in.



This line is 1 in. long. It is divided into 3 equal parts. Each part is $\frac{1}{3}$ in. long.



This square has been divided into 4 equal parts. Each of the small squares is $\frac{1}{4}$ of the large square.



One fourth is also called a quarter. One fourth of \$1 is a quarter of a dollar.

### 136. Writing Fractions

*Examples 1 to 4, oral — Examples 5 to 10, written*

**1.** Look at the first line and see how many fourths of an inch there are in an inch.

**2.** See how many fourths of an inch make $\frac{1}{2}$ in.

**3.** How many fourths make $\frac{1}{2}$ of the square?

**4.** We write 3 fourths thus: $\frac{3}{4}$. How do we write 1 third? How should we write 2 thirds?

**5.** Draw a line $\frac{3}{4}$ of an inch long.

*Write these fractions:*

**6.** One third.

**7.** Three fourths.

**8.** Two fourths.

**9.** Two thirds.

**10.** How many eggs in $2\frac{1}{4}$ doz. eggs?

### 137. The Half

*Examples 1 to 5, oral — Examples 6 to 12, written*

1. Which column is $\frac{1}{2}$ of 12?
2. Which column is $\frac{1}{2}$ of 4?
3. Which column is $\frac{1}{4}$ of 8?
4. Which column is $\frac{2}{4}$ of 8? $\frac{1}{2}$ of 8?
5. By what do you divide to find $\frac{1}{2}$ of a number?

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | 2 |
| | | | | | 2 | 2 |
| | | | | 2 | 2 | 2 |
| | | | 2 | 2 | 2 | 2 |
| | | 2 | 2 | 2 | 2 | 2 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 2 | 4 | 6 | 8 | 10 | 12 | |

6. Copy and learn: $\frac{1}{2} = \frac{2}{4}$; $\frac{1}{2} + \frac{1}{2} = 1$; $\frac{2}{2} = 1$.
7. Draw a line 1 in. long and mark off $\frac{4}{8}$ of it.

*Find $\frac{1}{2}$ of:*

**8.** 720. **9.** 642. **10.** 396. **11.** \$1440. **12.** \$2334.

### 138. The Third

*Examples 1 to 6, oral — Examples 7 to 12, written*

1. Which column at the top of the page is $\frac{1}{3}$ of 6?
2. Which column is $\frac{2}{3}$ of 6?
3. Which column is $\frac{1}{3}$ of 12?
4. Which column is $\frac{2}{3}$ of 12?
5. Show that $\frac{1}{3}$ of 12 and $\frac{2}{3}$ of 12 is 12.
6. If a lady buys 15 yd. of cloth and uses $\frac{1}{3}$ of it, how many yards does she use?
7. Copy and learn: $\frac{1}{3} + \frac{2}{3} = 1$; $\frac{3}{3} = 1$.

*Find $\frac{1}{3}$ of:*

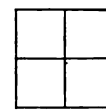
**8.** 420. **9.** 636. **10.** 459. **11.** \$1110. **12.** \$2202.

### 139. The Fourth

*Examples 1 to 4, oral — Examples 5 to 15, written*

1. One half equals how many fourths?

2. How many small squares in $\frac{3}{4}$ of the large square?



3. How many small squares in the large square? How many fourths make 1?

4. What name do we give to a quarter of a gallon?

5. Copy and learn: $\frac{2}{4}=\frac{1}{2}$; $\frac{1}{4}+\frac{3}{4}=1$; $\frac{4}{4}=1$.

*Find $\frac{1}{4}$ of:*

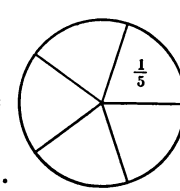
6. 124. 8. 248. 10. 648 ft. 12. \$1240. 14. \$3764.
7. 168. 9. 284. 11. 724 ft. 13. \$1680. 15. \$4884.

### 140. The Fifth

*Examples 1 to 3, oral — Examples 4 to 10, written*

1. How many fifths of the circle in the circle? We write one fifth thus: $\frac{1}{5}$.

2. Read: $\frac{1}{5}$ and $\frac{1}{5}$ are $\frac{2}{5}$.




3. How much is $\frac{1}{5}$ of the circle and $\frac{4}{5}$ of the circle?

4. Copy and learn: $\frac{1}{5}+\frac{4}{5}=1$; $\frac{5}{5}=1$.

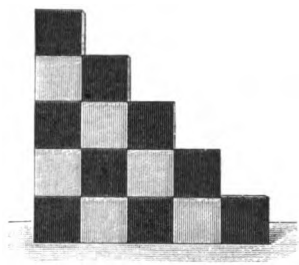
*Find $\frac{1}{5}$ of:*

5. 25. 6. 250. 7. 355 ft. 8. \$475. 9. \$6250.

10. If a grocer has 5 doz. cans of corn and sells $\frac{2}{5}$ of them, how many single cans does he sell?

### 141. The Fifth

*Examples 1 to 6, oral — Examples 7 to 11, written*



1. How much is $\frac{1}{5}$ of 5?
2. How much is $\frac{2}{5}$ of 5?
3. How much is $\frac{3}{5}$ of 5?
4. How much is $\frac{4}{5}$ of 5?
5. If we call the largest column 1, what shall we call each of the others?
6. If we call the largest column 50, what shall we call each of the others?

*Find $\frac{1}{5}$ of:*

7. 725. 8. 685. 9. 925. 10. \$7500. 11. \$6800.

### 142. The Sixth

*Examples 1 to 9, oral — Examples 10 to 15, written*

1. How many dots are $\frac{1}{6}$ of 12 dots? ⁘⁘

*State the number of dots in:*

2. $\frac{2}{6}$ of 12 dots; $\frac{1}{3}$ of 12 dots.
3. $\frac{3}{6}$ of 12 dots; $\frac{1}{2}$ of 12 dots.
4. $\frac{4}{6}$ of 12 dots; $\frac{2}{3}$ of 12 dots.
5. $\frac{5}{6}$ of 12 dots; $\frac{6}{6}$ of 12 dots.
6. $\frac{1}{6}$ of 6 dots.
7. $\frac{1}{3}$ of 6 dots.
8. $\frac{2}{3}$ of 6 dots.
9. $\frac{5}{6}$ of 6 dots.

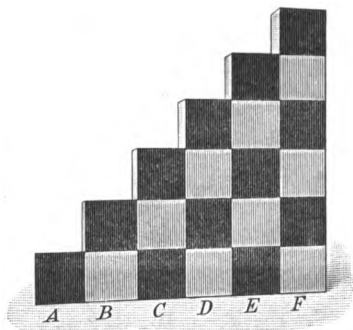
10. Copy and learn: $\frac{3}{6}=\frac{1}{2}$; $\frac{4}{6}=\frac{2}{3}$; $\frac{1}{6}+\frac{5}{6}=1$; $\frac{6}{6}=1$.

*Find $\frac{1}{6}$ of:*

11. 72. 12. 720. 13. 1320 ft. 14. \$2520. 15. \$3240.

### 143. The Sixth

*Examples 1 to 3, oral — Examples 4 to 11, written*




1. If column $F$ is called 1, what fraction shall we call column $A$?

2. What shall we then call $B$?

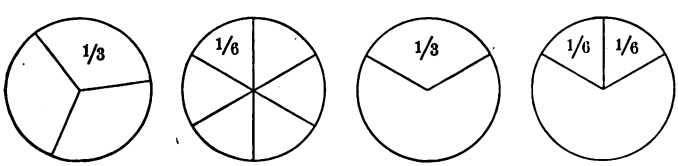
3. And what shall we call $C$, and $D$, and $E$?

*Find $\frac{1}{6}$ of:*

4. 1248.
5. 1560.
6. 1746.
7. 234 ft.
8. 342 ft.
9. 492 ft.
10. 2 doz.
11. 3 doz.

### 144. The Sixth

*Examples 1 to 3, oral — Examples 4 to 8, written*




1. Which circles show you that $\frac{1}{3} = \frac{1}{6} + \frac{1}{6}$?

2. How many sixths do you see in $\frac{1}{2}$ of the circle?

3. In the whole circle how many sixths do you see? how many thirds?

*Find $\frac{1}{6}$ of:*

4. \$2526.
5. \$3786.
6. \$4440.
7. \$5652.
8. \$9990.

### 145. The Seventh

*Examples 1 to 4, oral — Examples 5 to 18, written*

1. How many marks are here? // // // // // // //
2. What is $\frac{1}{7}$ of this number of marks?
3. What is $\frac{2}{7}$ of the number? $\frac{3}{7}$? $\frac{4}{7}$? $\frac{5}{7}$? $\frac{6}{7}$? $\frac{7}{7}$?
4. What is $\frac{1}{7}$ of 21? $\frac{1}{7}$ of 28? $\frac{1}{7}$ of 35? $\frac{1}{7}$ of 42?
5. Copy and learn: $\frac{1}{7}+\frac{6}{7}=1$; $\frac{7}{7}=1$.

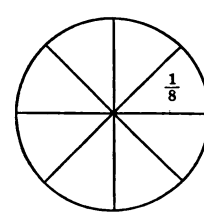
*Copy and add:*

6. $\frac{1}{7}+\frac{1}{7}$.
7. $\frac{1}{7}+\frac{2}{7}$.
8. $\frac{1}{7}+\frac{3}{7}$.
9. $\frac{1}{7}+\frac{4}{7}$.
10. $\frac{1}{7}+\frac{5}{7}$.
11. $\frac{1}{7}+\frac{6}{7}$.
12. $\frac{2}{7}+\frac{5}{7}$.
13. $\frac{3}{7}+\frac{4}{7}$.
14. $\frac{2}{7}+\frac{3}{7}$.
15. $\frac{2}{7}+\frac{2}{7}$.
16. $\frac{3}{7}+\frac{3}{7}$.
17. $\frac{2}{7}+\frac{4}{7}$.

18. How many yards is $\frac{1}{7}$ of 63 yd.? of 77 yd.?

### 146. The Eighth

*Examples 1 to 3, oral — Examples 4 to 13, written*




1. How many eighths do you find in the circle?
2. If I take 2 eighths of the circle, what part of the circle have I?
3. What is an eighth of a peck called?
4. Copy and learn: $\frac{2}{8}=\frac{1}{4}$; $\frac{4}{8}=\frac{1}{2}$; $\frac{6}{8}=\frac{3}{4}$; $\frac{8}{8}=1$.

*Copy and add:*

5. $\frac{1}{8}+\frac{1}{8}$.
6. $\frac{1}{8}+\frac{3}{8}$.
7. $\frac{1}{8}+\frac{5}{8}$.
8. $\frac{1}{8}+\frac{7}{8}$.
9. $\frac{3}{8}+\frac{5}{8}$.
10. $\frac{5}{8}+\frac{2}{8}$.
11. $\frac{1}{8}+\frac{4}{8}$, or $\frac{1}{8}+\frac{1}{2}$.
12. $\frac{1}{8}+\frac{6}{8}$, or $\frac{1}{8}+\frac{3}{4}$.
13. $\frac{1}{8}+\frac{2}{8}$, or $\frac{1}{8}+\frac{1}{4}$.

### 147. The Eighth

*Examples 1 to 3, oral — Examples 4 to 18, written*

1. If a lady has $\frac{7}{8}$ yd. of ribbon, how much more must she get in order to have 1 yd.?

2. If she has $\frac{5}{8}$ yd. of cloth and cuts off $\frac{1}{8}$ yd., how much will she have left?

3. If she has $\frac{1}{4}$ yd. of velvet and cuts off $\frac{1}{8}$ yd., how much will she have left?

*Find $\frac{1}{8}$ of:*

| | | | | |
|---|---|---|---|---|
| **4.** 24. | **7.** 104. | **10.** 2560. | **13.** \$24.40. | **16.** \$65.60. |
| **5.** 48. | **8.** 152. | **11.** 3776. | **14.** \$32.80. | **17.** \$74.40. |
| **6.** 96. | **9.** 192. | **12.** 4968. | **15.** \$49.60. | **18.** \$99.20. |

### 148. The Eighth

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. If there are 24 pupils in a class and $\frac{1}{8}$ of them are standing, how many are standing?

2. If there are 160 pupils in a certain school and $\frac{1}{8}$ of them are in the third grade, how many are in the third grade?

3. If a yard of velvet costs \$2.40, what will $\frac{1}{8}$ yd. cost? What will $\frac{1}{4}$ yd. cost?

*Copy and complete:*

| | | |
|---|---|---|
| **4.** $1-\frac{1}{8}$. | **7.** $\frac{3}{8}-\frac{1}{8}$. | **10.** $\frac{4}{8}-\frac{1}{8}$, or $\frac{1}{2}-\frac{1}{8}$. |
| **5.** $\frac{7}{8}-\frac{1}{8}$. | **8.** $\frac{7}{8}-\frac{5}{8}$. | **11.** $\frac{6}{8}-\frac{1}{8}$, or $\frac{3}{4}-\frac{1}{8}$. |
| **6.** $\frac{5}{8}-\frac{1}{8}$. | **9.** $\frac{7}{8}-\frac{3}{8}$. | **12.** $\frac{2}{8}-\frac{1}{8}$, or $\frac{1}{4}-\frac{1}{8}$. |

### 149. Fractional Parts

*Examples 1 to 4, oral — Examples 5 and 6, written*

| | | | | | |
|---|---|---|---|---|---|
| 2 | 3 | 4 | 5 | 6 | 7 |
| 2 | 3 | 4 | 5 | 6 | 7 |
| 2 | 3 | 4 | 5 | 6 | 7 |
| 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 12 | 16 | 20 | 24 | 28 |

*Looking at these columns, state rapidly:*

1. $\frac{1}{4}$ of 8; $\frac{3}{4}$ of 8.
2. $\frac{1}{4}$ of 12; $\frac{3}{4}$ of 12.
3. $\frac{1}{4}$ of 16; $\frac{3}{4}$ of 16.
4. $\frac{1}{4}$ of 20; $\frac{3}{4}$ of 20.
5. Add $\frac{3}{4}$ of 8, $\frac{1}{2}$ of 20, $\frac{1}{4}$ of 24, and $\frac{3}{4}$ of 28.
6. Add $\frac{1}{2}$ of 16, $\frac{3}{4}$ of 20, $\frac{3}{4}$ of 24, and $\frac{1}{4}$ of 28.

### 150. Fractional Parts

*Examples 1 to 5, oral — Examples 6 to 16, written*

1. At 32¢ a pound, what will $\frac{1}{2}$ lb. of butter cost?
2. At 36¢ a dozen, what will $\frac{1}{4}$ doz. eggs cost?
3. At 27¢ a dozen, what will $\frac{1}{3}$ doz. lemons cost?
4. At 32¢ a pound, what will $\frac{1}{4}$ lb. of butter cost?
5. At 36¢ a dozen, what will $\frac{1}{4}$ doz. bananas cost?
6. How many ounces are there in $\frac{1}{4}$ lb.? in $\frac{3}{4}$ lb.?

*Find $\frac{1}{4}$ of:*

7. 728. 8. 456. 9. 656. 10. 736. 11. 984.

*Multiplying the above results by 3, find $\frac{3}{4}$ of:*

12. 728. 13. 456. 14. 656. 15. 736. 16. 984.

### 151. Fractional Parts

*Examples 1 to 10, oral — Examples 11 to 16, written*

**1.** State the sum of each of these columns.

**2.** Which column is $\frac{1}{2}$ of 8? How much is $\frac{1}{2}$ of 8?

*State which column is:*

| | | | | | |
|---|---|---|---|---|---|
| | | | | | 4 |
| | | | | 4 | 4 |
| | | | 4 | 4 | 4 |
| | | 4 | 4 | 4 | 4 |
| | 4 | 4 | 4 | 4 | 4 |
| 4 | 4 | 4 | 4 | 4 | 4 |

**3.** $\frac{1}{3}$ of 12. **5.** $\frac{1}{3}$ of 24. **7.** $\frac{3}{5}$ of 20. **9.** $\frac{2}{3}$ of 24.

**4.** $\frac{1}{4}$ of 16. **6.** $\frac{2}{3}$ of 12. **8.** $\frac{3}{4}$ of 16. **10.** $\frac{5}{6}$ of 24.

*Copy and solve:*

**11.** $\frac{1}{5}$ of 525. **13.** $\frac{1}{4}$ of 364. **15.** $\frac{1}{6}$ of 444.

**12.** $\frac{2}{5}$ of 525. **14.** $\frac{3}{4}$ of 364. **16.** $\frac{5}{6}$ of 444.

### 152. Fractional Parts

*Examples 1 and 2, oral — Examples 3 to 10, written*

| | | | | | |
|---|---|---|---|---|---|
| | | | | | 5 |
| | | | | 5 | 5 |
| | | | 5 | 5 | 5 |
| | | 5 | 5 | 5 | 5 |
| | 5 | 5 | 5 | 5 | 5 |
| 5 | 5 | 5 | 5 | 5 | 5 |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | 7 |
| | | | | 7 | 7 |
| | | | 7 | 7 | 7 |
| | | 7 | 7 | 7 | 7 |
| | 7 | 7 | 7 | 7 | 7 |
| 7 | 7 | 7 | 7 | 7 | 7 |

**1.** Add each column.

**2.** Point to $\frac{2}{3}$ of 15; $\frac{3}{4}$ of 20; $\frac{4}{5}$ of 25; $\frac{4}{5}$ of 35.

*Copy and solve:*

**3.** $\frac{1}{2}$ of 30. **5.** $\frac{1}{4}$ of 20. **7.** $\frac{4}{5}$ of 25. **9.** $\frac{2}{3}$ of 42.

**4.** $\frac{1}{3}$ of 30. **6.** $\frac{3}{4}$ of 20. **8.** $\frac{5}{6}$ of 30. **10.** $\frac{5}{6}$ of 42.

### 153. Fractional Parts

*Examples 1 to 12, oral — Examples 13 to 17, written*

1. How many feet in 1 yd.? How many inches?
2. How many inches in $\frac{1}{3}$ yd.? in $\frac{1}{6}$ yd.? in $\frac{1}{2}$ yd.?

*State the number in:*

3. $\frac{1}{2}$ doz. 5. $\frac{1}{4}$ doz. 7. $\frac{3}{4}$ doz. 9. $\frac{5}{6}$ doz. 11. $1\frac{1}{3}$ doz.
4. $\frac{1}{3}$ doz. 6. $\frac{2}{3}$ doz. 8. $\frac{1}{6}$ doz. 10. $1\frac{1}{2}$ doz. 12. 2 doz.

*Write two numbers that equal:*

13. $\frac{1}{2}$ of other numbers, thus: $2 = \frac{1}{2}$ of 4; $3 = \frac{1}{2}$ of 6.
14. $\frac{1}{3}$ of other numbers. 16. $\frac{1}{4}$ of other numbers.
15. $\frac{2}{3}$ of other numbers. 17. $\frac{3}{4}$ of other numbers.

### 154. Fractional Parts

*Examples 1 to 6, oral — Examples 7 to 9, written*

1. How many ounces in $\frac{1}{2}$ lb.?

*State the number of ounces in:*

2. $\frac{1}{8}$ lb. 3. $\frac{3}{4}$ lb. 4. $\frac{3}{8}$ lb. 5. $\frac{5}{8}$ lb. 6. $\frac{7}{8}$ lb.

7. If a man has \$1840 and spends $\frac{1}{4}$ of it, how much does he spend? How much has he left?

8. How many gallons in 4 qt.? How many gallons of maple sirup will fill 196 quart jars?

9. A man having \$9720 invested $\frac{1}{8}$ of it in a lot, $\frac{1}{2}$ of it in a house, and $\frac{1}{4}$ of it in furniture. How much had he left?

If we divide 125 by 4, the quotient is 31 and the remainder is 1. This 1 is still to be divided by 4, so the complete quotient is $31\frac{1}{4}$.

$$4\overline{)125}\quad 31\tfrac{1}{4}$$

If we divide 245 by 8, the quotient is 30 and the remainder is 5. The complete quotient is written $30\frac{5}{8}$.

$$8\overline{)245}\quad 30\tfrac{5}{8}$$

### 155. Fraction in a Quotient

*Examples 1 and 2, oral — Examples 3 to 7, written*

1. How much is $5 \div 4$? $7 \div 4$?

2. If \$5 is divided equally between 2 persons, what is the share of each?

| 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|
| $5\overline{)274}$ | $5\overline{)361}$ | $5\overline{)488}$ | $5\overline{)752}$ | $5\overline{)1283}$ |

### 156. Fraction in a Quotient

*Examples 1 and 2, oral — Examples 3 to 12, written*

1. If \$13 is divided equally among 4 persons, what is the share of each?

2. If 25 qt. of berries are divided equally among 4 boys, what is the share of each?

| 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|
| $4\overline{)123}$ | $3\overline{)112}$ | $4\overline{)345}$ | $3\overline{)557}$ | $4\overline{)677}$ |

| 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|
| $6\overline{)253}$ | $4\overline{)727}$ | $7\overline{)155}$ | $4\overline{)2579}$ | $8\overline{)6573}$ |

### 157. Mixed Numbers

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. Numbers like $\frac{1}{2}$ and $\frac{3}{4}$ are called *fractions*. Numbers like 2, 3, and 4 are called *whole numbers*. Numbers like $2\frac{3}{4}$, $3\frac{1}{8}$, and $5\frac{1}{2}$ are called *mixed numbers*. What kind of number is $7\frac{2}{3}$?

2. Add $\frac{1}{2}$ and $\frac{1}{2}$; $1\frac{1}{2}$ and $\frac{1}{2}$; $3\frac{1}{2}$ and $\frac{1}{2}$.

3. Add $\frac{1}{4}$ and $\frac{3}{4}$; $7\frac{1}{4}$ and $8\frac{3}{4}$.

$$\begin{array}{r} 7\frac{1}{4} \\ 8\frac{3}{4} \\ \hline 15\frac{4}{4}, \text{ or } 16 \end{array}$$

*Copy and add:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| $2\frac{1}{2}$ | $3\frac{1}{2}$ | $27\frac{1}{2}$ | $20\frac{3}{4}$ | $20\frac{1}{4}$ | $30\frac{1}{4}$ |
| $4$ | $4\frac{1}{2}$ | $32\frac{1}{2}$ | $5\frac{1}{4}$ | $5\frac{3}{4}$ | $22\frac{3}{4}$ |

### 158. Mixed Numbers

*Examples 1 to 6, oral — Examples 7 to 12, written*

1. Add $\frac{1}{4}$ and $\frac{1}{4}$; $\$3\frac{1}{4}$ and $\$\frac{1}{4}$; $\$5\frac{1}{4}$ and $\$2\frac{1}{4}$.

2. Add $\frac{1}{4}$ and $\frac{3}{4}$; $\$7\frac{1}{4}$ and $\$\frac{3}{4}$; $\$6\frac{1}{4}$ and $\$\frac{3}{4}$.

3. Add $\frac{1}{8}$ and $\frac{1}{8}$; $2\frac{1}{8}$ and $\frac{1}{8}$; $3\frac{1}{8}$ and $2\frac{1}{8}$.

4. How much is $\frac{1}{8}$ yd. and $\frac{3}{8}$ yd.?

5. Add $\frac{1}{8}$ and $\frac{5}{8}$; $2\frac{1}{8}$ and $\frac{5}{8}$.

6. Add $\frac{1}{8}$ and $\frac{3}{8}$; $7\frac{1}{8}$ and $5\frac{3}{8}$.

$$\begin{array}{r} 7\frac{1}{8} \\ 5\frac{3}{8} \\ \hline 12\frac{4}{8}, \text{ or } 12\frac{1}{2} \end{array}$$

*Copy and add:*

| 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|
| $3\frac{1}{4}$ | $6\frac{1}{8}$ | $25\frac{1}{8}$ | $26\frac{3}{8}$ | $41\frac{5}{8}$ | $36\frac{1}{8}$ |
| $7\frac{3}{4}$ | $5\frac{3}{8}$ | $32\frac{1}{8}$ | $13\frac{5}{8}$ | $27\frac{1}{8}$ | $54\frac{7}{8}$ |

### 159. Mixed Numbers

*Examples 1 to 4, oral — Examples 5 to 12, written*

1. How many quarters make a half dollar?

2. If to $\$\frac{1}{2}$ I add $\$\frac{1}{4}$, how much have I?

3. How much is $\frac{1}{2}$ in. $+ \frac{1}{4}$ in.? $\frac{1}{2} + \frac{1}{4}$? $2\frac{1}{2} + \frac{1}{4}$? $3\frac{1}{2} + 2\frac{1}{4}$?

4. How much is $3\frac{1}{2}$ yd. $+ 2\frac{1}{4}$ yd.?

$$\begin{array}{r} 3\frac{1}{2} = 3\frac{2}{4} \\ \underline{2\frac{1}{4} = 2\frac{1}{4}} \\ 5\frac{3}{4} \end{array}$$

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|
| $5\frac{1}{2}$ | $25\frac{1}{2}$ | $32\frac{1}{2}$ | $29\frac{1}{2}$ | $31\frac{1}{4}$ | $26\frac{1}{2}$ |
| $\underline{6\frac{1}{4}}$ | $\underline{17\frac{1}{4}}$ | $\underline{46\frac{1}{4}}$ | $\underline{13\frac{1}{4}}$ | $\underline{11\frac{1}{2}}$ | $\underline{27\frac{1}{4}}$ |

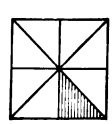
11. $2\frac{1}{2} + 5 + 3\frac{1}{4} + 7$.

12. $6\frac{1}{4} + 7 + 9\frac{1}{2} + 8$.

### 160. Mixed Numbers

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. If to $\frac{1}{8}$ of this square I add $\frac{1}{4}$ of the square, how many eighths will I have?



2. Look at the square and tell what $\frac{1}{2} + \frac{1}{8}$ equals.

3. How much is $\frac{1}{4}$ and $\frac{1}{8}$? $3\frac{1}{4} + 2\frac{1}{8}$?

$$\begin{array}{r} 3\frac{1}{4} = 3\frac{2}{8} \\ \underline{2\frac{1}{8} = 2\frac{1}{8}} \\ 5\frac{3}{8} \end{array}$$

*Copy and add:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| $7\frac{1}{4}$ | $5\frac{1}{4}$ | $25\frac{1}{4}$ | $42\frac{1}{4}$ | $27\frac{1}{8}$ | $48\frac{1}{4}$ |
| $\underline{6\frac{1}{8}}$ | $\underline{9\frac{1}{8}}$ | $\underline{16\frac{1}{8}}$ | $\underline{39\frac{1}{8}}$ | $\underline{56\frac{1}{4}}$ | $\underline{52\frac{1}{8}}$ |

10. $3\frac{1}{4} + 5\frac{1}{8}$.

11. $7\frac{1}{4} + 2\frac{1}{8}$.

12. $8\frac{1}{4} + 3\frac{1}{8}$.

### 161. Mixed Numbers

*Examples 1 to 3, oral — Examples 4 to 15, written*

1. If from 1 square I take $\frac{1}{4}$ of the square, what part of the square is left?

2. How much is $1-\frac{1}{4}$? $\frac{3}{4}-\frac{1}{4}$?

3. How much is $\frac{1}{2}-\frac{1}{4}$? $6\frac{1}{2}-2\frac{1}{4}$?

$$6\tfrac{1}{2}=6\tfrac{2}{4}$$
$$\underline{2\tfrac{1}{4}=2\tfrac{1}{4}}$$
$$4\tfrac{1}{4}$$

*Copy and subtract:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| $27\frac{1}{2}$ | $36\frac{1}{2}$ | $48\frac{1}{2}$ | $52\frac{1}{2}$ | $27\frac{1}{2}$ | $60\frac{1}{2}$ |
| $\underline{15\frac{1}{4}}$ | $\underline{23\frac{1}{4}}$ | $\underline{27\frac{1}{4}}$ | $\underline{10\frac{1}{4}}$ | $\underline{19\frac{1}{4}}$ | $\underline{55\frac{1}{4}}$ |

10. $16\frac{1}{2}-8\frac{1}{4}$.
11. $19\frac{1}{2}-7\frac{1}{4}$.
12. $25\frac{1}{2}-16\frac{1}{4}$.
13. $30\frac{1}{2}-12\frac{1}{4}$.
14. $32\frac{1}{2}-17\frac{1}{4}$.
15. $47\frac{1}{2}-29\frac{1}{4}$.

### 162. Mixed Numbers

*Examples 1 to 3, oral — Examples 4 to 18, written*

1. How much is $\frac{1}{4}$ in. $-\frac{1}{8}$ in.? $\$\frac{1}{4}-\$\frac{1}{8}$?

2. How much is $\frac{1}{2}$ in. $-\frac{1}{8}$ in.?

3. How much is $1\frac{1}{4}-\frac{1}{8}$? $3\frac{1}{4}-1\frac{1}{8}$?

$$3\tfrac{1}{4}=3\tfrac{2}{8}$$
$$\underline{1\tfrac{1}{8}=1\tfrac{1}{8}}$$
$$2\tfrac{1}{8}$$

*Copy and subtract:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| $15\frac{1}{4}$ | $17\frac{1}{4}$ | $25\frac{1}{4}$ | $32\frac{1}{4}$ | $29\frac{1}{4}$ | $43\frac{1}{4}$ |
| $\underline{2\frac{1}{8}}$ | $\underline{3\frac{1}{8}}$ | $\underline{5\frac{1}{8}}$ | $\underline{6\frac{1}{8}}$ | $\underline{16\frac{1}{8}}$ | $\underline{27\frac{1}{8}}$ |

10. $24\frac{1}{4}-3\frac{1}{8}$.
11. $25\frac{1}{4}-4\frac{1}{8}$.
12. $16\frac{1}{4}-9\frac{1}{8}$.
13. $5\frac{1}{4}-1\frac{1}{8}$.
14. $6\frac{1}{4}-3\frac{1}{8}$.
15. $9\frac{1}{4}-2\frac{1}{8}$.
16. $4\frac{1}{4}-2\frac{1}{8}$.
17. $3\frac{1}{4}-1\frac{1}{8}$.
18. $7\frac{1}{4}-1\frac{1}{8}$.

### 163. Review

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. If I have a half dollar and earn a quarter of a dollar more, how much have I?

2. If a boy nails a strip of wood $\frac{1}{4}$ in. thick on a strip that is $\frac{5}{8}$ in. thick, how thick is it then?

3. If a lady puts a lace edge $\frac{1}{2}$ in. wide on a piece of cloth $8\frac{1}{4}$ in. wide, how wide is it then?

*Copy and add:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| $26\frac{1}{4}$ | $28\frac{1}{4}$ | $42\frac{1}{4}$ | $31\frac{1}{8}$ | $48\frac{1}{8}$ | $54\frac{1}{8}$ |
| $33\frac{1}{2}$ | $19\frac{1}{8}$ | $16\frac{1}{8}$ | $26\frac{1}{4}$ | $22\frac{1}{4}$ | $16\frac{1}{4}$ |

### 164. Review

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. If I have a half dollar and spend a quarter of a dollar, how much have I left?

2. If a board 1 in. thick is planed down $\frac{1}{8}$ in., how thick is it then?

3. If a lady has $25\frac{1}{2}$ yd. of cloth and cuts off $5\frac{1}{4}$ yd., how much has she left?

*Copy and subtract:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| $32\frac{1}{2}$ | $42\frac{1}{4}$ | $60\frac{1}{4}$ | $15\frac{1}{4}$ | $27\frac{1}{2}$ | $21\frac{1}{2}$ |
| $10\frac{1}{4}$ | $30\frac{1}{8}$ | $20\frac{1}{8}$ | $9\frac{1}{8}$ | $16\frac{1}{4}$ | $16\frac{1}{4}$ |

### 165. Review

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. A lady sews a strip of cloth $\frac{3}{8}$ in. wide on a strip $\frac{5}{8}$ in. wide. How wide is it then?

2. A piece of marble $6\frac{1}{2}$ in. thick is polished down $\frac{1}{4}$ in. How thick is it then?

3. A pencil $6\frac{3}{8}$ in. long is sharpened down $\frac{1}{8}$ in. How long is it then?

*Copy and add:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| $2\frac{1}{4}$ | $3\frac{1}{2}$ | $4\frac{1}{8}$ | $2\frac{1}{8}$ | $5\frac{1}{8}$ | $3\frac{1}{8}$ |
| $3\frac{1}{8}$ | $2\frac{1}{4}$ | $5\frac{1}{8}$ | $3\frac{1}{4}$ | $2\frac{1}{4}$ | $\frac{1}{8}$ |

### 166. Review

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. On a pile of paper $\frac{1}{2}$ in. thick I lay a pile that is $\frac{1}{8}$ in. thick. How thick is the pile then?

2. If I have $\$2\frac{1}{2}$ and spend $\$\frac{1}{4}$, how much have I left?

3. If you carry home $3\frac{1}{4}$ lb. of butter and $\frac{3}{4}$ lb. of spice, how much do you carry in all?

*Copy and subtract:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| $4\frac{3}{4}$ lb. | $2\frac{1}{2}$ | $15\frac{1}{2}$ | $7\frac{1}{4}$ | $4\frac{1}{4}$ | $5\frac{1}{4}$ |
| $\frac{1}{4}$ | $\frac{1}{4}$ | $3\frac{1}{8}$ | $2\frac{1}{8}$ | $2\frac{1}{8}$ | $2\frac{1}{8}$ |

## X. PRACTICAL PROBLEMS

### 167. Shopping

*Examples 1 to 5, oral — Examples 6 to 12, written*

1. What will 7 yd. of calico cost at 8¢ a yard?
2. What will 8 yd. of braid cost at 5¢ a yard?
3. What will 7 spools of silk cost at 10¢ a spool?
4. What will 9 yd. of toweling cost at 8¢ a yard?
5. What will 6 yd. of velvet cost at $2 a yard?

*Add:*

| 6. | 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|---|
| 27¢ | 37¢ | 47¢ | 52¢ | 29¢ | 82¢ | $2.45 |
| 30 | 43 | 26 | 48 | 71 | 18 | 1.27 |

### 168. Shopping

*Examples 1 to 4, oral — Examples 5 to 10, written*

1. What will 6 yd. of gingham cost at 9¢ a yard?

*Find the cost of:*

2. 7 yd. of muslin at 8¢ a yard.
3. 2 yd. of lining at 20¢ a yard.
4. 3 doz. buttons at 10¢ a dozen.

*Add:*

| 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|
| $34 | $2.75 | $4.80 | $5.65 | $2.96 | $9.27 |
| 19 | 3.50 | 2.75 | 3.48 | 4.81 | 1.35 |

### 169. Shopping

*Examples 1 to 6, oral — Examples 7 to 16, written*

1. What will $\frac{1}{2}$ yd. lace cost at \$1 a yard?

*Find the cost of:*

2. $\frac{1}{4}$ yd. of flannel at \$1 a yard.
3. $\frac{1}{2}$ yd. of silk at 80¢ a yard.
4. $\frac{1}{2}$ yd. of velvet at \$2 a yard.
5. $\frac{1}{4}$ yd. of gingham at 16¢ a yard.
6. $\frac{1}{4}$ yd. of ribbon at 36¢ a yard.

*Find the change due from \$1 on purchases of:*

7. 80¢. 9. 70¢. 11. 60¢. 13. 50¢. 15. 40¢.
8. 72¢. 10. 65¢. 12. 57¢. 14. 48¢. 16. 36¢.

### 170. Shopping

*Examples 1 to 4, oral — Examples 5 to 10, written*

1. Tell the cost of 1 yd. of some kind of cloth. What will 2 yd. of that cloth cost?

*Find the cost of:*

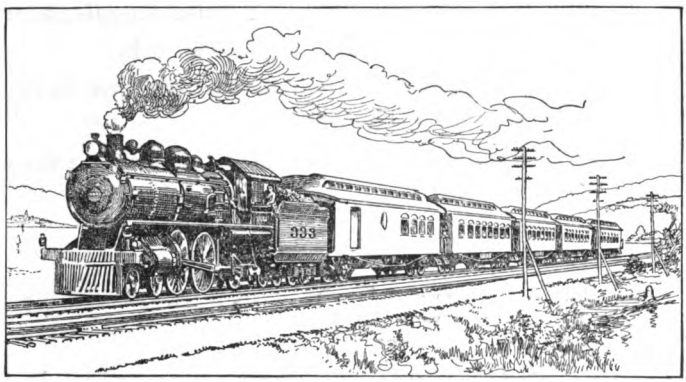
2. 2 pairs of shoes at \$2 a pair.
3. 2 yd. of lining at 50¢ a yard; at 60¢ a yard.
4. 5 spools of silk at 8¢ a spool; at 9¢ a spool.

*Add:*

| 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|
| \$2.48 | \$5.75 | \$6.83 | \$5.58 | \$7.68 | \$2.97 |
| 3.96 | 2.87 | 4.29 | 2.75 | 3.96 | 6.75 |

### 171. Railroads and Trolleys

*Examples 1 to 3, oral — Examples 4 to 7, written*




1. A train has 32 freight cars and 11 coal cars. How many are there in all?

2. A train has 40 men passengers and 12 women passengers. How many are there in all?

3. A train of 50 cars has 12 switched off. How many are left?

4. From a trolley car having 33 passengers 16 passengers went out. How many were left in the car?

5. A train of 4 cars had 46 passengers in the first car, 39 in the second, 48 in the third, and 25 in the fourth. How many were there in all?

6. Of four freight trains the first had 29 cars, the second 49 cars, the third 37 cars, and the fourth 58 cars. How many cars were there in all?

7. Add 7 cars, 63 cars, 46 cars, and 39 cars.

### 172. Cooking Measures

*Examples 1 to 3, oral — Examples 4 to 9, written.*

1. If 1 dessert spoon holds 2 teaspoonfuls, how many teaspoonfuls in 12 dessert spoonfuls?

2. If 1 tablespoon holds 4 teaspoonfuls, how many teaspoonfuls in 11 tablespoonfuls?

3. If 1 pt. of water weighs 1 lb., how much does 1 qt. weigh? how much does 3 qt. weigh?

*At 45 drops to 1 teaspoonful, how many drops in:*

4. $\frac{1}{3}$ of a teaspoonful. 6. $\frac{1}{5}$ of a teaspoonful.

5. $\frac{2}{3}$ of a teaspoonful. 7. $\frac{2}{5}$ of a teaspoonful.

8. Express as pints: 3 qt.; 2 gal.; $2\frac{1}{2}$ qt.

9. Express as quarts: 4 gal.; 8 pt.; $2\frac{1}{2}$ gal.

### 173. The Farm

*Examples 1 to 3, oral — Examples 4 to 6, written*

1. A farmer has 25 sheep in one flock and 30 in another. How many has he in both?

2. If each sheep produces 9 lb. of wool, how many pounds will 11 sheep produce?

3. At \$7 a head, what will 20 sheep cost?

4. If one sheep produces $9\frac{1}{4}$ lb. of wool and another $8\frac{1}{2}$ lb., how much do they both produce?

5. At \$0.90 a bushel, what will 10 bu. of wheat cost? What will 100 bu. cost?

6. At \$45 each, what must a farmer pay for 23 cows? for 64 cows? for 78 cows?

### 174. Buying Food

*Examples 1 to 5, oral — Examples 6 to 11, written*

1. At 22¢ a pound, what will 3 lb. of steak cost?
2. At 15¢ a gallon, what will 2 gal. of oil cost?
3. At 30¢ a pound, what will 3 lb. of butter cost?
4. At 40¢ a can, what will 5 cans of tea cost?
5. At 60¢ a can, what will 5 cans of cocoa cost?

*Copy and add:*

| 6. | 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|---|
| $2.37 | $3.28 | $1.87 | $3.04 | $3.58 | $5.75 |
| 4.26 | 2.37 | 2.36 | 2.68 | 1.49 | 2.75 |
| 1.25 | 3.46 | 4.29 | 1.29 | 2.76 | 4.25 |
| 3.42 | 1.92 | 5.07 | 4.42 | 3.59 | 7.25 |

### 175. Buying Food

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. At 24¢ a gallon, what will 2 gal. of molasses cost? what will $\frac{1}{2}$ gal. cost?
2. At 6¢ a pound, what will 20 lb. of dried apples cost? what will 30 lb. cost?
3. At $2.20 a pail, what will 2 pails of mackerel cost? what will 3 pails cost?

*Copy and subtract:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| $10.00 | $10.00 | $20.00 | $20.00 | $25.00 | $30.00 |
| 5.75 | 6.42 | 13.72 | 16.96 | 22.37 | 24.98 |

### 176. Review of Addition

*Examples 1 to 4, oral — Examples 5 to 12, written*

1. $20 + 10 + 30$.
2. $15 + 10 + 20$.
3. \$125 + \$25.
4. \$250 + \$50.

*Copy and add:*

| 5. | 6. | 7. | 8. |
|---|---|---|---|
| \$247.50 | \$196.80 | \$237.62 | \$175.42 |
| 162.75 | 247.50 | 762.38 | 263.87 |

| 9. | 10. | 11. | 12. |
|---|---|---|---|
| \$316.42 | \$148.72 | \$524.75 | \$268.43 |
| 721.83 | 629.39 | 127.63 | 129.74 |
| 683.58 | 851.28 | 309.96 | 486.97 |

### 177. Review of Subtraction

*Examples 1 to 6, oral — Examples 7 to 14, written*

1. $250 - 150$.
2. \$375 − \$25.
3. 425 ft. − 200 ft.
4. 650 in. − 150 in.
5. 250 bu. − 150 bu.
6. 375 gal. − 175 gal.

*Copy and subtract:*

| 7. | 8. | 9. | 10. |
|---|---|---|---|
| \$250.00 | \$429.75 | \$480.75 | \$300.00 |
| 175.26 | 128.69 | 192.86 | 129.86 |

| 11. | 12. | 13. | 14. |
|---|---|---|---|
| \$352.90 | \$257.90 | \$493.70 | \$800.00 |
| 172.86 | 189.86 | 287.69 | 468.73 |

### 178. Review of Multiplication

*Examples 1 to 9, oral — Examples 10 to 19, written*

| | | |
|---|---|---|
| **1.** $3 \times 30$. | **4.** $5 \times 40$. | **7.** $7 \times 30$. |
| **2.** $4 \times 20$. | **5.** $5 \times 50$. | **8.** $8 \times 50$. |
| **3.** $4 \times 30$. | **6.** $6 \times 20$. | **9.** $9 \times 20$. |

*Copy and multiply:*

| **10.** | **11.** | **12.** | **13.** | **14.** |
|---|---|---|---|---|
| 126 | 235 | 287 | 921 | 742 |
| 4 | 6 | 7 | 8 | 9 |

| **15.** | **16.** | **17.** | **18.** | **19.** |
|---|---|---|---|---|
| 864 | 596 | 758 | 297 | 489 |
| 11 | 11 | 12 | 12 | 12 |

### 179. Review of Division

*Examples 1 to 12, oral — Examples 13 to 27, written*

| | | |
|---|---|---|
| **1.** $40 \div 2$. | **5.** $66 \div 6$. | **9.** $99 \div 9$. |
| **2.** $60 \div 3$. | **6.** $63 \div 7$. | **10.** $80 \div 10$. |
| **3.** $44 \div 4$. | **7.** $84 \div 7$. | **11.** $70 \div 10$. |
| **4.** $80 \div 5$. | **8.** $96 \div 8$. | **12.** $60 \div 10$. |

*Copy and divide:*

| | | |
|---|---|---|
| **13.** $725 \div 5$. | **18.** $936 \div 6$. | **23.** $3411 \div 2$. |
| **14.** $844 \div 4$. | **19.** $854 \div 7$. | **24.** $4213 \div 4$. |
| **15.** $642 \div 3$. | **20.** $968 \div 8$. | **25.** $3925 \div 4$. |
| **16.** $642 \div 2$. | **21.** $639 \div 9$. | **26.** $6845 \div 8$. |
| **17.** $876 \div 2$. | **22.** $882 \div 9$. | **27.** $7377 \div 8$. |

### 180. General Review

*Examples 1 to 8, oral — Examples 9 to 17, written*

1. If I add 20 to 34, what is the sum?
2. If I take 40 from 96, what is left?
3. How much is $7 \times 20$? $7 \times 21$?
4. How much is $63 \div 7$? $630 \div 7$?
5. What is $\frac{1}{2}$ of 24? $\frac{1}{3}$ of 24? $\frac{1}{4}$ of 24? $\frac{1}{8}$ of 24?
6. What is $\frac{1}{3}$ of 33? $\frac{2}{3}$ of 33? $\frac{1}{3}$ of 27? $\frac{2}{3}$ of 27?
7. Make up a problem, using the sum of 25¢ and 12¢, and then solve the problem.
8. In a basket there are 1 doz. eggs. How many eggs will there be if I add $\frac{1}{2}$ doz. more?
9. How far is it around a schoolroom that is 30 ft. long and 20 ft. wide?
10. If you have read 172 pages of a book of 200 pages, how many more have you to read?
11. At \$3 each, how many lamps can be bought for \$33?
12. At \$2 each, how many sleds can be bought for \$24?
13. At \$34 a dozen, what will 4 doz. chairs cost?
14. At \$22 a dozen, what will $\frac{1}{2}$ doz. hats cost?
15. At 95¢ a bushel, what will 12 bu. of wheat cost?
16. A man buys 7 chairs at \$2.50 each, and a table for \$12. What does he pay for all?
17. A man buys 8 bu. of wheat at 96¢ a bushel and \$37.25 worth of hay. What does he pay for both?

# CHAPTER III

## NUMBERS TO 1,000,000

### I. READING AND WRITING NUMBERS

#### 1. Counting by 10,000's

*Examples 1 to 17, oral — Examples 18 to 23, written*

**1.** Count by hundreds from 1 hundred to 10 hundred.

**2.** Count by thousands from 1 thousand to 10 thousand.

**3.** What is the largest number of four figures?

**4.** We write 10 thousand thus: 10,000. How many figures are used? How many figures to the right of the comma?

**5.** Read the numbers: 10,000; 20,000; 30,000.

*Read the following:*

**6.** 40,000. **9.** 90,000. **12.** 15,000. **15.** 72,000.
**7.** 50,000. **10.** 80,000. **13.** 25,000. **16.** 87,000.
**8.** 70,000. **11.** 60,000. **14.** 12,000. **17.** 100,000.

*Write in figures:*

**18.** 20 thousand. **20.** 13 thousand. **22.** 99 thousand.
**19.** 70 thousand. **21.** 87 thousand. **23.** 100 thousand.

### 2. Numbers to 100,000

*Examples 1 to 13, oral — Examples 14 to 17, written*

1. Read these numbers: $36,000; $24,500.

*Read the following:*

| | | | |
|---|---|---|---|
| 2. 225. | 5. 61,225. | 8. 39,879. | 11. 99,000. |
| 3. 1225. | 6. 45,375. | 9. 57,621. | 12. 99,999. |
| 4. 21,225. | 7. 62,564. | 10. 72,067. | 13. 100,000. |

*Write in figures:*

14. 65 thousand 7 hundred 56.
15. 72 thousand 6 hundred 72.
16. 98 thousand 7 hundred 65.
17. Ninety-nine thousand seven hundred one.

### 3. Numbers to 100,000

*Examples 1 to 9, oral — Examples 10 to 14, written*

1. Read these numbers: $29,475; $63,002.

*Read the following:*

| | | | |
|---|---|---|---|
| 2. 70,007. | 4. 20,202. | 6. 33,033. | 8. 90,900. |
| 3. 60,009. | 5. 40,040. | 7. 44,044. | 9. 87,870. |

*Write in figures:*

10. One thousand two.
11. Eleven thousand one.
12. Seventy thousand seventy.
13. Fifty-five thousand fifty-five.
14. Ninety-nine thousand nine hundred ninety.

### 4. Counting by 100,000's

*Examples 1 to 9, oral — Examples 10 to 18, written*

1. Read these numbers: \$100; 100 ft.; 100,000.

*Read the following:*

2. 200 ft. 4. 500 yd. 6. 600,000. 8. 800,000.
3. 200,000. 5. 500,000. 7. 700,000. 9. 900,000.

*Write in figures:*

10. 300 thousand.
11. 700 thousand.
12. 400 thousand.
13. 200 thousand.
14. 500 thousand.
15. 800 thousand.
16. 600 thousand.
17. 900 thousand.
18. Add \$100 and \$200; 100,000 and 200,000.

### 5. Numbers to 1,000,000

*Examples 1 to 9, oral — Examples 10 to 19, written*

1. Read these numbers: \$250; 250 ft.; 250,000.

*Read the following:*

2. 350,000. 4. 225,000. 6. 111,000. 8. 642,000.
3. 150,000. 5. 375,000. 7. 505,000. 9. 237,000.

*Write in figures:*

10. 275 thousand.
11. 296 thousand.
12. 463 thousand.
13. 260 thousand.
14. 307 thousand.
15. 365 thousand.
16. 509 thousand.
17. 750 thousand.
18. 876 thousand.
19. 999 thousand.

### 6. Numbers to 1,000,000

*Examples 1 to 5, oral — Examples 6 to 11, written*

1. Read these numbers: \$800,000; \$900,000; \$1,000,000. We call a thousand thousand by the name *million*, and we write it thus: 1,000,000.

*Read the following:*

2. 276,842. 3. 478,926. 4. 999,999. 5. 1,000,000.

*Write in figures:*

6. 242 thousand.
7. 376 thousand 6.
8. 498 thousand 80.
9. 700 thousand 7.
10. 888 thousand 88.
11. 123 thousand 456.

### 7. Roman Numerals

*Examples 1 to 6, oral — Examples 7 to 14, written*

1. What letters are used in writing Roman numerals from one to one hundred?

*Read the following:*

2. XXIV. 3. XLVI. 4. LXIX. 5. XC. 6. XCIV.

We use D for 500 and M for 1000. We write the hundreds from 200 to 900 thus: CC, CCC, CD, D, DC, DCC, DCCC, CM or DCCCC.

*Write in common figures:*

7. D. 9. DCLI. 11. CD. 13. MCMXX.
8. DL. 10. DCCV. 12. CMIV. 14. MDCCCCXX.

## II. ADDITION

### 8. Addition to 1000

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. If you spend 20¢ for a ball and 45¢ for a bat, how much do you spend for both?

2. If you save 25¢, 50¢, and 5¢, how much do you save in all?

3. Add 20¢, 50¢, and 30¢. To the sum add $1.

*Copy and add:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| 243 | 243 | 243 | 526 | 476 | 348 |
| 421 | 429 | 479 | 358 | 294 | 469 |

### 9. Addition to 10,000

*Examples 1 to 7, oral — Examples 8 to 13, written*

1. How much is $200, $300, and $500?

*Add the following:*

| 2. | 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|---|
| 200 | 275 | 305 | 2000 | 3000 | 7500 |
| 1000 | 2000 | 4000 | 5000 | 6000 | 2000 |

*Copy and add:*

| 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|
| 247 | 2247 | 2247 | 5296 | 4686 | 3542 |
| 396 | 396 | 4396 | 4372 | 4297 | 6458 |

### 10. Addition to 10,000

*Examples 1 and 2, oral — Examples 3 to 8, written*

1. A man paid $1000 for a lot and $3500 for building a house. How much did he pay for both?

2. A man paid $3000 for a farm and $1200 for stock. How much did he pay for both?

*Copy and add:*

| 3. | 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|---|
| $125 | $280 | $27.50 | $35.40 | $1245 | $1527 |
| 250 | 396 | 72.65 | 62.96 | 2326 | 208 |
| 375 | 481 | 39.75 | 37.84 | 1092 | 3983 |
| 475 | 375 | 28.80 | 33.80 | 1872 | 4282 |

### 11. Addition to 10,000

*Examples 1 and 2, oral — Examples 3 to 8, written*

1. A dealer sold 1200 pairs of shoes one month and 1100 pairs the next month. How many pairs did he sell in both months?

2. 1500 pairs and 1500 pairs are how many pairs?

*Copy and add:*

| 3. | 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|---|
| $2.48 | $3.81 | $42.80 | $2472 | $3872 | $3972 |
| 3.96 | 2.74 | 36.92 | 3698 | 126 | 1206 |
| 7.52 | 6.19 | 57.20 | 183 | 3481 | 1087 |
| 6.04 | 7.26 | 63.07 | 2196 | 962 | 298 |

### 12. Addition to 10,000

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. Add 225 ft. and 2000 ft.
2. Add 100 ft., 300 ft., 4000 ft., and 44 ft.
3. Add \$300, \$700, \$2000, and \$1000.

*Copy and add:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| 27 | 127 | 2127 | 1207 | \$20.64 | \$17.99 |
| 32 | 232 | 1232 | 2356 | 32.43 | 26.43 |
| 46 | 546 | 3546 | 1000 | 20.00 | 10.00 |
| 84 | 884 | 884 | 1793 | 7.57 | 13.57 |
| 61 | 961 | 1961 | 3644 | 19.36 | 32.01 |

### 13. Addition to 100,000

*Examples 1 and 2, oral — Examples 3 to 8, written*

1. Add 10,000 and 20,000.
2. Add 25 ft. and 50 ft.; 25,000 and 50,000.

*Copy and add:*

| 3. | 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|---|
| 14 | 214 | \$12.14 | 11,214 | 21,000 | 12,425 |
| 12 | 612 | 36.12 | 13,612 | 16,250 | 17,574 |
| 23 | 423 | 54.23 | 15,423 | 31,475 | 23,021 |
| 64 | 564 | 25.64 | 12,564 | 10,025 | 16,378 |
| 21 | 321 | 13.21 | 11,321 | 11,007 | 13,906 |
| 48 | 548 | 45.48 | 14,548 | 10,008 | 16,695 |

### 14. Addition

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. Add \$15 and \$5; 15,000 and 5000.
2. Add 25 ft. and 5 ft.; 25,000 and 5000.
3. Add 75¢ and 9¢; 75,000 and 9000.

*Copy and add:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| 34 | 64 | 47 | \$2.47 | \$17.86 | 35,425 |
| 66 | 39 | 66 | 4.82 | 43.21 | 1,006 |
| 48 | 55 | 52 | 7.52 | 82.14 | 23,407 |
| 52 | 36 | 34 | 5.18 | 56.79 | 356 |
| 99 | 61 | 22 | 2.22 | 22.22 | 20,075 |

### 15. Addition

*Examples 1 to 3, oral — Examples 4 to 13, written*

1. Add $a$ and $b$ in I; also in II.
2. Add $a$ and $c$ in I; also in II.
3. Add $b$ and $c$ in I; also in II.

*Add in I:*

4. $d$ and $e$.
5. $e$, $f$, and $g$.
6. $g$, $h$, and $i$.
7. $d$, $e$, $f$, $g$.
8. $f$, $g$, $h$, $i$.
9. All of I.

*Add in II:*

10. $c$, $d$, $e$, $f$.
11. $d$, $e$, $f$, $g$.
12. $e$, $f$, $g$, $h$, $i$.
13. All of II.

| | I | II |
|---|---|---|
| $a$ | 2000 | 3000 |
| $b$ | 3500 | 4500 |
| $c$ | 2200 | 1100 |
| $d$ | 3446 | 2746 |
| $e$ | 8227 | 3981 |
| $f$ | 3742 | 4293 |
| $g$ | 2681 | 5196 |
| $h$ | 6173 | 84 |
| $i$ | 3796 | 177 |

## III. SUBTRACTION

### 16. Subtraction

*Examples 1 to 3, oral — Examples 4 to 8, written*

1. A man has 60 chickens and sells 40 of them. How many are left? How much is 60,000 − 40,000?

2. A man has $90 and spends $50. How much has he left? How much is 90,000 − 50,000?

3. How much is 250,000 − 30,000?

*Copy and subtract:*

| 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|
| $37.50 | $37.50 | $259.70 | $428.62 | $526.35 |
| 15.00 | 19.75 | 176.92 | 239.48 | 129.48 |

### 17. Subtraction

*Examples 1 to 9, oral — Examples 10 to 14, written*

1. From $2 make change for $1.35, thus: $1.35 and 5 (cents) are $1.40, and 10 (cents) are $1.50, and 50 (cents) are $2. The change is, then, 65¢.

*From $2 make change for these purchases:*

2. $1.50. 4. $1.25. 6. $1.68. 8. $1.06.
3. $1.75. 5. $1.32. 7. $1.83. 9. $1.03.

*Copy and subtract:*

| 10. | 11. | 12. | 13. | 14. |
|---|---|---|---|---|
| $169.30 | $142.20 | $284.36 | $375.80 | $421.62 |
| 48.25 | 83.60 | 97.09 | 263.95 | 392.48 |

### 18. Subtraction

*Examples 1 to 9, oral — Examples 10 to 14, written*

1. If you buy \$2.40 worth of groceries, what change is due from \$3?

*From \$5 make change for these purchases:*

2. \$4.50. 4. \$4.25. 6. \$2.50. 8. \$4.80.
3. \$4.75. 5. \$3.50. 7. \$3.75. 9. \$4.85.

*Copy and subtract:*

| 10. | 11. | 12. | 13. | 14. |
|---|---|---|---|---|
| \$426.00 | \$286.40 | \$397.50 | \$1000.00 | \$1000.00 |
| 135.75 | 193.75 | 248.80 | 275.75 | 326.48 |

### 19. Subtraction

*Examples 1 to 9, oral — Examples 10 to 15, written*

1. From \$10 make change for a \$6.50 purchase.

*From \$10 make change for these purchases:*

2. \$9.50. 4. \$9.25. 6. \$7.50. 8. \$8.40.
3. \$9.75. 5. \$8.50. 7. \$8.75. 9. \$6.65.

10. A man bought a farm for \$6750 and sold it for \$8200. How much did he gain?

*Copy and subtract:*

| 11. | 12. | 13. | 14. | 15. |
|---|---|---|---|---|
| 34,625 | 43,726 | 29,763 | 37,829 | 752,386 |
| 12,302 | 12,318 | 14,846 | 15,939 | 426,497 |

### 20. Subtraction

*Examples 1 and 2, oral — Examples 3 to 13, written*

1. From \$4 make change for a \$3.50 purchase.
2. Also for purchases of \$3.75, \$3.21, \$3.06.

*Copy and subtract:*

| 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|
| \$326.50 | \$491.62 | \$348.77 | \$934.21 | \$826.37 |
| 241.75 | 272.54 | 122.36 | 134.13 | 248.24 |

| 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|
| \$427.20 | \$727.46 | \$843.39 | \$496.29 | \$1823.41 |
| 293.62 | 171.91 | 65.62 | 237.86 | 823.42 |

13. From 5280 ft. take 1760 ft.

### 21. Subtraction

*Examples 1 to 5, oral — Examples 6 to 10, written*

1. How much more is \$2500 than \$1800?
2. How much less is \$2500 than \$3200?
3. How much greater than 250 ft. is 500 ft.?
4. How much less than 750 ft. is 500 ft.?
5. Make a problem about $725 - 125$, and solve it.

*Copy and subtract:*

| 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|
| 42,350 | 71,375 | 82,433 | 37,296 | 80,001 |
| 26,485 | 29,460 | 29,647 | 12,987 | 70,002 |

### 22. Subtraction

*Examples 1 to 10, oral — Examples 11 to 16, written*

1. If my purchases are 50¢, 20¢, and 10¢, what change do I get from $1?

2. If I receive in change from $2 a fifty-cent piece, a quarter, and a 5-cent piece, what was the amount of my purchases?

*State the remainders rapidly:*

| 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|---|---|---|
| 24 | 24 | 24 | 47 | 47 | 50 | 50 | 75 |
| 10 | 14 | 16 | 37 | 39 | 48 | 28 | 56 |

11. A man had $68.75 in the bank and drew out $29.87. How much had he left?

12. Pikes Peak is 14,147 ft. high. Mt. Washington is 6288 ft. high. How much higher is Pikes Peak than Mt. Washington?

13. Make a problem about $4126 - 3685$, and solve it.

14. The population of a city is now 157,275. It has gained 49,396 in ten years. What was it ten years ago?

15. If a man has $254.26 in the bank and draws out $27.60 and $32.75, how much has he left?

16. If a man has $348.25 in the bank and draws out $32.50, $49.62, and $166.13, how much has he left?

## IV. MULTIPLICATION

### 23. Multiplying by 10

*Examples 1 to 11, oral — Examples 12 to 26, written*

1. Recite the multiplication table of 10's.

*Multiply by 10:*

| | | | | |
|---|---|---|---|---|
| **2.** 3. | **4.** 5. | **6.** 7. | **8.** 9. | **10.** 11. |
| **3.** 4. | **5.** 6. | **7.** 8. | **9.** 10. | **11.** 25. |

*Multiply by 10:*

| | | | | |
|---|---|---|---|---|
| **12.** 75. | **15.** 50. | **18.** 125. | **21.** 340. | **24.** 1275. |
| **13.** 62. | **16.** 20. | **19.** 475. | **22.** 400. | **25.** 4380. |
| **14.** 97. | **17.** 40. | **20.** 642. | **23.** 700. | **26.** 5000. |

### 24. Multiplying by 10

*Examples 1 to 9, oral — Examples 10 to 19, written*

1. What will 25 tables cost at \$10 each?
2. What will 10 cows cost at \$45 each?
3. Multiply by 10: \$2; \$0.10 or 10¢; \$2.10.
4. In multiplying \$2.10 by 10, what must be done with the period between dollars and dimes?

*Multiply by 10:*

| | | |
|---|---|---|
| **5.** \$2.50. | **10.** \$175.50. | **15.** \$312.05. |
| **6.** \$3.70. | **11.** \$225.75. | **16.** \$1245.00. |
| **7.** \$4.25. | **12.** \$486.45. | **17.** \$3546.70. |
| **8.** \$5.65. | **13.** \$527.73. | **18.** \$3560.00. |
| **9.** \$15.00. | **14.** \$217.45. | **19.** \$2875.05. |

To multiply 36 by 20, we multiply 36 by 2 and annex 0, arranging the work as here shown.

$$\begin{array}{r} 36 \\ \times\ 20 \\ \hline 720 \end{array}$$

To multiply a number by 10, we annex 0 to the number and move the decimal point, if there is one, one place to the right, thus:

$10 \times 575 = 5750.$ $10 \times \$5.75 = \$57.50.$

To multiply 42 by 300, we multiply 42 by 3 and annex two zeros, arranging the work as here shown.

$$\begin{array}{r} 42 \\ \times\ 300 \\ \hline 12600 \end{array}$$

To multiply a number by 100, we annex two zeros to the number and move the decimal point, if there is one, two places to the right, thus:

$100 \times 575 = 57{,}500,$ $100 \times \$5.75 = \$575.00.$

### 25. Multiplying by 10's and 100's

*Examples 1 to 5, oral — Examples 6 to 10, written*

1. Recite the table of 6's, adding 5 to each product.
2. Recite the table of 7's, adding 4 to each product.
3. Recite the table of 8's, adding 6 to each product.
4. Multiply \$25.50 by 10; by 100.
5. Multiply \$200 by 10; by 20; by 100.

*Copy and multiply:*

| 6. | 7. | 8. | 9. | 10. |
|---|---|---|---|---|
| 27 | 48 | 69 | \$4.28 | \$9.75 |
| × 30 | × 70 | × 300 | × 30 | × 200 |

### 26. Multiplying by 10's and 100's

*Examples 1 to 4, oral — Examples 5 to 12, written*

1. At 50¢ a dozen, what will 10 doz. oranges cost?
2. At 48¢ a dozen, what will 10 doz. eggs cost?
3. At $6 each, what will 100 sheep cost?
4. Recite the table of 9's, adding 3 to each product.

*Multiply:*

5. $200 \times 75$.
6. $300 \times 26$.
7. $70 \times \$25$.
8. $40 \times \$64$.
9. $30 \times \$2.75$.
10. $50 \times \$12.50$.

11. At 56 lb. each, what will 30 bu. of corn weigh?
12. At 60 lb. each, what will 75 bu. of beans weigh?

### 27. Multiplying by 10's and 100's

*Examples 1 to 6, oral — Examples 7 to 12, written*

1. Multiply by 10: 2; 5; 7; and 9.
2. Multiply by 100: 3; 4; 8; and 10.
3. Multiply by 20: 5; 6; 9; and 11.
4. Recite the table of 8's, adding 4 to each product.
5. Make a problem about multiplying 4 by 10, and solve it.
6. There being 10 dimes in $1, how many dimes are there in $75? in $87? in $95?

*Multiply:*

7. $300 \times 75$.
8. $400 \times 25$.
9. $200 \times 1450$.
10. $500 \times 1135$.
11. $700 \times \$62$.
12. $800 \times \$98$.

### 28. Multiplying by 11

*Examples 1 to 10, oral — Examples 11 to 22, written*

1. How much is $2 \times 11$? $3 \times 11$? $4 \times 11$?
2. Count by 11's, thus: 11, 22, and so on to 132.

*State the results rapidly:*

3. $4 \times 11$.
4. $5 \times 11$.
5. $7 \times 11$.
6. $3 \times 11$.
7. $6 \times 11$.
8. $9 \times 11$.
9. $8 \times 11$.
10. $10 \times 11$.

*Copy and learn:*

11. $1 \times 11 = 11$.
12. $2 \times 11 = 22$.
13. $3 \times 11 = 33$.
14. $4 \times 11 = 44$.
15. $5 \times 11 = 55$.
16. $6 \times 11 = 66$.
17. $7 \times 11 = 77$.
18. $8 \times 11 = 88$.
19. $9 \times 11 = 99$.
20. $10 \times 11 = 110$.
21. $11 \times 11 = 121$.
22. $12 \times 11 = 132$.

### 29. Multiplying by 11

*Examples 1 to 3, oral — Examples 4 to 27, written*

1. At 8¢ a quart, what will 11 qt. of berries cost?
2. At 5¢ each, what will 11 pencils cost?
3. Recite the table of 11's, adding 1 to each product.

*Multiply by 11 in the way learned on page 119:*

4. 35.
5. 48.
6. 72.
7. 96.
8. 75.
9. 80.
10. 125.
11. 233.
12. 481.
13. 962.
14. 348.
15. 683.
16. 1250.
17. 3175.
18. 6832.
19. $4196.
20. $8132.
21. $4875.
22. 2200.
23. 3000.
24. 8005.
25. 6060.
26. $22.75.
27. $35.75.

### 30. Multiplying by 12

*Examples 1 to 10, oral — Examples 11 to 22, written*

1. How much is $2 \times 12$? $3 \times 12$? $4 \times 12$?
2. Count by 12's, thus: 12, 24, and so on to 144.

*State the results rapidly:*

3. $3 \times 12$.
4. $4 \times 12$.
5. $5 \times 12$.
6. $2 \times 12$.
7. $1 \times 12$.
8. $10 \times 12$.
9. $11 \times 12$.
10. $100 \times 12$.

*Copy and learn:*

11. $1 \times 12 = 12$.
12. $2 \times 12 = 24$.
13. $3 \times 12 = 36$.
14. $4 \times 12 = 48$.
15. $5 \times 12 = 60$.
16. $6 \times 12 = 72$.
17. $7 \times 12 = 84$.
18. $8 \times 12 = 96$.
19. $9 \times 12 = 108$.
20. $10 \times 12 = 120$.
21. $11 \times 12 = 132$.
22. $12 \times 12 = 144$.

### 31. Multiplying by 12

*Examples 1 to 3, oral — Examples 4 to 27, written*

1. At 12¢ a box, what will 8 boxes of berries cost?
2. At 12¢ each, what will 9 fishing lines cost?
3. Recite the table of 12's, adding 1 to each product.

*Multiply by 12 in the way learned on page 120:*

4. 42.
5. 86.
6. 93.
7. 75.
8. 33.
9. 99.
10. 125.
11. 642.
12. 327.
13. 409.
14. 505.
15. 700.
16. $275.
17. $825.
18. $670.
19. $1260.
20. $2380.
21. $4080.
22. 1000.
23. 1200.
24. 3003.
25. 5050.
26. $21.50.
27. $12.75.

To multiply 325 by 21, we first multiply by 1 and then by 2 (tens), adding the products, as here shown.

We see that $1 \times 325 = 325$, and we write the 5 under units.

We see that $2 \times 325 = 650$, and since we are multiplying by tens, we write the 0 under tens.

The product is 6825.

$$\begin{array}{r} 325 \\ 21 \\ \hline 325 \\ 650 \\ \hline 6825 \end{array}$$

To multiply 406 by 68, we first multiply by 8 and then by 6 (tens), adding the products, as here shown.

$$\begin{array}{r} 406 \\ 68 \\ \hline 3248 \\ 2436 \\ \hline 27608 \end{array}$$

### 32. Two-figure Multipliers

*Examples 1 to 5, oral — Examples 6 to 17, written*

1. What will 20 bookcases cost at \$10 each?
2. What will 10 carriages cost at \$125 each?
3. What will 30 wagons cost at \$100 each?
4. What will 10 sulky plows cost at \$40 each?
5. Recite the table of 4's, adding 6 to each product.

*Copy and multiply:*

| 6. | 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|---|
| 253 | 167 | 240 | 724 | 308 | 632 |
| 27 | 33 | 25 | 37 | 62 | 68 |

| 12. | 13. | 14. | 15. | 16. | 17. |
|---|---|---|---|---|---|
| 575 | 404 | 428 | 606 | 643 | 999 |
| 36 | 75 | 32 | 66 | 39 | 99 |

To multiply \$24.75 by 64, we proceed in the usual way, placing the decimal point in the product directly under the decimal point in the multiplicand, as here shown.

\$24.75
64
9900
14850
\$1584.00

### 33. Two-figure Multipliers

*Examples 1 to 6, oral — Examples 7 to 24, written*

1. At \$1.50 a dozen, what will 2 doz. collars cost?
2. At \$1.25 a yard, what will 2 yd. of silk cost?
3. At \$2 a yard, what will 4 yd. of velvet cost?
4. At \$2.50 apiece, what will 2 books cost?
5. At \$3 apiece, what will 20 fountain pens cost?
6. Recite the table of 5's, adding 9 to each product.

*Copy and multiply:*

| 7. | 8. | 9. | 10. | 11. | 12. |
|---|---|---|---|---|---|
| \$2.50 | \$3.65 | \$4.80 | \$5.25 | \$12.50 | \$27.62 |
| 31 | 22 | 34 | 42 | 40 | 39 |

| 13. | 14. | 15. | 16. | 17. | 18. |
|---|---|---|---|---|---|
| \$4.60 | \$7.95 | \$5.92 | \$9.37 | \$13.75 | \$52.96 |
| 22 | 26 | 36 | 39 | 60 | 37 |

| 19. | 20. | 21. | 22. | 23. | 24. |
|---|---|---|---|---|---|
| \$5.80 | \$8.34 | \$8.75 | \$9.99 | \$48.70 | \$99.99 |
| 75 | 27 | 48 | 99 | 80 | 99 |

To multiply 392 by 136, we first multiply by 6, the product being 2352. We then multiply by 3 (tens), the product being 1176 (tens), and we place the right-hand figure in tens' place. We then multiply by 1 (hundred), and place the right-hand figure in hundreds' place.

```
 392
 136
2352
1176
392
53312
```

The sum of these partial products is 53,312. Therefore the result is 53,312.

### 34. Three-figure Multipliers

*Examples 1 to 4, oral — Examples 5 to 19, written*

1. At \$50 each, what will 100 cows cost?
2. At \$60 each, what will 100 bicycles cost?
3. At \$40 each, what will 100 plows cost?
4. At \$30 each, what will the maker receive for 200 sets of furniture?

*Copy and multiply:*

5. $245 \times 378$.
6. $326 \times 497$.
7. $129 \times 688$.
8. $237 \times 843$.
9. $125 \times 888$.
10. $125 \times 816$.
11. $278 \times 396$.
12. $843 \times 981$.
13. $125 \times 8000$.
14. $125 \times 4444$.
15. $237 \times 1276$.
16. $398 \times 2247$.

17. What will 125 barrels of apples cost at \$3.75 per barrel?
18. Make a problem about $75 \times \$6.75$, and solve it.
19. What will 16 mowing machines cost at \$42.50 each?

To multiply 487 by 604, we first multiply by 4, the product being 1948. Since we multiplied by units, we place the right-hand figure in units' place. When we multiply by 0, we get only 0, so we do not write this product. When we multiply by 6 (hundreds), we have 2922 for the product, and this we write so that the right-hand figure comes under hundreds. The result is 294,148.

$$\begin{array}{r} 487 \\ 604 \\ \hline 1948 \\ 2922 \\ \hline 294148 \end{array}$$

### 35. Three-figure Multipliers

*Examples 1 to 3, oral — Examples 4 to 23, written*

1. Recite the multiplication table of 11's.
2. Recite the multiplication table of 12's.
3. How many square inches in a square foot?

*Copy and multiply:*

| | | |
|---|---|---|
| 4. $101 \times 427$. | 10. $301 \times 648$. | 16. $305 \times 702$. |
| 5. $101 \times 363$. | 11. $407 \times 942$. | 17. $406 \times 1475$. |
| 6. $202 \times 787$. | 12. $307 \times 682$. | 18. $308 \times 3209$. |
| 7. $303 \times 525$. | 13. $805 \times 377$. | 19. $402 \times 2008$. |
| 8. $505 \times 766$. | 14. $904 \times 782$. | 20. $408 \times 2007$. |
| 9. $909 \times 999$. | 15. $809 \times 698$. | 21. $909 \times 1009$. |

22. What will 225 acres of land cost at \$75 an acre?

23. A man buys 15 acres of land at \$62.50 an acre, and 125 acres at \$87.50 an acre. What does all the land cost him?

### 36. Review of Multiplication

*Examples 1 to 4, oral — Examples 5 to 19, written*

1. What will 4 doz. bananas cost at 30¢ a dozen?
2. What will 3 lb. of beef cost at 22¢ a pound?
3. What will 7 yd. of carpet cost at 80¢ a yard?
4. What will 16 suits cost at $10 each?

*Copy and multiply:*

| | | |
|---|---|---|
| 5. $73 \times \$287$. | 10. $42 \times \$4.75$. | 15. $39 \times \$5.08$. |
| 6. $48 \times \$481$. | 11. $37 \times \$4.69$. | 16. $72 \times \$7.06$. |
| 7. $79 \times \$633$. | 12. $59 \times \$9.73$. | 17. $48 \times \$9.09$. |
| 8. $57 \times \$597$. | 13. $62 \times \$8.49$. | 18. $25 \times \$4.08$. |
| 9. $65 \times \$921$. | 14. $38 \times \$7.76$. | 19. $36 \times \$8.07$. |

### 37. Review of Multiplication

*Examples 1 to 8, oral — Examples 9 to 20, written*

1. At 30¢ a dozen, what will 10 doz. eggs cost?
2. At 30¢ a dozen, what will 12 doz. eggs cost?

*Multiply quickly:*

| | | |
|---|---|---|
| 3. $20 \times 40$. | 5. $30 \times 500$. | 7. $70 \times 600$. |
| 4. $20 \times 400$. | 6. $30 \times 5000$. | 8. $70 \times 6000$. |

*Copy and multiply:*

| | | |
|---|---|---|
| 9. $243 \times \$2.75$. | 13. $244 \times \$12.75$. | 17. $209 \times \$7.43$. |
| 10. $327 \times \$6.42$. | 14. $386 \times \$15.90$. | 18. $306 \times \$9.81$. |
| 11. $488 \times \$7.50$. | 15. $589 \times \$92.30$. | 19. $709 \times \$8.72$. |
| 12. $521 \times \$9.73$. | 16. $448 \times \$87.62$. | 20. $805 \times \$5.08$. |

### 38. Review of Multiplication

*Examples 1 to 4, oral — Examples 5 to 9, written*

1. Find the cost of 2 lb. of coffee at 15¢ a pound.

*Find the cost of:*

2. 2 lb. of tea at 40¢ a pound.
3. 3 cans of cocoa at 30¢ a can.
4. 2 lb. of chocolate at 60¢ a pound.
5. 35 cows at $55 each.
6. 17 ponies at $95 each.
7. 12 building lots at $1375 each.
8. 35 automobiles at $2450 each.
9. 12 farm wagons at $87.50 each.

### 39. Review of Multiplication

*Examples 1 to 4, oral — Examples 5 to 10, written*

1. Multiply by 7 and then add 6: 8; 4; 3; 9; 7.

*Find the cost of:*

2. 2 cans of condensed milk at 14¢ a can.
3. 5 lb. of maple sugar at 20¢ a pound.
4. 10 lb. of cheese at 18¢ a pound.
5. 6 gal. of maple sirup at $1.45 a gallon.
6. 7 gal. of New Orleans molasses at 65¢ a gallon.
7. 24 carriages at $135 each.
8. 7 locomotives at $9875 each.
9. 16 passenger cars at $3950 each.
10. 62 yd. of velvet carpet at $1.65 a yard.

### 40. Review of Multiplication

*Examples 1 to 4, oral — Examples 5 to 16, written*

1. Multiply by 8 and then add 4: 7; 5; 6; 9; 3.

*Find the cost of:*

2. 2 packages of breakfast food at 15¢ each.
3. 3 bags of hominy at 30¢ each.
4. 9 boxes of cornstarch at 8¢ each.

*Multiply:*

| | | |
|---|---|---|
| 5. $7 \times \$48$. | 9. $4 \times \$2.94$. | 13. $12 \times 825$. |
| 6. $6 \times \$92$. | 10. $3 \times \$6.82$. | 14. $28 \times 956$. |
| 7. $8 \times \$275$. | 11. $5 \times \$9.27$. | 15. $125 \times 387$. |
| 8. $9 \times \$456$. | 12. $6 \times \$7.42$ | 16. $625 \times 842$. |

### 41. Review of Multiplication

*Examples 1 to 5, oral — Examples 6 to 14, written*

1. Multiply by 7 and then add 2: 6; 8; 4; 9; 3.

*Find the cost of:*

2. 2 tins of crackers at 22¢ each.
3. 3 cans of soup at 21¢ each.
4. 4 cans of corned beef at 12¢ each.
5. 2 cans of asparagus at 50¢ each.

*Multiply:*

| | | |
|---|---|---|
| 6. $6 \times \$125$. | 9. $5 \times \$42.20$. | 12. $250 \times \$800$. |
| 7. $7 \times \$143$. | 10. $6 \times \$38.50$. | 13. $375 \times \$625$. |
| 8. $8 \times \$250$. | 11. $9 \times \$21.75$. | 14. $450 \times \$375$. |

## V. DIVISION

### 42. Division by 10

*Examples 1 to 6, oral — Examples 7 to 22, written*

1. How many 10's in 20? in 30? in 40?

*Divide by 10:*

2. 40. 3. 90. 4. 520. 5. 640. 6. 730.

*Copy and divide by 10:*

| | | | |
|---|---|---|---|
| 7. 750. | 11. 4860. | 15. $2500. | 19. 4080. |
| 8. 680. | 12. 5220. | 16. $3700. | 20. 6090. |
| 9. 940. | 13. 3490. | 17. $6400. | 21. 7070. |
| 10. 370. | 14. 6280. | 18. $9200. | 22. 8000. |

### 43. Division by 10's

*Examples 1 to 4, oral — Examples 5 to 13, written*

1. What is the short way of dividing 80 by 20?

2. Divide 28 by 4; $28 by $4; 28 ft. by 4 ft.; 28 tens by 4 tens; 280 by 40.

3. We see that to divide 280 by 40 is the same as to divide 28 by 4, canceling the 0's as here shown. Divide 240 by 40 in this way.

$$4\cancel{0})28\cancel{0}\quad 7$$

4. Divide 250 by 50; 480 by 40; 500 by 50.

*Copy and divide:*

| | | |
|---|---|---|
| 5. 490 by 70. | 8. 6750 by 90. | 11. 1760 by 40. |
| 6. 560 by 80. | 9. 5280 by 40. | 12. 1120 by 20. |
| 7. 1230 by 30. | 10. 4440 by 60. | 13. 1840 by 80. |

If we divide 3421 by 4, we have a quotient 855 and a remainder 1. But $1 \div 4 = \frac{1}{4}$, so we write for the total quotient $855\frac{1}{4}$.

$$4\overline{)3421} \qquad 855\tfrac{1}{4}$$

If we divide 2967 by 10, we may cut off the last figure, 7. Then the rest of the number is the quotient, and 7 is the remainder. We therefore write as the total quotient $296\frac{7}{10}$.

$$10\overline{)2967} \qquad 296\tfrac{7}{10}$$

### 44. Short Division

*Examples 1 to 3, oral — Examples 4 to 33, written*

1. At 10¢ each, how many cans of peas can I buy for \$1? for \$2? for \$5?

2. At 10¢ each, how many boxes of crackers can I buy for 50¢? for 90¢? for \$3?

3. At 4¢ a yard, how many yards of ribbon can I buy for 32¢? for 33¢? for 25¢?

*Divide, writing any remainder as a fraction:*

| | | |
|---|---|---|
| 4. $120 \div 4$. | 14. $2641 \div 9$. | 24. $7233 \div 10$. |
| 5. $121 \div 4$. | 15. $21{,}421 \div 2$. | 25. $3177 \div 10$. |
| 6. $123 \div 4$. | 16. $36{,}422 \div 3$. | 26. $4860 \div 20$. |
| 7. $3471 \div 2$. | 17. $25{,}121 \div 4$. | 27. $3960 \div 30$. |
| 8. $4262 \div 3$. | 18. $65{,}154 \div 5$. | 28. $4260 \div 30$. |
| 9. $5833 \div 4$. | 19. $72{,}617 \div 6$. | 29. $1760 \div 40$. |
| 10. $7276 \div 5$. | 20. $1270 \div 10$. | 30. $1780 \div 40$. |
| 11. $8185 \div 6$. | 21. $2360 \div 10$. | 31. $2730 \div 70$. |
| 12. $6456 \div 7$. | 22. $1477 \div 10$. | 32. $2740 \div 70$. |
| 13. $7181 \div 8$. | 23. $1869 \div 10$. | 33. $3440 \div 80$. |

To divide 143 by 11, we write the numbers as here shown.

Then 14 (tens) ÷ 11 = 1 (ten), with 3 (tens) remainder. Write the 1 above tens.

Subtract and bring down the next figure, and we have 33 to be divided.

33 ÷ 11 = 3. Write the 3 above units.

Subtract 3 × 11, and we have no remainder.

The quotient is 13.

$$\begin{array}{r} 13 \\ 11\overline{)143} \\ 11 \\ \hline 33 \\ 33 \\ \hline \end{array}$$

This kind of division is called *long division.* That on page 198 is called *short division.*

### 45. Division by 11

*Examples 1 to 3, oral — Examples 4 to 20, written*

**1.** At 11¢ a quart, how many quarts of berries can I buy for 33¢? for 55¢?

**2.** At 11¢ a package, how many packages of breakfast food can I buy for 99¢? for $1.10?

**3.** At 11¢ a yard, how many yards of cloth can I buy for 88¢? for $1.21?

*Divide by 11:*

| | | | | |
|---|---|---|---|---|
| **4.** 154. | **7.** 231. | **10.** 594. | **13.** 1331. | **16.** 2541. |
| **5.** 176. | **8.** 352. | **11.** 671. | **14.** 1441. | **17.** 3861. |
| **6.** 198. | **9.** 473. | **12.** 891. | **15.** 1001. | **18.** 7007. |

**19.** How much is $\frac{1}{11}$ of $341?

**20.** Make a problem about $737 ÷ $11, and solve it; also about $781 ÷ $11.

To divide 714 by 21, we proceed as follows:

$7 \div 2 = 3$ and some remainder, and $71 \div 21$ also equals 3 and some remainder.

Subtract 3 (tens) × 21 from 71 tens.

Remainder, 8 tens. Bring down 4.

Subtract 4 × 21 from 84.

No remainder. Quotient is 34.

$$\begin{array}{r} 34 \\ 21\overline{)714} \\ 63 \\ \hline 84 \\ 84 \\ \hline \end{array}$$

The first figure of the quotient may often be found by dividing the first figure of the dividend by the first figure of the divisor.

### 46. Two-figure Divisors

*Examples 1 to 13, oral — Examples 14 to 25, written*

**1.** Divide 62 by 31; 62 ft. by 31 ft.; \$62 by \$31.

*State the quotients rapidly:*

**2.** $80 \div 20$.
**3.** $84 \div 21$.
**4.** $80 \div 40$.
**5.** $82 \div 41$.
**6.** $120 \div 60$.
**7.** $122 \div 61$.

*State only the first figure in each quotient:*

**8.** $735 \div 21$.
**9.** $961 \div 31$.
**10.** $1353 \div 41$.
**11.** $1683 \div 51$.
**12.** $2684 \div 61$.
**13.** $6237 \div 81$.

*Divide:*

**14.** $189 \div 21$.
**15.** $328 \div 41$.
**16.** $637 \div 91$.
**17.** $961 \div 31$.
**18.** $1353 \div 41$.
**19.** $1683 \div 51$.
**20.** $2684 \div 61$.
**21.** $6237 \div 81$.
**22.** $6643 \div 91$.
**23.** $6461 \div 71$.
**24.** $8008 \div 91$.
**25.** $9009 \div 91$.

### 47. Two-figure Divisors

*Examples 1 to 4, oral — Examples 5 to 14, written*

1. Divide 80 by 20; 84 by 21; 84 in. by 21 in.
2. 48 in. is how many times 12 in.?
3. 77 in. is how many times 11 in.?
4. 26 lb. is how many times 13 lb.?

*Divide:*

5. $682 \div 31$.
6. $806 \div 31$.
7. $1023 \div 31$.
8. $902 \div 41$.
9. $1683 \div 51$.
10. $2074 \div 61$.
11. $2840 \div 71$.
12. $3362 \div 82$.
13. $4784 \div 92$.

14. If one bicycle costs \$31, how many bicycles can be bought for \$651?

### 48. Two-figure Divisors

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. A room 30 ft. long and 10 ft. high is how many times as long as high?
2. A room 30 ft. long and 15 ft. wide is how many times as long as wide?
3. A man weighs 160 lb. and his son weighs 40 lb. The man is how many times as heavy as the son?

*Divide:*

4. $924 \div 42$.
5. $1664 \div 52$.
6. $2542 \div 62$.
7. $3723 \div 73$.
8. $6889 \div 83$.
9. $7614 \div 94$.
10. $1749 \div 53$.
11. $4752 \div 72$.
12. $6804 \div 84$.

### 49. Two-figure Divisors

*Examples 1 to 5, oral — Examples 6 to 14, written*

1. How much is $40 \div 20$? Then $40 \div 19$ will be nearly what number?

2. How much is $90 \div 30$? Then $90 \div 29$ will be nearly what number?

*State the first figure in each quotient:*

3. $4000 \div 19$. 4. $9000 \div 29$. 5. $8000 \div 39$.

*Divide:*

6. $418 \div 19$. 9. $928 \div 29$. 12. $3636 \div 36$.
7. $589 \div 19$. 10. $1189 \div 29$. 13. $3774 \div 37$.
8. $798 \div 19$. 11. $1560 \div 39$. 14. $8140 \div 74$.

### 50. Two-figure Divisors

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. How many suits of clothes can be bought for \$75, at \$25 each?

2. How many loads of corn, each containing 22 bu., can be made from 88 bu.?

3. If a man saves \$30 a month, how long will it take him to save \$60? \$600?

*Divide:*

4. $6457 \div 59$. 7. $8372 \div 65$. 10. $6753 \div 57$.
5. $7436 \div 34$. 8. $8757 \div 67$. 11. $9362 \div 89$.
6. $5936 \div 47$. 9. $3764 \div 29$. 12. $8579 \div 73$.

To divide 24,000, 24,357, and 25,357 by 2000, we proceed as follows:

$$2\not{0}\not{0}\not{0})\underline{24\not{0}\not{0}\not{0}} \qquad 2\not{0}\not{0}\not{0})\underline{24\not{3}\not{5}\not{7}} \qquad 2\not{0}\not{0}\not{0})\underline{25\not{3}\not{5}\not{7}}$$
$$12 \qquad 12\tfrac{3\,5\,7}{2\,0\,0\,0} \qquad 12\tfrac{1\,3\,5\,7}{2\,0\,0\,0}$$

That is, we *cancel* (cross out) the zeros at the right of the divisor and cancel as many figures at the right of the dividend as we cancel zeros of the divisor, writing the complete remainder over the divisor.

Canceling three figures divides by 1000, and because we divide the rest by 2, we really have divided by 2000.

### 51. Divisors ending in Zeros

*Examples 1 to 11, oral — Examples 12 to 21, written*

1. \$9000 is how many times \$3000?
2. \$16,000 is how many times \$4000?

*State the quotients:*

| | | |
|---|---|---|
| 3. $40\overline{)280}$ | 6. $70\overline{)560}$ | 9. $80\overline{)720}$ |
| 4. $50\overline{)450}$ | 7. $70\overline{)5600}$ | 10. $80\overline{)7200}$ |
| 5. $60\overline{)420}$ | 8. $700\overline{)5600}$ | 11. $800\overline{)7200}$ |

*Divide:*

| | |
|---|---|
| 12. $6000 \div 300$. | 17. $4000 \div 200$. |
| 13. $6007 \div 300$. | 18. $4009 \div 200$. |
| 14. $6107 \div 300$. | 19. $4109 \div 200$. |
| 15. $60{,}107 \div 300$. | 20. $102{,}107 \div 6000$. |
| 16. $69{,}107 \div 300$. | 21. $147{,}111 \div 7000$. |

To divide 54,445 by 432, we proceed as with smaller numbers, as already shown.

| | $126\frac{13}{432}$ |
|---|---|
| First, $544 \div 432 = 1 +$ something. | $432\overline{)54445}$ |
| Then multiply $1 \times 432$. | 432 |
| Subtract, and bring down 4. | 1124 |
| Then multiply $2 \times 432$. | 864 |
| Subtract, and bring down 5. | 2605 |
| Then multiply $6 \times 432$. | 2592 |
| Write the remainder over 432. | 13 |

### 52. Three-figure Divisors

*Examples 1 to 4, oral — Examples 5 to 24, written*

1. 1600 ft. is how many times 400 ft.?
2. \$2500 is how many times \$500?
3. 1200 miles is how many times 300 miles?
4. \$3200 is how many times \$800?

*Divide:*

5. 16,875 ÷ 125.
6. 25,868 ÷ 116.
7. 26,288 ÷ 212.
8. 28,413 ÷ 231.
9. 86,028 ÷ 201.
10. 38,354 ÷ 302.
11. 59,985 ÷ 215.
12. 70,512 ÷ 226.
13. 50,470 ÷ 245.
14. 117,440 ÷ 367.
15. 472,932 ÷ 783.
16. 179,450 ÷ 485.
17. 137,544 ÷ 521.
18. 863,241 ÷ 321.
19. 260,021 ÷ 302.
20. 123,540 ÷ 225.
21. 656,647 ÷ 456.
22. 221,335 ÷ 102.
23. 302,591 ÷ 227.
24. 369,963 ÷ 333.

### 53. Review

*Examples 1 to 3, oral — Examples 4 to 6, written*

1. Fanny and Emily are buying cake. They buy $\frac{1}{2}$ lb. at 40¢ a pound. What does it cost? What do they pay for 6 rolls at 10¢ a dozen?

2. They buy a pie for 15¢ and 2 loaves of bread at 5¢ each. What do these cost?

3. They buy 10¢ worth of doughnuts and 16¢ worth of brown bread. How much do these cost?

4. If the baker pays one of his men $2.25 a day, how much does he pay him in 6 days?

5. If he pays another man $3.15 a day, how much does he pay him in 6 days?

6. If the baker sold 36,000 cakes last year, how many cakes did he sell a month?

### 54. Review

*Examples 1 to 5, oral — Examples 6 to 17, written*

1. How much is \$2.75 and \$0.25?
2. How much is \$2.75 and \$1.25?
3. Take \$1.25 from \$4.25; from \$5.25.
4. How much is $2 \times 70¢$? $2 \times 5¢$? $2 \times 75¢$?
5. How much is $\frac{1}{2}$ of $40¢$? $\frac{1}{2}$ of \$4? $\frac{1}{2}$ of \$400?
6. \$27.50 + \$9.65.
7. \$37.64 + \$8.96.
8. \$49.78 + \$6.22.
9. \$62.62 + \$7.38.
10. \$50.73 − \$9.27.
11. \$38.42 − \$9.64.
12. $49 \times$ \$75.
13. $23 \times$ \$68.
14. $37 \times$ \$96.
15. $86 \times$ \$73.
16. $57 \times$ \$89.
17. $99 \times$ \$99.

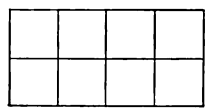
### 55. Review

*Examples 1 to 3, oral — Examples 4 to 13, written*

1. At 21 in. to a step, how many inches do you go in taking 4 steps?
2. At 21 in. to a step, how many steps do you take in going 63 in.?
3. If one of you boys weighs 46 lb. and another weighs 50 lb., how much do you both weigh?
4. $234 \times 234$.
5. $487 \times 487$.
6. $540 \times 540$.
7. $672 \times 672$.
8. $808 \times 909$.
9. \$1478.64 − \$369.98.
10. \$2409.72 − \$1046.83.
11. \$4082.68 − \$3296.49.
12. \$5007.70 − \$2990.09.
13. \$4000.00 − \$1999.99.

## VI. FRACTIONS

To take $\frac{3}{8}$ of this rectangle, we divide the rectangle into 8 equal parts and we take 3 of these parts.



In the fraction $\frac{3}{8}$, 3 is called the *numerator*, and it tells how many equal parts we take.

In the same fraction 8 is called the *denominator*, and it tells the number of equal parts into which the rectangle has been divided.

$$\frac{3}{8} = \frac{\text{numerator}}{\text{denominator}}.$$

The numerator and denominator are called the *terms* of the fraction. The terms of the fraction $\frac{3}{8}$ are 3 and 8.

A whole number, like 2, 7, or \$10, is called an *integer*.

An integer and a fraction together are called a *mixed number;* as $2\frac{1}{2}$, $\$4\frac{3}{4}$.

A fraction that is less than 1 is called a *proper fraction;* as $\frac{1}{2}$, $\frac{3}{4}$, $\frac{2}{5}$.

A fraction that is equal to 1 or greater than 1 is called an *improper fraction;* as $\frac{4}{4}$, $\frac{5}{5}$, $\frac{5}{4}$, $\frac{15}{8}$.

Look at the above picture and study the following:

$\frac{1}{2}$ of 8 is 4. $\frac{1}{8}$ of 8 is 1.
$\frac{1}{4}$ of 8 is 2. $\frac{3}{8}$ of 8 is 3.
$\frac{3}{4}$ of 8 is 6. $\frac{5}{8}$ of 8 is 5.
$\frac{4}{4}$ of 8 is 8. $\frac{7}{8}$ of 8 is 7.

### 56. Fraction Names

*Examples 1 to 7, oral — Examples 7 to 11, written*

1. What is the numerator of the fraction $\frac{3}{4}$?
2. What is the denominator of the fraction $\frac{7}{8}$?
3. What do you mean by the terms of a fraction?
4. Name the integers: $4\frac{1}{2}$, $3\frac{7}{8}$, 6, $2\frac{1}{3}$, 5, $\frac{1}{2}$, 4.
5. Name the mixed numbers: $\frac{3}{3}$, 4, $\frac{3}{8}$, $5\frac{1}{2}$, $7\frac{3}{4}$.
6. Name the fractions: 7, $\frac{2}{3}$, 19, $\frac{7}{8}$, 5, $8\frac{4}{5}$, $\frac{9}{8}$, $6\frac{3}{4}$.
7. Name the proper fractions: $\frac{2}{3}$, $3\frac{1}{2}$, $\frac{4}{4}$, $\frac{5}{4}$, $\frac{1}{2}$, $\frac{6}{7}$.
8. Write ten proper fractions.
9. Write ten improper fractions.
10. Write ten mixed numbers.
11. Write ten integers.

### 57. Fraction Names

*Examples 1 to 3, oral — Examples 4 to 11, written*

1. In the fraction $\frac{3}{4}$ in., what does 4 tell you about the fraction? What does 3 tell you?
2. What does the denominator of any fraction tell you? What does the numerator tell you?
3. In the mixed number $2\frac{7}{8}$, which is the integer? What kind of a fraction is the other part?
4. Write 5 integers and 5 mixed numbers.
5. Write 5 proper and 5 improper fractions.

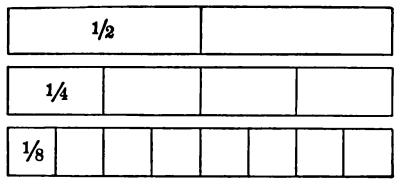
*Write the results:*

6. $\frac{1}{2}$ of 18.
7. $\frac{1}{2}$ of 28.
8. $\frac{1}{4}$ of 24.
9. $\frac{1}{4}$ of 48.
10. $\frac{1}{8}$ of 64.
11. $\frac{1}{8}$ of 96.

### 58. Reduction

*Examples 1 to 3, oral — Examples 4 to 11, written*

1. Calling each of these large rectangles *one*, tell how many halves you see in 1?




2. How many fourths do you see in $\frac{1}{2}$? in 1?

3. How many eighths do you see in $\frac{1}{4}$? in $\frac{1}{2}$? in 1?

*Copy, complete, and learn:*

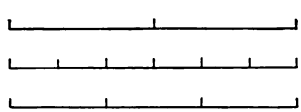
4. $\frac{}{2} = 1$.
5. $\frac{}{4} = 1$.
6. $\frac{}{8} = 1$.
7. $\frac{}{4} = \frac{1}{2}$.
8. $\frac{}{8} = \frac{1}{4}$.
9. $\frac{}{8} = \frac{1}{2}$.
10. $\frac{}{8} = \frac{3}{4}$.
11. $\frac{4}{} = \frac{1}{2}$.

### 59. Reduction

*Examples 1 and 2, oral — Examples 3 to 16, written*

1. How many sixths do you see in $\frac{1}{2}$? in 1?

2. How many sixths do you see in $\frac{1}{3}$? in $\frac{2}{3}$?



*Copy, complete, and learn:*

3. $\frac{}{3} = 1$.
4. $\frac{}{6} = 1$.
5. $\frac{}{6} = \frac{1}{2}$.
6. $\frac{}{6} = \frac{1}{3}$.
7. $\frac{}{6} = \frac{2}{3}$.
8. $\frac{}{6} = \frac{3}{3}$.
9. $\frac{2}{6} = \frac{}{3}$.
10. $\frac{4}{6} = \frac{2}{}$.

*Write the results:*

11. $\frac{1}{3}$ of 21.
12. $\frac{1}{3}$ of 39.
13. $\frac{1}{6}$ of 12.
14. $\frac{1}{6}$ of 30.
15. $\frac{1}{6}$ of 42.
16. $\frac{1}{6}$ of 72.

We have now seen that $\frac{1}{2} = \frac{2}{4}$, that $\frac{1}{4} = \frac{2}{8}$, and that $\frac{1}{3} = \frac{2}{6}$, each term of the first fraction being multiplied by 2 to make the second.

*Both terms of a fraction may be multiplied by the same number without changing the value of the fraction.*

For example,

$\frac{1}{2} = \frac{2}{4}$ $\quad$ $\frac{3}{4} = \frac{6}{8}$ $\quad$ $\frac{2}{3} = \frac{4}{6}$ $\quad$ $\frac{3}{5} = \frac{6}{10}$

$\frac{1}{4} = \frac{2}{8}$ $\quad$ $\frac{1}{3} = \frac{2}{6}$ $\quad$ $\frac{1}{5} = \frac{2}{10}$ $\quad$ $\frac{1}{2} = \frac{5}{10}$

### 60. Reduction

*Examples 1 to 4, oral — Examples 5 to 28, written*

1. How many eighths of an inch in $\frac{1}{2}$ in.?
2. How many quarters of a dollar in $\$\frac{1}{2}$?
3. How many tenths of a foot in $\frac{1}{2}$ ft.?
4. How many sixths of a foot in $\frac{2}{3}$ ft.?

*Express as eighths:*

**5.** $\frac{1}{2}$. **6.** $\frac{1}{4}$. **7.** $\frac{3}{4}$. **8.** 1. **9.** $\frac{2}{2}$. **10.** $\frac{5}{4}$.

*Express as twelfths:*

**11.** $\frac{1}{2}$. **12.** $\frac{1}{4}$. **13.** $\frac{3}{4}$. **14.** $\frac{1}{3}$. **15.** $\frac{1}{6}$. **16.** $\frac{5}{6}$.

*Express as tenths:*

**17.** $\frac{1}{2}$. **18.** $\frac{1}{5}$. **19.** $\frac{2}{5}$. **20.** $\frac{3}{5}$. **21.** $\frac{4}{5}$. **22.** $\frac{7}{5}$.

*Express as sixths:*

**23.** $\frac{1}{3}$. **24.** $\frac{2}{3}$. **25.** $\frac{3}{3}$. **26.** 1. **27.** $\frac{4}{3}$. **28.** $\frac{5}{3}$.

We have seen that $\frac{1}{2}$ and $\frac{2}{4}$ have the same value; that is, $\frac{2}{4} = \frac{1}{2}$. In the same way, $\frac{2}{8} = \frac{1}{4}$, $\frac{5}{10} = \frac{1}{2}$, and so on, each term of the first fraction being divided by the same number to make the second.

*Both terms of a fraction may be divided by the same number without changing the value of the fraction.*

For example,

$\frac{2}{4} = \frac{1}{2}$ $\quad$ $\frac{4}{8} = \frac{1}{2}$ $\quad$ $\frac{4}{6} = \frac{2}{3}$ $\quad$ $\frac{5}{10} = \frac{1}{2}$

When both terms cannot be divided by the same number, the fraction is said to be *in lowest terms.*

To reduce a fraction to lowest terms, divide by the largest number that will divide both terms without a remainder.

$$\frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}, \text{ lowest terms.}$$

In this example 4 is said to be *canceled* from both terms when the work is written like this:

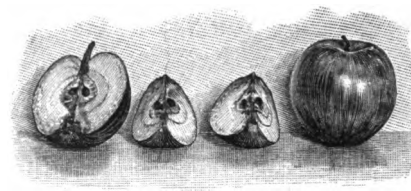
$$\frac{\overset{2}{\cancel{8}}}{\underset{3}{\cancel{12}}} = \frac{2}{3}.$$

*Study the following:*

$$\frac{\overset{2}{\cancel{8}}}{\underset{5}{\cancel{15}}} = \frac{2}{5}. \qquad \frac{\overset{2}{\cancel{8}}}{\underset{5}{\cancel{20}}} = \frac{2}{5}. \qquad \frac{\overset{3}{\cancel{12}}}{\underset{7}{\cancel{28}}} = \frac{3}{7}.$$

### 61. Reduction

*Examples 1 to 4, oral — Examples 5 to 19, written*



**1.** Express 1 apple as halves.

**2.** Express 1 apple as fourths.

**3.** Express $\frac{1}{2}$ apple as fourths.

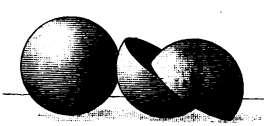
**4.** Express $\frac{1}{2}$ as eighths; as tenths.

*Reduce to lowest terms:*

| | | | | |
|---|---|---|---|---|
| **5.** $\frac{4}{8}$. | **8.** $\frac{4}{10}$. | **11.** $\frac{5}{10}$. | **14.** $\frac{4}{12}$. | **17.** $\frac{2}{8}$. |
| **6.** $\frac{4}{6}$. | **9.** $\frac{6}{12}$. | **12.** $\frac{5}{15}$. | **15.** $\frac{4}{16}$. | **18.** $\frac{6}{8}$. |
| **7.** $\frac{6}{9}$. | **10.** $\frac{3}{12}$. | **13.** $\frac{10}{20}$. | **16.** $\frac{8}{16}$. | **19.** $\frac{8}{12}$. |

### 62. Reduction

*Examples 1 and 2, oral — Examples 3 to 8, written*



**1.** How many halves in 1? in 2?

**2.** How many fourths in 1? in 2? in 3? in 4?

Because $1 = \frac{4}{4}$, 2 must equal $\frac{2 \times 4}{4}$, or $\frac{8}{4}$.

Because $1 = \frac{10}{10}$, 5 must equal $\frac{5 \times 10}{10}$, or $\frac{50}{10}$.

*Express as fourths:*

**3.** 2. **4.** 7. **5.** 9. **6.** 12. **7.** 15. **8.** 3.

### 63. Reducing Improper Fractions

*Examples 1 to 3, oral — Examples 4 to 14, written*

1. How many fourths in 1? in $1\frac{1}{4}$? in $1\frac{3}{4}$?
2. Express $\frac{5}{4}$ as a mixed number.
3. Express $\frac{7}{4}$ as a mixed number.

*To express an improper fraction as a mixed number, divide the numerator by the denominator.*

Thus $\frac{6}{4} = 6 \div 4 = 1\frac{2}{4}$, or $1\frac{1}{2}$.

*Express as integers or as mixed numbers:*

4. $\frac{8}{4}$. 6. $\frac{16}{4}$. 8. $\frac{9}{4}$. 10. $\frac{7}{6}$. 12. $\frac{15}{4}$.
5. $\frac{15}{5}$. 7. $\frac{20}{2}$. 9. $\frac{8}{5}$. 11. $\frac{9}{6}$. 13. $\frac{17}{8}$.

14. Express 9 quarters of a dollar as dollars.

### 64. Adding Fractions

*Examples 1 to 3, oral — Examples 4 to 16, written*

1. Add 2 in. and 2 in. Add $\frac{2}{3}$ and $\frac{2}{3}$, expressing the sum as a mixed number.
2. Express $\frac{3}{4} + \frac{3}{4}$ as fourths; as a mixed number.
3. Express $\frac{5}{8} + \frac{5}{8}$ as a mixed number.

*Add, expressing the sums as mixed numbers:*

4. $\frac{3}{4} + \frac{3}{4}$. 7. $\frac{5}{8} + \frac{7}{8}$. 10. $\frac{3}{5} + \frac{4}{5}$. 13. $\frac{5}{10} + \frac{7}{10}$.
5. $\frac{5}{8} + \frac{5}{8}$. 8. $\frac{7}{8} + \frac{3}{8}$. 11. $\frac{4}{5} + \frac{4}{5}$. 14. $\frac{7}{10} + \frac{7}{10}$.
6. $\frac{7}{8} + \frac{7}{8}$. 9. $\frac{3}{5} + \frac{3}{5}$. 12. $\frac{5}{6} + \frac{5}{6}$. 15. $\frac{7}{10} + \frac{9}{10}$.

16. A man has 9 quarters of a dollar in one hand and 8 in the other. How many dollars has he?

### 65. Adding Fractions

*Examples 1 to 3, oral — Examples 4 to 11, written*

1. How many are 1 apple and 3 apples? $\frac{1}{8}$ and $\frac{3}{8}$?

2. How many are 1 apple and 3 oranges? How many pieces of fruit?

*To add things we must give them the same name.*

3. To add $\frac{1}{4}$ and $\frac{3}{8}$, we may call $\frac{1}{4}$ by the name $\frac{2}{8}$. Add $\frac{2}{8}$ and $\frac{3}{8}$.

$$\frac{1}{4} = \frac{2}{8}$$
$$\frac{3}{8} = \frac{3}{8}$$
$$\frac{5}{8}$$

*Copy and add:*

4. $\frac{1}{2} + \frac{3}{4}$.
5. $\frac{1}{4} + \frac{3}{8}$.
6. $\frac{3}{4} + \frac{7}{8}$.
7. $\frac{1}{2} + \frac{3}{8}$.
8. $\frac{1}{2} + \frac{1}{8}$.
9. $\frac{1}{4} + \frac{5}{8}$.
10. $\frac{1}{2} + \frac{5}{8}$.
11. $\frac{1}{4} + \frac{7}{8}$.

### 66. Adding Mixed Numbers

*Examples 1 to 3, oral — Examples 4 to 21, written*

1. How many feet are $3\frac{3}{4}$ ft. and 2 ft.?
2. How much is $5\frac{3}{4}$ and $\frac{1}{4}$?
3. Add $3\frac{3}{4}$ and $2\frac{1}{4}$; $3\frac{3}{4}$ in. and $2\frac{1}{4}$ in.

$$3\tfrac{3}{4}$$
$$2\tfrac{1}{4}$$
$$5\tfrac{4}{4} = 6$$

*Copy and add:*

4. $3\frac{1}{2} + 2\frac{1}{2}$.
5. $5\frac{1}{4} + 2\frac{3}{4}$.
6. $4\frac{1}{8} + 3\frac{7}{8}$.
7. $6\frac{3}{8} + 2\frac{5}{8}$.
8. $3\frac{1}{4} + 6\frac{1}{4}$.
9. $7\frac{1}{8} + 8\frac{1}{8}$.
10. $5\frac{1}{8} + 4\frac{3}{8}$.
11. $2\frac{1}{8} + 3\frac{5}{8}$.
12. $4\frac{1}{5} + 7\frac{4}{5}$.
13. $6\frac{2}{5} + 9\frac{3}{5}$.
14. $4\frac{1}{6} + 8\frac{5}{6}$.
15. $5\frac{1}{7} + 6\frac{6}{7}$.
16. $2\frac{1}{2} + 3\frac{1}{2} + 4\frac{1}{2}$.
17. $2\frac{1}{4} + 4\frac{1}{4} + 5\frac{1}{4}$.
18. $3\frac{1}{4} + 2\frac{3}{4} + 7\frac{1}{4}$.
19. $3\frac{1}{4} + 3\frac{1}{4} + 3\frac{1}{4}$.
20. $2\frac{1}{4} + 2\frac{1}{4} + 3\frac{1}{4}$.
21. $2\frac{1}{8} + 3\frac{3}{8} + 2\frac{1}{8}$.

### 67. Adding Fractions

*Examples 1 to 4, oral — Examples 5 to 22, written*

1. How many eighths are $\frac{3}{4}$?
2. How many eighths are $\frac{3}{4} + \frac{5}{8}$?
3. Express $\frac{11}{8}$ as a mixed number.
4. Express $\frac{3}{4} + \frac{5}{8}$ as a mixed number.

$$\frac{3}{4} = \frac{6}{8}$$
$$\frac{5}{8} = \frac{5}{8}$$
$$\frac{11}{8} = 1\frac{3}{8}$$

*Copy and add:*

5. $\frac{1}{2} + \frac{7}{8}$.
6. $\frac{1}{2} + \frac{3}{4}$.
7. $\frac{1}{2} + \frac{5}{6}$.
8. $\frac{1}{2} + \frac{7}{10}$.
9. $\frac{1}{2} + \frac{9}{10}$.
10. $\frac{1}{3} + \frac{5}{6}$.
11. $\frac{2}{3} + \frac{5}{6}$.
12. $\frac{4}{5} + \frac{7}{10}$.
13. $\frac{4}{5} + \frac{9}{10}$.
14. $\frac{3}{4} + \frac{5}{12}$.
15. $\frac{3}{4} + \frac{7}{12}$.
16. $\frac{3}{4} + \frac{11}{12}$.
17. $\frac{1}{2} + \frac{3}{8}$.
18. $\frac{1}{2} + \frac{5}{8}$.
19. $\frac{1}{3} + \frac{1}{6}$.
20. $\frac{1}{5} + \frac{3}{10}$.
21. $\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$.
22. $\frac{1}{2} + \frac{3}{4} + \frac{5}{8}$.

### 68. Adding Mixed Numbers

*Examples 1 to 5, oral — Examples 6 to 15, written*

1. How many fourths is $\frac{1}{2}$?
2. How much is $\frac{2}{4} + \frac{3}{4}$?
3. Express $\frac{5}{4}$ as a mixed number.
4. Add $2\frac{2}{4}$ and 4.
5. Add $2\frac{2}{4}$ and $4\frac{3}{4}$.

$$2\tfrac{1}{2} = 2\tfrac{2}{4}$$
$$4\tfrac{3}{4} = 4\tfrac{3}{4}$$
$$6\tfrac{5}{4} = 7\tfrac{1}{4}$$

*Copy and add:*

6. $2\frac{3}{4} + 4\frac{3}{4}$.
7. $3\frac{1}{2} + 7\frac{3}{4}$.
8. $5\frac{1}{2} + 6\frac{3}{4}$.
9. $2\frac{3}{4} + 3\frac{5}{8}$.
10. $3\frac{3}{4} + 4\frac{7}{8}$.
11. $3\frac{1}{2} + 9\frac{7}{8}$.
12. $4\frac{1}{2} + 3\frac{5}{8}$.
13. $5\frac{2}{3} + 3\frac{5}{6}$.
14. $7\frac{4}{5} + 2\frac{9}{10}$.
15. A box is $6\frac{3}{4}$ in. long and $3\frac{7}{8}$ in. wide. How far is it around the box?

We have learned that in adding fractions we should have the denominators alike.

If we have to add $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{3}{4}$, we must multiply the terms of each fraction by some number that shall give the required denominator.

We find the smallest number that will contain each of the denominators 2, 3, and 4, without a remainder. This number is called the *least common denominator* of the fractions.

Since it must contain 2, 3, and 4, this denominator must be at least as large as $3 \times 4$, and we see that 12 does contain all three numbers.

12 is the least common denominator of $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{3}{4}$.

$\frac{1}{2}$ is how many twelfths? $\frac{1}{2}$ is $\frac{6}{12}$.
$\frac{2}{3}$ is how many twelfths? $\frac{2}{3}$ is $\frac{8}{12}$.
$\frac{3}{4}$ is how many twelfths? $\frac{3}{4}$ is $\frac{9}{12}$.

Add all these and reduce to a mixed number.

Multiply the terms by 6. $\frac{1}{2} = \frac{6}{12}$
Multiply the terms by 4. $\frac{2}{3} = \frac{8}{12}$
Multiply the terms by 3. $\frac{3}{4} = \frac{9}{12}$
Add and reduce, the sum being $\frac{23}{12} = 1\frac{11}{12}$

Since in practical arithmetic we no longer use common fractions with large terms, it is not necessary to use the terms *greatest common divisor* and *least common multiple* at this time. Such definitions and additional explanation as may be necessary with individual pupils or required by particular courses of study are best given by the teacher, but plenty of practice is the only means of securing quickness in this work. Teachers may give the definitions of factors and prime factors and a brief list of prime numbers at this time, as shown in the Appendix, if the course of study requires it.

### 69. Adding Fractions

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. Add $\frac{1}{2}$ in., $\frac{1}{2}$ in., and $\frac{1}{2}$ in.
2. Add $\frac{1}{2}$ in., $\frac{1}{2}$ in., and $\frac{1}{4}$ in.
3. Add $\frac{1}{3}$ in., $\frac{1}{3}$ in., and $\frac{2}{3}$ in.
4. In adding $\frac{1}{3}$ and $\frac{1}{5}$ what is the least common denominator to be used?

*Copy and add:*

5. $\frac{3}{4} + \frac{5}{8}$.
6. $\frac{1}{2} + \frac{1}{3}$.
7. $\frac{1}{2} + \frac{2}{3}$.
8. $\frac{1}{3} + \frac{1}{4}$.
9. $\frac{1}{3} + \frac{3}{4}$.
10. $\frac{2}{3} + \frac{3}{4}$.
11. $\frac{1}{2} + \frac{1}{5}$.
12. $\frac{1}{2} + \frac{4}{5}$.
13. $\frac{1}{2} + \frac{2}{3} + \frac{3}{4}$.
14. $\frac{1}{2} + \frac{2}{3} + 1\frac{3}{4}$.
15. $\frac{1}{2} + 1\frac{2}{3} + 3\frac{3}{4}$.
16. $\frac{1}{2} + \frac{4}{5} + \frac{3}{10}$.
17. How much is $\$\frac{1}{2} + \$\frac{1}{4} + \$\frac{3}{4}$?

### 70. Adding Mixed Numbers

*Examples 1 to 4, oral — Examples 5 to 11, written*

1. How much is $\$1\frac{3}{4}$ and $\$2\frac{1}{2}$?
2. How much is $\$1\frac{1}{2} + \$2 + \$3\frac{1}{4}$?
3. How much is $\$1\frac{1}{4} + \$5 + \$2\frac{3}{4} + \$1$?
4. How much is $2\frac{1}{2}$ ft. + $3\frac{1}{2}$ ft. + $2\frac{1}{2}$ ft. + $1\frac{1}{2}$ ft.?

*Copy and add:*

| 5. | 6. | 7. | 8. | 9. | 10. | 11. |
|---|---|---|---|---|---|---|
| $3\frac{1}{2}$ | $1\frac{1}{2}$ | $5\frac{1}{2}$ | $5\frac{1}{2}$ | $2\frac{1}{3}$ | $3\frac{1}{4}$ | $2\frac{3}{4}$ |
| $5\frac{3}{4}$ | $2\frac{3}{8}$ | $2\frac{1}{3}$ | $6\frac{3}{5}$ | $1\frac{1}{2}$ | $2\frac{5}{6}$ | $3\frac{2}{3}$ |
| $2\frac{3}{4}$ | $7\frac{1}{4}$ | $1\frac{1}{4}$ | $2\frac{7}{10}$ | $6\frac{5}{6}$ | $4\frac{1}{2}$ | $5\frac{1}{2}$ |
| $5\frac{1}{4}$ | $6\frac{3}{4}$ | $3\frac{2}{3}$ | $1\frac{4}{5}$ | $1\frac{1}{6}$ | $8\frac{2}{3}$ | $4\frac{5}{6}$ |

### 71. Addition

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. If you buy $2\frac{3}{4}$ yd. of ribbon, and then buy $3\frac{3}{4}$ yd. more, how much do you buy in all?

2. If you have $\$2\frac{3}{4}$ in the bank and add $\$1\frac{1}{2}$ to it, how much have you?

3. Make a problem about $16\frac{1}{2}$ yd. $+ 3\frac{3}{4}$ yd., and solve it; also about $8\frac{1}{4}$ yd. $+ 7\frac{1}{2}$ yd.

*Add:*

4. $\frac{1}{4} + \frac{1}{2} + \frac{1}{8}$.
5. $\frac{2}{3} + \frac{1}{4} + \frac{1}{6}$.
6. $\frac{1}{2} + \frac{1}{6} + \frac{3}{4}$.
7. $\frac{2}{3} + \frac{1}{2} + \frac{1}{4}$.
8. $\frac{1}{2} + \frac{5}{6} + \frac{2}{3}$.
9. $\frac{1}{2} + \frac{2}{5} + \frac{7}{10}$.
10. $2\frac{3}{4} + 5\frac{2}{3} + \frac{1}{6}$.
11. $3\frac{4}{5} + 2\frac{1}{2} + \frac{7}{10}$.
12. $5\frac{2}{3} + 3\frac{3}{4} + 1\frac{7}{12}$.

### 72. Addition

*Examples 1 to 3, oral — Examples 4 to 11, written*

1. A man paid $\$2\frac{3}{4}$ for a hat and $\$\frac{1}{2}$ for a necktie. What did he pay for both?

2. Some boys walked $2\frac{3}{4}$ miles in one hour and $2\frac{1}{2}$ miles the next hour. How many miles did they walk in the two hours?

3. Add $3\frac{1}{2}$, 4, $\frac{1}{4}$, 2, 10, 20, and $\frac{1}{4}$.

*Add:*

4. $3\frac{1}{2} + 2\frac{7}{8}$.
5. $2\frac{1}{4} + 3\frac{5}{8}$.
6. $4\frac{3}{4} + 3\frac{3}{8}$.
7. $5\frac{2}{3} + 4\frac{5}{6}$.
8. $24\frac{1}{2} + 10\frac{3}{4} + 8\frac{2}{3} + 9\frac{1}{6}$.
9. $14\frac{1}{4} + 12\frac{1}{2} + 3\frac{5}{6} + 2\frac{1}{12}$.
10. $10\frac{1}{2} + 12\frac{3}{5} + 2\frac{4}{5} + 8\frac{7}{10}$.
11. $15\frac{3}{4} + 17\frac{7}{8} + 13\frac{1}{2} + 2\frac{5}{8}$.

### 73. Subtraction

*Examples 1 to 3, oral — Examples 4 to 12, written*

**1.** If from $7\frac{3}{4}$ yd. of cloth a lady cuts off $\frac{1}{2}$ yd. how much is left?

**2.** If a strip of carpet $2\frac{1}{2}$ yd. long is pieced out so as to be $4\frac{1}{2}$ yd. long, how much must be added?

**3.** What must be added to $2\frac{2}{4}$ to make $4\frac{3}{4}$? to $2\frac{1}{2}$ to make $4\frac{3}{4}$?

$$\begin{array}{r} 4\frac{3}{4} = 4\frac{3}{4} \\ 2\frac{1}{2} = 2\frac{2}{4} \\ \hline 2\frac{1}{4} \end{array}$$

*Copy and subtract:*

**4.** $\frac{7}{8} - \frac{1}{2}$. **6.** $3\frac{5}{8} - 2\frac{1}{4}$. **8.** $6\frac{7}{8} - 5\frac{3}{4}$. **10.** $9\frac{7}{8} - 6\frac{3}{4}$.

**5.** $\frac{5}{8} - \frac{1}{4}$. **7.** $7\frac{7}{8} - 3\frac{1}{4}$. **9.** $9\frac{7}{8} - 4\frac{1}{2}$. **11.** $8\frac{3}{4} - 2\frac{3}{8}$.

**12.** How much is $12\frac{7}{8}$ in. $- 6\frac{3}{4}$ in.?

### 74. Subtraction

*Examples 1 to 3, oral — Examples 4 to 12, written*

**1.** Express $\frac{1}{4}$ as twelfths.

**2.** Express $\frac{2}{3}$ as twelfths.

**3.** Express $1\frac{3}{12}$ as twelfths.

$$\begin{array}{r} 15\frac{1}{4} = 15\frac{3}{12} = 14\frac{15}{12} \\ 8\frac{2}{3} = 8\frac{8}{12} = 8\frac{8}{12} \\ \hline 6\frac{7}{12} \end{array}$$

In taking $8\frac{8}{12}$ from $15\frac{3}{12}$ we cannot take $\frac{8}{12}$ from $\frac{3}{12}$, so we take 1 from 15 and write it $\frac{12}{12}$. Then $\frac{12}{12} + \frac{3}{12} = \frac{15}{12}$. We can then subtract.

*Subtract:*

**4.** $15\frac{1}{2} - 5\frac{2}{3}$. **7.** $15\frac{1}{2} - 9\frac{7}{8}$. **10.** $22\frac{1}{8} - 12\frac{1}{2}$.

**5.** $20\frac{2}{3} - 7\frac{1}{4}$. **8.** $16\frac{1}{4} - 3\frac{7}{8}$. **11.** $31\frac{1}{4} - 16\frac{5}{8}$.

**6.** $24\frac{1}{6} - 3\frac{1}{2}$. **9.** $25\frac{1}{4} - 17\frac{2}{3}$. **12.** $40\frac{1}{3} - 35\frac{5}{6}$.

### 75. Subtraction

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. A baker had 6 doz. loaves and sold $4\frac{1}{2}$ doz. How many dozen had he left?

2. From a piece of cloth $12\frac{3}{4}$ yd. long $6\frac{1}{2}$ yd. were cut. How many yards were left?

3. From a board $9\frac{1}{2}$ ft. long $\frac{3}{4}$ ft. was sawed off. How much was left?

*Subtract:*

| 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|
| $32\frac{1}{2}$ | $48\frac{2}{3}$ | $71\frac{1}{3}$ | $43\frac{1}{6}$ | $51\frac{1}{2}$ | $35\frac{1}{2}$ |
| $27\frac{3}{4}$ | $16\frac{1}{2}$ | $23\frac{1}{2}$ | $21\frac{3}{4}$ | $16\frac{7}{10}$ | $27\frac{4}{5}$ |

### 76. Subtraction

*Examples 1 to 3, oral — Examples 4 to 10, written*

1. A board $1\frac{1}{8}$ in. thick is planed down $\frac{1}{4}$ in. How thick is it then?

2. A book is $\frac{3}{4}$ in. thick. Each of the two leaves of the cover is $\frac{1}{8}$ in. thick. How thick is the book without the cover?

3. Make a problem about $54\frac{1}{2}$ yd. $- 3\frac{1}{4}$ yd., and solve it; also about $62\frac{1}{4}$ ft. $- 8\frac{1}{2}$ ft.

*Subtract:*

4. $15\frac{1}{3} - 9\frac{5}{6}$.
5. $27\frac{1}{4} - 8\frac{5}{6}$.
6. $36\frac{1}{5} - 14\frac{1}{2}$.
7. $42\frac{2}{5} - 16\frac{1}{2}$.
8. $33\frac{1}{3} - 27\frac{3}{4}$.
9. $51\frac{1}{4} - 36\frac{2}{3}$.
10. From the sum of $15\frac{1}{2}$ and $7\frac{3}{4}$ take $18\frac{1}{4}$.

### 77. Subtraction

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. Albert is $4\frac{1}{4}$ ft. tall and Emily is $3\frac{1}{2}$ ft. tall. How much taller is Albert than Emily?

2. A rug is $4\frac{1}{2}$ ft. long and $2\frac{3}{4}$ ft. wide. It is how much longer than wide?

3. A dealer has 7 pt. of cream and sells $3\frac{1}{4}$ pt. How much has he left?

*Subtract:*

4. $27\frac{1}{5} - 16\frac{1}{2}$.
5. $41\frac{2}{5} - 17\frac{1}{2}$.
6. $45\frac{1}{2} - 27\frac{3}{5}$.
7. $61\frac{1}{16} - 7\frac{1}{2}$.
8. $42\frac{3}{16} - 8\frac{3}{4}$.
9. $16\frac{5}{16} - 7\frac{1}{2}$.
10. $28\frac{7}{16} - 13\frac{3}{4}$.
11. $29\frac{3}{4} - 15\frac{5}{16}$.
12. $38\frac{9}{16} - 16\frac{3}{4}$.

### 78. Subtraction

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. From $7\frac{1}{2}$ lb. of sugar I use $\frac{3}{4}$ lb. How much is left?

2. From $8\frac{1}{4}$ bu. of oats I take out $\frac{1}{2}$ bu. How much is left?

3. From $5\frac{1}{4}$ qt. of milk I use $2\frac{1}{2}$ qt. How much is left?

*Subtract:*

| 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|
| $200\frac{1}{3}$ | $310\frac{1}{5}$ | $4167\frac{1}{8}$ | $3170\frac{1}{2}$ | $4300\frac{1}{4}$ |
| $125\frac{1}{2}$ | $275\frac{1}{2}$ | $2109\frac{1}{2}$ | $2609\frac{4}{5}$ | $2762\frac{2}{3}$ |

9. From the sum of $275\frac{1}{2}$ and $16\frac{1}{4}$ take $280\frac{3}{4}$.

### 79. Multiplying by an Integer

*Examples 1 to 3, oral — Examples 4 to 15, written*

1. How much is $2 \times 3¢$? $2 \times \$3$? $2 \times 3$ fourths?
2. Reduce $\frac{6}{4}$ to halves; to a mixed number.
3. Reduce $3 \times \frac{2}{3}$ to a whole number.

*To multiply a fraction by an integer, multiply the numerator and write the product over the denominator. Reduce the result to lowest terms.*

*Multiply:*

4. $2 \times \frac{2}{5}$.
5. $3 \times \frac{1}{5}$.
6. $2 \times \frac{2}{3}$.
7. $3 \times \frac{1}{2}$.
8. $3 \times \frac{3}{4}$.
9. $4 \times \frac{3}{5}$.
10. $3 \times \frac{5}{8}$.
11. $5 \times \frac{7}{8}$.
12. $6 \times \frac{3}{4}$.
13. $10 \times \frac{1}{4}$.
14. $10 \times \frac{3}{8}$.
15. $12 \times \frac{7}{8}$.

### 80. Multiplying by an Integer

*Examples 1 to 3, oral — Examples 4 to 11, written*

1. How much is $4 \times \frac{1}{4}$? $4 \times \frac{3}{4}$?
2. How much is $6 \times \frac{1}{3}$? $6 \times \frac{2}{3}$?
3. How much is $10 \times \frac{1}{5}$? $10 \times \frac{3}{5}$?

*In multiplying a fraction it is shorter to cancel if possible before multiplying the numerator.*

$$8 \times \frac{3}{4} = \frac{\overset{2}{\cancel{8}} \times 3}{\cancel{4}} = 6.$$

*Multiply:*

4. $6 \times \frac{2}{3}$.
5. $8 \times \frac{1}{2}$.
6. $10 \times \frac{4}{5}$.
7. $10 \times \frac{5}{6}$.
8. $12 \times \frac{5}{8}$.
9. $16 \times \frac{7}{8}$.
10. $20 \times \frac{3}{8}$.
11. $30 \times \frac{7}{10}$.

### 81. Multiplying by an Integer

*Examples 1 to 3, oral — Examples 4 to 16, written*

1. If each side of a triangle is $\frac{2}{3}$ in., how far is it around the triangle?

2. If one side of a square is $\frac{3}{8}$ in., how far is it around the square?

3. If 1 yd. of cloth costs $\$\frac{3}{4}$, what will 8 yd. cost?

*Multiply:*

4. $5 \times \frac{4}{5}$.
5. $10 \times \frac{3}{5}$.
6. $15 \times \frac{2}{5}$.
7. $12 \times \frac{1}{6}$.
8. $18 \times \frac{5}{6}$.
9. $15 \times \frac{5}{6}$.
10. $16 \times \frac{3}{8}$.
11. $24 \times \frac{5}{8}$.
12. $32 \times \frac{7}{8}$.
13. $25 \times \frac{1}{8}$.
14. $30 \times \frac{3}{8}$.
15. $35 \times \frac{5}{8}$.

16. What will 35 yd. of cloth cost at $\$\frac{3}{4}$ a yard?

### 82. Multiplying a Mixed Number

*Examples 1 to 3, oral — Examples 4 to 19, written*

1. How much is $6 \times 15$?
2. How much is $6 \times \frac{3}{4}$?
3. How much is $6 \times 15\frac{3}{4}$?

$$\begin{array}{r} 15\frac{3}{4} \\ 6 \\ \hline 90\frac{18}{4} \\ = 90\frac{9}{2} \\ = 94\frac{1}{2} \end{array}$$

*Multiply:*

4. $2 \times 3\frac{1}{2}$.
5. $4 \times 12\frac{1}{2}$.
6. $8 \times 12\frac{1}{2}$.
7. $3 \times 33\frac{1}{3}$.
8. $3 \times 66\frac{2}{3}$.
9. $6 \times 16\frac{2}{3}$.
10. $12 \times 8\frac{1}{3}$.
11. $16 \times 6\frac{1}{4}$.
12. $20 \times 13\frac{1}{5}$.
13. $25 \times 26\frac{4}{5}$.
14. $8 \times 5\frac{3}{4}$.
15. $6 \times 8\frac{4}{9}$.
16. $10 \times 4\frac{2}{5}$.
17. $12 \times 12\frac{3}{5}$.
18. $16 \times 14\frac{4}{5}$.

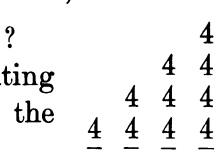
19. How much must a dealer pay for 48 suits of clothes at $\$12\frac{1}{2}$ a suit?

### 83. Fractional Parts

*Examples 1 to 8, oral — Examples 9 to 23, written*

**1.** Which column represents 16?

**2.** Point to the columns representing $\frac{1}{4}$ of 16; $\frac{1}{2}$ of 16; $\frac{3}{4}$ of 16. State the sum of each column.

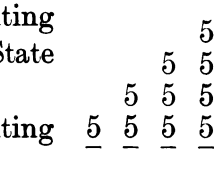



**3.** Point to $\frac{1}{2}$ of 16, and then to $\frac{1}{2}$ of that number.

**4.** How much is $\frac{1}{2}$ of $\frac{1}{2}$ of 16?

**5.** Which column represents 12? Which represents $\frac{1}{3}$ of 12? $\frac{2}{3}$ of 12?

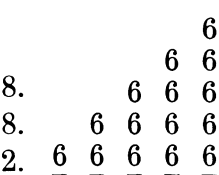
**6.** Point to the column representing 20; $\frac{1}{4}$ of 20; $\frac{1}{2}$ of 20; $\frac{3}{4}$ of 20. State the sum of each column.




**7.** Point to the column representing $\frac{1}{2}$ of $\frac{1}{2}$ of 20, and state the sum.

**8.** How much is $\frac{1}{5}$ of 30?

*Copy and complete:*




**9.** $\frac{2}{5}$ of 30. **12.** $\frac{1}{2}$ of 24. **15.** $\frac{1}{3}$ of 18.

**10.** $\frac{3}{5}$ of 30. **13.** $\frac{1}{4}$ of 24. **16.** $\frac{2}{3}$ of 18.

**11.** $\frac{4}{5}$ of 30. **14.** $\frac{3}{4}$ of 24. **17.** $\frac{1}{2}$ of 12.

**18.** How many inches in $\frac{1}{2}$ of 12 in.?

**19.** How many inches in $\frac{1}{2}$ of 1 ft.? in $\frac{1}{3}$ of 1 ft.?

**20.** A boy is $4\frac{1}{2}$ ft. tall. This is how many inches?

**21.** A girl is $4\frac{1}{4}$ ft. tall. This is how many inches?

**22.** How many inches in $5\frac{3}{4}$ ft.?

**23.** If a month has 30 days, how many days in $\frac{3}{5}$ of that month?

### 84. Fractional Parts

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. How do you find $\frac{1}{4}$ of 20? $\frac{1}{2}$ of 20?
2. How do you find $\frac{1}{4}$ of 16? $\frac{3}{4}$ of 16?
3. How do you find $\frac{1}{5}$ of 30? $\frac{2}{5}$ of 30? $\frac{3}{5}$ of 30?

Find $\frac{5}{8}$ of 488.

$\frac{1}{8}$ of $488 = 488 \div 8 = 61$.
$\frac{5}{8}$ of $488 = 5 \times 61 = 305$.

*Find the following:*

4. $\frac{3}{8}$ of 256.
5. $\frac{5}{8}$ of 744.
6. $\frac{7}{8}$ of 992.
7. $\frac{2}{5}$ of 255.
8. $\frac{3}{5}$ of 775.
9. $\frac{4}{5}$ of 615.
10. $\frac{2}{3}$ of 1110.
11. $\frac{3}{4}$ of 2376.
12. $\frac{9}{10}$ of 3470.

### 85. Fractional Parts

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. How much is $\frac{2}{3}$ of 30 yd. of cloth?
2. How much is $\frac{3}{4}$ of \$40? of \$48?
3. How much is $\frac{3}{5}$ of 35 ft.? of 45 ft.?

This is the common way of finding $\frac{5}{6}$ of 372:

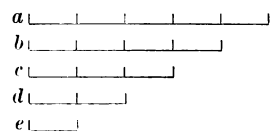
$$\frac{5}{\cancel{6}} \text{ of } \overset{62}{\cancel{372}} = 310.$$

*Find the following:*

4. $\frac{5}{6}$ of 384.
5. $\frac{5}{6}$ of 432.
6. $\frac{5}{6}$ of 942.
7. $\frac{3}{8}$ of 1768.
8. $\frac{5}{8}$ of 2576.
9. $\frac{7}{8}$ of 2008.
10. $\frac{2}{5}$ of 4005.
11. $\frac{3}{5}$ of 1235.
12. $\frac{4}{5}$ of 7890.

### 86. Fraction of a Fraction

*Examples 1 to 7, oral — Examples 8 to 11, written*




**1.** Point to $\frac{4}{5}$ of line $a$; to $\frac{3}{5}$ of line $a$.

**2.** Point to $\frac{1}{4}$ of $\frac{4}{5}$ of line $a$. This is what part of $a$?

**3.** Point to $\frac{1}{3}$ of $\frac{3}{5}$ of line $a$. This is what part of $a$?

**4.** Point to $\frac{2}{3}$ of $\frac{3}{5}$ of line $a$. This is what part of $a$?

**5.** Which line equals $\frac{4}{5}$ of line $a$?

**6.** Which line equals $\frac{3}{5}$ of line $a$?

**7.** Which line equals $\frac{2}{3}$ of line $c$?

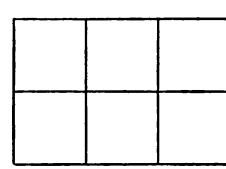
*Copy and complete:*

**8.** $\frac{1}{3}$ of $\frac{3}{5}$. **9.** $\frac{1}{2}$ of $\frac{4}{5}$. **10.** $\frac{2}{3}$ of $\frac{3}{5}$. **11.** $\frac{1}{4}$ of $\frac{4}{5}$.

### 87. Fraction of a Fraction

*Examples 1 to 3, oral — Examples 4 to 6, written*

**1.** Point to $\frac{1}{2}$ of the rectangle; to $\frac{1}{3}$ of $\frac{1}{2}$ of the rectangle.



**2.** How much is $\frac{1}{3}$ of $\frac{1}{2}$? $\frac{1}{2}$ of $\frac{1}{3}$?

**3.** How much is $\frac{1}{2}$ of $\frac{2}{3}$? $\frac{2}{3}$ of $\frac{1}{2}$?

**4.** Draw a rectangle 4 in. long and 2 in. wide, and divide it into square inches.

**5.** How much is $\frac{1}{2}$ of $\frac{1}{4}$ of this rectangle? $\frac{1}{4}$ of $\frac{1}{2}$ of the rectangle? $\frac{1}{3}$ of $\frac{3}{8}$? $\frac{2}{3}$ of $\frac{6}{8}$?

**6.** How much is $\frac{1}{5}$ of $\frac{5}{8}$ of the rectangle?

### 88. Fraction of a Fraction

*Examples 1 to 7, oral — Examples 8 to 27, written*

1. How much is $\frac{1}{2}$ of $\frac{1}{2}$ in.? $\frac{1}{2}$ of \$$\frac{1}{2}$?
2. How much is $\frac{1}{2}$ of $\frac{1}{3}$ in.? $\frac{1}{2}$ of \$$\frac{1}{3}$?
3. How much is $\frac{1}{2}$ of $\frac{2}{3}$ in.? $\frac{1}{2}$ of $\frac{2}{3}$ ft.?

To take $\frac{1}{2}$ of $\frac{2}{3}$ is called *multiplying* $\frac{2}{3}$ by $\frac{1}{2}$.

*To multiply one fraction by another, multiply the numerators together for a new numerator and the denominators together for a new denominator. Always cancel if possible.*

$$\frac{2}{3} \text{ of } \frac{3}{4} = \frac{\cancel{2} \times \cancel{3}}{\cancel{3} \times \cancel{4}_{2}} = \frac{1}{2}.$$

Teachers should explain the advantages of cancellation in solving problems, requiring its use where it is justified.

4. If I take $\frac{1}{2}$ of $\frac{1}{2}$ bu., what part of a bushel do I take?
5. What part of a quart is $\frac{1}{3}$ of $\frac{1}{2}$ qt.?
6. What part of a yard is $\frac{1}{2}$ of $\frac{2}{3}$ yd.?
7. If I have $\frac{3}{4}$ lb. of sugar and use $\frac{1}{2}$ of it, what part of a pound do I use?

*Take:*

| | | | |
|---|---|---|---|
| 8. $\frac{2}{3}$ of $\frac{3}{8}$. | 13. $\frac{3}{4}$ of $\frac{4}{5}$. | 18. $\frac{1}{4}$ of $\frac{4}{5}$. | 23. $\frac{1}{3}$ of $\frac{3}{8}$. |
| 9. $\frac{2}{5}$ of $\frac{5}{8}$. | 14. $\frac{2}{5}$ of $\frac{5}{6}$. | 19. $\frac{1}{4}$ of $\frac{1}{2}$. | 24. $\frac{3}{8}$ of $\frac{1}{3}$. |
| 10. $\frac{3}{4}$ of $\frac{5}{6}$. | 15. $\frac{7}{8}$ of $\frac{4}{7}$. | 20. $\frac{1}{2}$ of $\frac{1}{4}$. | 25. $\frac{3}{5}$ of $\frac{5}{8}$. |
| 11. $\frac{4}{5}$ of $\frac{5}{6}$. | 16. $\frac{1}{2}$ of $\frac{4}{5}$. | 21. $\frac{1}{3}$ of $\frac{1}{4}$. | 26. $\frac{5}{8}$ of $\frac{3}{5}$. |
| 12. $\frac{2}{3}$ of $\frac{7}{8}$. | 17. $\frac{1}{2}$ of $\frac{1}{5}$. | 22. $\frac{1}{3}$ of $\frac{3}{4}$. | 27. $\frac{1}{6}$ of $\frac{6}{7}$. |

### 89. Multiplying by a Mixed Number

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. How much is $2 \times \$4$? $\frac{1}{2}$ of \$4? $2\frac{1}{2} \times \$4$?
2. How much is $8 \times \$2$? $8\frac{1}{2} \times \$2$?
3. How much is $2\frac{1}{2} \times 4$?

When we write $2\frac{3}{4} \times 25$ we mean $2 \times 25$ and $\frac{3}{4}$ of 25. We read it "$2\frac{3}{4}$ times 25."

$$\begin{array}{rl} & 25 \\ \frac{1}{4} \text{ of } 25 = & 6\frac{1}{4} \\ \frac{3}{4} \text{ of } 25 = & 18\frac{3}{4} \\ 2 \times 25 = & 50 \\ 2\frac{3}{4} \times 25 = & 68\frac{3}{4} \end{array}$$

4. $3\frac{1}{2} \times 36$.
5. $4\frac{1}{4} \times 32$.
6. $3\frac{3}{4} \times 48$.
7. $10\frac{1}{2} \times 36$.
8. $11\frac{1}{3} \times 33$.
9. $33\frac{1}{3} \times 60$.
10. $37\frac{1}{2} \times 80$.
11. $66\frac{2}{3} \times 96$.
12. $66\frac{1}{2} \times 84$.

### 90. The Principles of Fractions

*Oral work by the teacher and class*

1. Learn this principle: *Multiplying the numerator or dividing the denominator of a fraction by any number multiplies the fraction by that number.*

Illustrate by numerous examples.

2. Learn this principle: *Dividing the numerator or multiplying the denominator of a fraction by any number divides the fraction by that number.*

Illustrate by numerous examples.

3. Learn this principle: *Multiplying or dividing both numerator and denominator by the same number does not change the value of the fraction.*

Illustrate by numerous examples.

### 91. Aliquot Parts of $1

*Examples 1 to 15, oral — Examples 16 to 23, written*

1. How many half dollars in $1?
2. How many quarter dollars in $1?
3. How many dimes in $1?
4. 50¢ is what part of $1? 25¢ is what part of $1? 10¢ is what part of $1?
5. Read and learn:

| | |
|---|---|
| $50¢ = \frac{1}{2}$ of $1 | $75¢ = \frac{3}{4}$ of $1 |
| $25¢ = \frac{1}{4}$ of $1 | $12\frac{1}{2}¢ = \frac{1}{8}$ of $1 |
| $20¢ = \frac{1}{5}$ of $1 | $33\frac{1}{3}¢ = \frac{1}{3}$ of $1 |
| $10¢ = \frac{1}{10}$ of $1 | $66\frac{2}{3}¢ = \frac{2}{3}$ of $1 |

Think of $8 \times 50¢$ as $8 \times \$\frac{1}{2}$; of $16 \times 25¢$ as $16 \times \$\frac{1}{4}$; of $16 \times 75¢$ as $16 \times \$\frac{3}{4}$; and so on.

6. $16 \times 50¢ = 16 \times$ what part of $1?
7. $16 \times 25¢ = 16 \times$ what part of $1?
8. $12 \times 75¢ = 12 \times$ what part of $1?
9. How many dollars is $8 \times 50¢$?

*State rapidly the result in dollars:*

10. $4 \times 50¢$.
11. $8 \times 25¢$.
12. $15 \times 20¢$.
13. $4 \times 75¢$.
14. $3 \times 33\frac{1}{3}¢$.
15. $3 \times 66\frac{2}{3}¢$.
16. At 25¢ a yard, what will 24 yd. of cotton cost?
17. At $12\frac{1}{2}¢$ a yard, what will 32 yd. of cloth cost?

*Multiply, expressing the result in dollars:*

18. $48 \times 25¢$.
19. $64 \times 75¢$.
20. $45 \times 33\frac{1}{3}¢$.
21. $36 \times 25¢$.
22. $12 \times 75¢$.
23. $16 \times 50¢$.

### 92. Dividing by an Integer

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. Divide by 2: 2¢, 2 thirds, 4 ft., 4 fifths.
2. Divide by 3: 3 in., 3 fifths, 9 yd., 9 tenths.
3. Divide by 2: 2 thirds, $\frac{2}{3}$, $\frac{4}{5}$, $\frac{6}{10}$, $\frac{8}{9}$, $\frac{10}{12}$, $\frac{12}{15}$.
4. Divide by 3: 3 fourths, $\frac{3}{4}$, $\frac{6}{7}$, $\frac{9}{10}$, $\frac{12}{15}$, $\frac{15}{16}$, $\frac{15}{17}$.

*Copy and divide:*

5. 6 in. ÷ 2. **8.** 8 ft. ÷ 4. **11.** 15¢ ÷ 5. **14.** \$16 ÷ 8.
6. $\frac{6}{7} \div 2$. **9.** $\frac{8}{10} \div 4$. **12.** $\frac{15}{16} \div 5$. **15.** $\frac{16}{18} \div 8$.
7. $\frac{6}{8} \div 2$. **10.** $\frac{8}{15} \div 4$. **13.** $\frac{15}{20} \div 5$. **16.** $\frac{16}{25} \div 8$.

**17.** If it is $\frac{9}{16}$ in. around a triangle, and the sides are all equal, how long is each side?

### 93. Dividing by an Integer

*Examples 1 to 4, oral — Examples 5 to 17, written*

1. Divide by 4: $\frac{4}{5}$, $\frac{4}{7}$, $\frac{4}{9}$, $\frac{8}{9}$, $\frac{8}{10}$, $\frac{8}{15}$, $\frac{12}{13}$, $\frac{12}{14}$.
2. Divide by 5: $\frac{5}{7}$, $\frac{5}{8}$, $\frac{5}{9}$, $\frac{10}{15}$, $\frac{15}{16}$, $\frac{20}{25}$, $\frac{20}{21}$, $\frac{20}{23}$.
3. Divide by 6: $\frac{6}{7}$, $\frac{6}{8}$, $\frac{6}{9}$, $\frac{12}{13}$, $\frac{12}{15}$, $\frac{18}{19}$, $\frac{18}{20}$, $\frac{24}{25}$, $\frac{24}{27}$.
4. Divide by 8: $\frac{8}{9}$, $\frac{8}{10}$, $\frac{8}{11}$, $\frac{8}{13}$, $\frac{8}{15}$, $\frac{16}{25}$, $\frac{24}{25}$, $\frac{32}{35}$.

*Copy and divide:*

5. 14¢ ÷ 7. **8.** 27¢ ÷ 9. **11.** 30 ÷ 10. **14.** 24 ÷ 12.
6. $\frac{14}{15} \div 7$. **9.** $\frac{27}{32} \div 9$. **12.** $\frac{30}{34} \div 10$. **15.** $\frac{24}{25} \div 12$.
7. $\frac{14}{25} \div 7$. **10.** $\frac{27}{35} \div 9$. **13.** $\frac{30}{50} \div 10$. **16.** $\frac{24}{33} \div 12$.

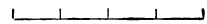
**17.** If we cut $\frac{15}{36}$ of a yard of ribbon into 3 equal parts, how long is each part?

### 94. Integer by a Fraction

*Examples 1 to 5, oral — Examples 6 to 13, written*

1. How many halves of an inch in 1 in.?

2. How many fourths of an inch in 1 in.?



3. How many times is $\frac{1}{2}$ contained in 1? in 2? in 3? in 4? in 5? in 6? in 8? in 10?

4. How many times is $\frac{1}{4}$ contained in 1? in 2? in 3? in 4? in 5? in 7? in 10?

5. How many times is $\frac{1}{3}$ contained in 1? in 2?

*Copy and divide:*

6. $1 \div \frac{1}{2}$. 8. $2 \div \frac{1}{2}$. 10. $4 \div \frac{1}{2}$. 12. $5 \div \frac{1}{2}$.
7. $1 \div \frac{1}{3}$. 9. $2 \div \frac{1}{3}$. 11. $4 \div \frac{1}{4}$. 13. $5 \div \frac{1}{3}$.

### 95. Integer by a Fraction

*Examples 1 to 5, oral — Examples 6 to 17, written*

1. Divide 12¢ by 3¢; 12 ft. by 3 ft.; 12 fourths by 3 fourths; 12 fifths by 3 fifths.

2. How much is $\frac{12}{4} \div \frac{3}{4}$? 3, or $\frac{12}{4}$, divided by $\frac{3}{4}$?

3. Divide 20¢ by 4¢; $\frac{20}{5}$ by $\frac{4}{5}$; 4 by $\frac{4}{5}$; 8 by $\frac{4}{5}$.

4. Divide 30¢ by 3¢; $\frac{30}{5}$ by $\frac{3}{5}$; 6 by $\frac{3}{5}$; 9 by $\frac{3}{5}$.

5. How will you write 10 so as to divide it by $\frac{2}{3}$?

*Copy and divide:*

6. $15¢ \div 3¢$. 9. $40¢ \div 5¢$. 12. $45¢ \div 3¢$. 15. $6 \div \frac{3}{4}$.
7. $\frac{15}{5} \div \frac{3}{5}$. 10. $\frac{40}{8} \div \frac{5}{8}$. 13. $\frac{45}{5} \div \frac{3}{5}$. 16. $6 \div \frac{3}{8}$.
8. $3 \div \frac{3}{5}$. 11. $5 \div \frac{5}{8}$. 14. $9 \div \frac{3}{5}$. 17. $8 \div \frac{4}{5}$.

### 96. Fraction by a Fraction

*Examples 1 to 3, oral — Examples 4 to 20, written*

1. Express as a fraction: $2 \div 3$; $2\not{} \div 3\not{}$; $\frac{2}{5} \div \frac{3}{5}$.
2. Express as a fraction: $3 \div 4$; $\frac{3}{5} \div \frac{4}{5}$; $\frac{3}{7} \div \frac{4}{7}$.
3. Express as a fraction: $4 \div 5$; $\frac{4}{8} \div \frac{5}{8}$; $\frac{4}{9} \div \frac{5}{9}$.

*Copy and divide:*

4. $\frac{2}{5} \div \frac{3}{5}$.
5. $\frac{2}{8} \div \frac{3}{8}$.
6. $\frac{2}{3} \div \frac{3}{3}$.
7. $\frac{2}{10} \div \frac{3}{10}$.
8. $\frac{3}{5} \div \frac{4}{5}$.
9. $\frac{3}{8} \div \frac{4}{8}$.
10. $\frac{3}{10} \div \frac{4}{10}$.
11. $\frac{3}{16} \div \frac{4}{16}$.
12. $\frac{5}{9} \div \frac{8}{9}$.
13. $\frac{5}{10} \div \frac{8}{10}$.
14. $\frac{5}{16} \div \frac{8}{16}$.
15. $\frac{5}{32} \div \frac{8}{32}$.
16. $\frac{7}{9} \div \frac{8}{9}$.
17. $\frac{7}{15} \div \frac{8}{15}$.
18. $\frac{9}{20} \div \frac{11}{20}$.
19. $\frac{12}{25} \div \frac{4}{25}$.

20. How much is $\frac{2}{4} \div \frac{3}{4}$? How shall we write $\frac{1}{2}$ so as to divide it by $\frac{3}{4}$?

### 97. Fraction by a Fraction

*Examples 1 and 2, oral — Examples 3 to 26, written*

1. Express $\frac{1}{4}$ as eighths. How much is $\frac{1}{4} \div \frac{3}{8}$?
2. Express $\frac{1}{5}$ as tenths. How much is $\frac{1}{5} \div \frac{3}{10}$?

*Express with the same denominators, and then divide:*

3. $\frac{1}{2} \div \frac{1}{4}$.
4. $\frac{1}{2} \div \frac{3}{4}$.
5. $\frac{1}{4} \div \frac{1}{2}$.
6. $\frac{3}{4} \div \frac{1}{2}$.
7. $\frac{1}{2} \div \frac{1}{8}$.
8. $\frac{1}{2} \div \frac{3}{8}$.
9. $\frac{1}{2} \div \frac{5}{8}$.
10. $\frac{7}{8} \div \frac{1}{2}$.
11. $\frac{1}{4} \div \frac{1}{8}$.
12. $\frac{3}{4} \div \frac{1}{8}$.
13. $\frac{1}{4} \div \frac{3}{8}$.
14. $\frac{3}{4} \div \frac{3}{8}$.
15. $\frac{3}{8} \div \frac{1}{4}$.
16. $\frac{5}{8} \div \frac{1}{4}$.
17. $\frac{7}{8} \div \frac{1}{4}$.
18. $\frac{3}{8} \div \frac{3}{4}$.
19. $\frac{5}{8} \div \frac{3}{4}$.
20. $\frac{7}{8} \div \frac{3}{4}$.
21. $\frac{1}{2} \div \frac{1}{3}$.
22. $\frac{1}{3} \div \frac{1}{2}$.
23. $\frac{1}{2} \div \frac{2}{3}$.
24. $\frac{2}{3} \div \frac{1}{2}$.
25. $\frac{1}{2} \div \frac{1}{5}$.
26. $\frac{4}{5} \div \frac{1}{2}$.

## VII. MEASURES

### 98. Table of Length

*Examples 1 to 7, oral — Examples 8 to 15, written*

1. How many inches make a foot?
2. How many feet make a yard?
3. An inch is what part of a foot?
4. A foot is what part of a yard?
5. Measure $5\frac{1}{2}$ yd. along the side of the room. This length is called a *rod*.
6. Read aloud and learn:

**12 inches (in.) = 1 foot (ft.)**
**3 feet = 1 yard (yd.)**
**$5\frac{1}{2}$ yards or $16\frac{1}{2}$ feet = 1 rod (rd.)**
**320 rods or 5280 feet = 1 mile (mi.)**

7. Do you know of some place that is one mile from the school? What place is it?
8. Multiply $16\frac{1}{2}$ ft. by 320 and thus find the number of feet in a mile.
9. Divide 5280 ft. by 320 and thus find the number of feet in a rod.
10. Multiply 3 ft. by $5\frac{1}{2}$ and thus find the number of feet in a rod.
11. How many feet are there in 2 mi.?
12. How many feet are there in $\frac{1}{2}$ mi.?
13. How many feet are there in $\frac{1}{4}$ mi.?
14. How many rods are there in $\frac{3}{4}$ mi.?
15. How many yards are there in $\frac{1}{2}$ mi.?

### 99. Square Measure

*Examples 1 to 7, oral — Examples 8 to 14, written*

1. How many inches in 1 ft.?
2. How many square inches in 1 sq. ft.?
3. How many square feet in 1 sq. yd.?
4. How many yards in 1 rd.?
5. How could we find the number of square yards in 1 square rod?
6. Do you know of a piece of land that contains about 1 acre? Tell the class where it is.
7. Read aloud and learn:

**144 square inches (sq. in.) = 1 square foot (sq. ft.)**
**9 square feet = 1 square yard (sq. yd.)**
**30¼ square yards = 1 square rod (sq. rd.)**
**160 square rods = 1 acre (A.)**
**640 acres = 1 square mile (sq. mi.)**

A strip of land 4 rd. wide and 40 rd. long contains an acre.

8. How many square inches in 30 sq. ft.?
9. How many square rods in 15 A.?
10. How many acres in 6 sq. mi.?
11. How many 160-acre farms equal 1 sq. mi.?
12. Make a problem about the area of some land, and solve it.
13. A piece of land is 32 rd. long and 20 rd. wide. How many acres does it contain?
14. A piece of land is 48 rd. long and 32 rd. wide. How many acres does it contain?

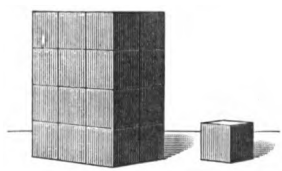
### 100. Cubic Measure

*Examples 1 to 5, oral — Examples 6 to 13, written*

**1.** How many cubic inches in a block 1 in. long, 1 in. wide, and 1 in. high?

**2.** How long is the edge of a cubic inch? of a cubic foot? of a cubic yard?

**3.** If a block is 3 in. long, 2 in. wide, and 4 in. high, the lower layer of cubes will contain $2 \times 3$ cubic inches. There are four of these layers. How many cubic inches in the block?



**4.** How will you find the number of cubic feet in a cubic yard?

**5.** Read aloud and learn:

**1728 cubic inches (cu. in.) = 1 cubic foot (cu. ft.)**
**27 cubic feet = 1 cubic yard (cu. yd.)**

**6.** If a box is 12 in. long, 8 in. wide, and 5 in. deep, the volume is $12 \times 8 \times 5$ cu. in. How much is this?

*Find the volumes of boxes of these measurements:*

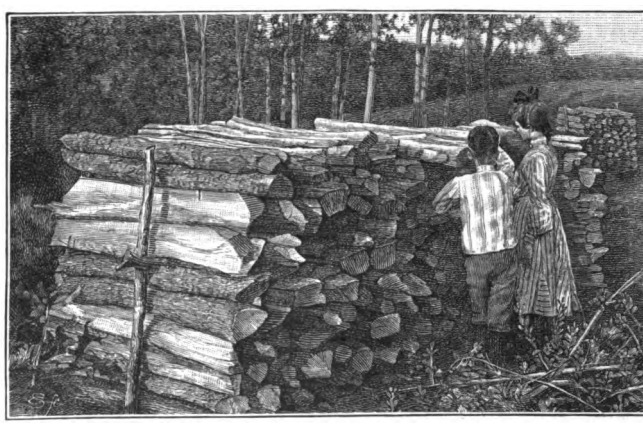
**7.** 3 ft., 6 ft., 4 ft.
**8.** 9 in., 8 in., 7 in.
**9.** 6 ft., 8 ft., 7 ft.
**10.** 18 in., 12 in., 8 in.
**11.** 21 in., 17 in., 12 in.
**12.** 32 in., 28 in., 17 in.

**13.** If a room is 24 ft. long, 16 ft. wide, and $10\frac{1}{2}$ ft. high, how many cubic feet of air does the room contain?

### 101. Cubic Measure

*Examples 1 to 3, oral — Examples 4 to 6, written*

1. This pile of wood is 8 ft. long, 4 ft. wide, and 4 ft. high. How would you find the number of cubic feet that it contains?



2. Read aloud and learn:

**128 cubic feet = 1 cord (cd.)**

This picture represents a cord of wood.

3. What will 9 cd. of wood cost at $4 a cord?

4. A wagon box is 7 ft. long, 3 ft. wide, and 2 ft. high. How many cubic feet does it contain?

5. How many cubic feet in the pile of wood 8 ft. long, 4 ft. wide, and 4 ft. high?

6. How many cubic yards of earth in an excavation 12 yd. long, 8 yd. wide, and 2 yd. deep?

### 102. Time

*Examples 1 to 4, oral — Examples 5 to 13, written*

1. How many minutes in 1 hr.?
2. How many hours in 1 da.?
3. How many days in 1 wk.? in 2 wk.?
4. Read aloud and learn:

**60 seconds (sec.) = 1 minute (min.)**
**60 minutes = 1 hour (hr.)**
**24 hours = 1 day (da.)**
**7 days = 1 week (wk.)**
**365 days = 1 common year (yr.)**
**366 days = 1 leap year**
**100 years = 1 century**

There are 12 months (mo.) or about 52 weeks in a year.

The names of the months are January, February, March, April, May, June, July, August, September, October, November, December.

Thirty days hath September,
April, June, and November.

The other months have 31 days each, except February, which has 28 days in each year except leap year, when it has 29 days. Common years have 365 days, leap years have 366 days.

*Express as hours:*

**5.** 3 da. **6.** $3\frac{1}{4}$ da. **7.** 1 wk. **8.** 120 min. **9.** $2\frac{1}{2}$ da.

*Express as days:*

**10.** 8 wk. **11.** 26 wk. **12.** 48 hr. **13.** 144 hr.

### 103. Review of Liquid Measure

*Examples 1 to 4, oral — Examples 5 to 20, written*

1. How many gills in 1 pt.? in 6 pt.?
2. How many pints in 1 qt.? in 9 qt.?
3. How many quarts in 1 gal.? in 11 gal.?
4. How many gallons in 8 qt.? in 16 qt.?

*Express as quarts, or as quarts and pints:*

| | | | |
|---|---|---|---|
| **5.** 1 gal. | **7.** $4\frac{1}{2}$ gal. | **9.** 24 pt. | **11.** 8 gi. |
| **6.** 23 gal. | **8.** $5\frac{1}{4}$ gal. | **10.** 15 pt. | **12.** 32 gi. |

*Express as gallons, or as gallons and quarts:*

| | | | |
|---|---|---|---|
| **13.** 8 qt. | **15.** 9 qt. | **17.** 18 pt. | **19.** 34 pt. |
| **14.** 64 qt. | **16.** 16 pt. | **18.** 26 pt. | **20.** 42 pt. |

### 104. Review of Dry Measure

*Examples 1 to 4, oral — Examples 5 to 16, written*

1. How many pints in 1 qt.? in 20 qt.?
2. How many quarts in 1 pk.? in 6 pk.?
3. How many pecks in 1 bu.? in 11 bu.?
4. How many bushels in 12 pk.? in 16 pk.?

*Express as pecks, or as pecks and quarts:*

| | | | |
|---|---|---|---|
| **5.** 1 bu. | **7.** 20 bu. | **9.** 16 qt. | **11.** 40 qt. |
| **6.** 8 bu. | **8.** 25 bu. | **10.** 32 qt. | **12.** 80 qt. |

*Express as bushels, or as bushels and pecks:*

| | | | |
|---|---|---|---|
| **13.** 8 pk. | **14.** 32 pk. | **15.** 80 pk. | **16.** 9 pk. |

### 105. Weight

*Examples 1 to 3, oral — Examples 4 to 8, written*

1. How many ounces in 1 lb.? in 10 lb.?
2. Name something that is sold by the ton.
3. Read aloud and learn:

**16 ounces (oz.) = 1 pound (lb.)**
**2000 pounds = 1 ton (T.)**

*Find the cost of:*

4. 7 T. of coal at \$5.50 a ton.
5. 25 T. of hay at \$14.50 a ton.
6. 8 oz. of pepper at 18¢ a pound.
7. 75 T. of ice at \$2.50 a ton; at \$3.50 a ton.
8. $6\frac{1}{2}$ T. of coal at \$6.50 a ton; at \$9 a ton.

### 106. Weight

*Examples 1 to 6, oral — Examples 7 to 12, written*

1. If 4 lb. of raisins cost \$1.20, what is the price per pound? per half pound? for 2 lb.?

*Find the number of ounces in:*

2. $\frac{1}{8}$ lb. 3. $\frac{3}{4}$ lb. 4. 1 lb. 4 oz. 5. 1 lb. 10 oz.
6. How many pounds in $\frac{1}{2}$ T.? in $\frac{1}{4}$ T.? in $2\frac{1}{2}$ T.?

*Find the number of ounces in:*

7. 6 lb. 8. 8 lb. 9. 25 lb. 10. $1\frac{1}{2}$ lb. 11. $2\frac{1}{4}$ lb.

12. What is the cost of $7\frac{1}{2}$ lb. of butter at 30¢ a pound? at 32¢ a pound? at 28¢ a pound?

### 107. Measuring Temperature

*Examples 1 to 3, oral — Examples 4 and 5, written*

1. What is the temperature to-day?

2. What is the highest temperature you remember in summer?

3. What is the lowest temperature you remember in winter?

*Water freezes at 32 degrees (32°) and boils at 212°.*

4. How many degrees between the freezing and boiling points of water?

5. How many degrees above freezing is the temperature in your schoolroom to-day?

### 108. Measuring Temperature

*Examples 1 to 3, oral — Examples 4 to 6, written*

1. How many degrees from 32° to 72°?

2. How many degrees from 72° to 98°?

3. How many degrees from 1° below zero to 1° above zero?

4. The temperature of the body is about 98°. How many degrees is this above 32°?

5. If it is 52° in an Eskimo boy's snow hut and 68° in your schoolroom, how much warmer is it where you are?

6. How many degrees from 68° to 212°? from 32° to 98°? from 10° below zero to 32° above zero?

## VIII. DENOMINATE NUMBERS

### 109. Reduction

*Examples 1 and 2, oral — Examples 3 to 12, written*

1. How many ounces in 1 lb.? in 1 lb. 4 oz.?
2. How many inches in 2 ft.? in 2 ft. 6 in.?

*Express as ounces:*

3. 3 lb. 8 oz. 4. 5 lb. 6 oz. 5. 7 lb. 12 oz.

*Express as inches:*

6. 3 ft. 8 in. 7. 9 ft. 6 in. 8. 15 ft. 10 in.

*Express as quarts:*

9. $3\frac{1}{2}$ gal. 10. $7\frac{1}{4}$ gal. 11. $9\frac{3}{4}$ gal. 12. $12\frac{1}{2}$ gal.

### 110. Reduction

*Examples 1 to 3, oral — Examples 4 to 18, written*

1. How many pounds in 16 oz.? in 32 oz.?
2. How many feet in 12 in.? in 24 in.?
3. How many hours in 60 min.? in 120 min.?

*Express as pounds and ounces:*

4. 96 oz. 5. 18 oz. 6. 24 oz. 7. 32 oz. 8. 36 oz.

*Express as feet and inches:*

9. 13 in. 10. 15 in. 11. 24 in. 12. 27 in. 13. 36 in.

*Express as gallons and fractions:*

14. 4 qt. 15. 5 qt. 16. 10 qt. 17. 16 qt. 18. 35 qt.

### 111. Addition

*Examples 1 to 3, oral — Examples 4 to 11, written*

1. How many inches are 8 in. + 6 in.? Express this as feet and inches.

2. Add 5 ft. and 14 in., expressing the result as feet and inches.

3. Add 2 ft. 8 in. and 3 ft. 6 in. as here shown.

| 2 ft. | 8 in. |
|---|---|
| 3 | 6 |
| 5 ft. | 14 in. |
| =6 ft. | 2 in. |

4. 7 ft. 9 in. + 6 ft. 8 in.
5. 9 ft. 7 in. + 7 ft. 6 in.
6. 3 lb. 9 oz. + 7 lb. 8 oz.
7. 5 lb. 8 oz. + 8 lb. 10 oz.
8. 2 pk. 7 qt. + 3 pk. 5 qt.
9. 3 pk. 6 qt. + 2 pk. 6 qt.
10. 4 da. 18 hr. + 2 da. 16 hr.
11. 5 da. 22 hr. + 6 da. 15 hr.

### 112. Addition

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. Add 2 ft. 7 in. and 3 ft. 5 in.
2. Add 2 lb. 7 oz. and 3 lb. 5 oz.
3. Add 2 yd. 7 in. and 3 yd. 5 in.

| 4. | | 5. | | 6. | |
|---|---|---|---|---|---|
| 23 lb. | 8 oz. | 42 ft. | 7 in. | 26 wk. | 5 da. |
| 47 | 10 | 39 | 9 | 18 | 6 |

| 7. | | 8. | | 9. | |
|---|---|---|---|---|---|
| 56 lb. | 9 oz. | 72 ft. | 10 in. | 36 bu. | 2 pk. |
| 27 | 8 | 63 | 7 | 43 | 3 |

### 113. Addition

*Example 1, oral — Examples 2 to 7, written*

1. Add 40 min. and 20 min. Express the result in hours.

| 2. | 3. | 4. |
|---|---|---|
| 3 hr. 20 min. | 5 hr. 32 min. | 7 hr. 29 min. |
| 4 45 | 6 27 | 8 36 |
| 2 35 | 3 46 | 5 38 |

| 5. | 6. | 7. |
|---|---|---|
| 5 ft. 8 in. | 16 lb. 12 oz. | 29 lb. 14 oz. |
| 6 9 | 15 15 | 26 8 |
| 7 8 | 18 13 | 44 15 |

### 114. Addition

*Examples 1 to 3, oral — Examples 4 to 6, written*

1. Allowing 30 da. to the month, how many months and days in 43 da.?

2. 15 mo. + 1 mo. 13 da. is how much?

*Always call 30 days a month in computing time.*

3 yr. 7 mo. 28 da.
2 8 15
5 yr. 15 mo. 43 da.
= 6 yr. 4 mo. 13 da.

3. Add 2 yr. 7 mo. and 5 yr. 3 mo.

| 4. | 5. | 6. |
|---|---|---|
| 5 yr. 9 mo. | 2 yr. 8 mo. 28 da. | 3 yr. 6 mo. 23 da. |
| 6 8 | 3 6 18 | 4 9 19 |

### 115. Subtraction

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. From 8 ft. 3 in. subtract 6 ft.

2. From 10 lb. 8 oz. subtract 6 oz.

3. From 2 ft. 8 in. subtract 8 in.; then subtract 2 in. more.

To subtract 2 ft. 8 in. from 6 ft. 4 in., we write the numbers as here shown. Since we cannot take 8 in. from 4 in., we take 1 ft. from the 6 ft. and add it to the 4 in., making 16 in. We can then subtract. The result is 3 ft. 8 in.

| | |
|---|---|
| 6 ft. 4 in. | = 5 ft. 16 in. |
| 2 8 | = 2 8 |
| | 3 ft. 8 in. |

We may subtract without writing the numbers a second time. To take 5 lb. 9 oz. from 8 lb. 4 oz., we may *think* of 1 lb. (or 16 oz.) taken from 8 lb. and added to 4 oz. Then 20 oz. − 9 oz. = 11 oz., and 7 lb. − 5 lb. = 2 lb. The result is 2 lb. 11 oz.

| | |
|---|---|
| 8 lb. | 4 oz. |
| 5 | 9 |
| 2 lb. | 11 oz. |

*Subtract:*

| 4. | 5. | 6. |
|---|---|---|
| 26 lb. 8 oz. | 32 ft. 3 in. | 42 ft. 2 in. |
| 19 9 | 16 8 | 19 9 |
| **7.** | **8.** | **9.** |
| 26 ft. 3 in. | 52 ft. 7 in. | 70 ft. 0 in. |
| 18 7 | 26 9 | 32 8 |

### 116. Subtraction

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. From 3 ft. 6 in. subtract 2 ft. 4 in.
2. From 9 ft. 8 in. subtract 3 ft. 2 in.
3. From 8 lb. 7 oz. subtract 2 lb. 5 oz.

*Subtract:*

| 4. | 5. | 6. |
|---|---|---|
| 23 yd. 0 ft. | 23 gal. 0 qt. | 15 hr. 10 min. |
| 17 2 | 15 3 | 8 30 |
| **7.** | **8.** | **9.** |
| 2 yr. 3 mo. | 16 wk. 3 da. | 16 hr. 15 min. |
| 8 | 9 6 | 8 45 |

### 117. Subtraction

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. From 3 wk. 6 da. subtract 1 wk. 4 da.
2. From 8 yd. 2 ft. subtract 6 yd. 1 ft.
3. From 15 bu. 1 pk. subtract 12 bu. 1 pk.

*Subtract:*

| 4. | 5. | 6. |
|---|---|---|
| 127 ft. 2 in. | 6 bu. 2 pk. | 6 yr. 7 mo. 10 da. |
| 98 7 | 3 3 | 2 3 25 |
| **7.** | **8.** | **9.** |
| 321 ft. 3 in. | 8 yd. 1 ft. | 7 yr. 2 mo. 13 da. |
| 148 9 | 2 2 | 5 8 22 |

### 118. Subtraction

*Examples 1 to 3, oral — Examples 4 to 8, written*

1. From a board 12 ft. long a carpenter saws 1 in. from each end. How long is the board then?

2. From 7 yd. of cloth a lady cuts 30 in. How long is the board then?

3. How long is it from half past ten this morning to noon?

4. 9 hr. 20 min. − 6 hr. 40 min.

5. 4 T. 1750 lb. − 2 T. 1900 lb.

6. 4 yr. 2 mo. 10 da. − 1 yr. 4 mo. 25 da.

7. 5 yr. 1 mo. 3 da. − 2 yr. 9 mo. 15 da.

8. How many months and days from your last birthday until to-day?

### 119. Subtraction

*Examples 1 to 4, oral — Examples 5 to 11, written*

1. 7 ft. 6 in. − 5 ft. 6 in.
2. 7 ft. 6 in. − 5 ft. 8 in.
3. 7 lb. 6 oz. − 5 lb. 6 oz.
4. 7 lb. 6 oz. − 5 lb. 8 oz.
5. 10 hr. 30 min. − 8 hr. 45 min.
6. 10 hr. 30 min. 20 sec. − 8 hr. 45 min. 10 sec.
7. 10 hr. 30 min. 20 sec. − 8 hr. 45 min. 30 sec.
8. 8 yr. 6 mo. 14 da. − 4 yr. 6 mo. 4 da.
9. 6 yr. 7 mo. 15 da. − 2 yr. 10 mo. 25 da.
10. 7 yr. 2 mo. 10 da. − 5 yr. 4 mo. 24 da.
11. 8 yr. 3 mo. 18 da. − 4 yr. 9 mo. 27 da.

To multiply 2 lb. 9 oz. by 2, we multiply each part separately, the result being 4 lb. 18 oz. But 18 oz. = 1 lb. 2 oz., so we write the result 5 lb. 2 oz.

| | |
|---|---|
| 2 lb. | 9 oz. |
| | 2 |
| 4 lb. | 18 oz. |
| = 5 lb. | 2 oz. |

To multiply 2 ft. 9 in. by 2, we proceed as before, the result being 4 ft. 18 in. But 18 in. = 1 ft. 6 in., so we write the result 5 ft. 6 in.

| | |
|---|---|
| 2 ft. | 9 in. |
| | 2 |
| 4 ft. | 18 in. |
| = 5 ft. | 6 in. |

### 120. Multiplication

*Examples 1 to 3, oral — Examples 4 to 12, written*

1. How much is $2 \times 2\frac{1}{2}$? $2 \times 2$ ft. 6 in.?
2. How much is $2 \times \$2.50$? $2 \times 2$ lb. 8 oz.?
3. How much is $2 \times \frac{5}{2}$? $2 \times 2$ bu. 2 pk.?

*Multiply:*

| 4. | 5. | 6. |
|---|---|---|
| 23 ft. 7 in. | 14 lb. 6 oz. | 23 yd. 27 in. |
| 4 | 3 | 4 |
| **7.** | **8.** | **9.** |
| 23 lb. 7 oz. | 14 yd. 6 in. | 23 min. 27 sec. |
| 4 | 3 | 4 |
| **10.** | **11.** | **12.** |
| 26 ft. 6 in. | 26 lb. 6 oz. | 23 hr. 27 min. |
| 8 | 8 | 7 |

### 121. Multiplication

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. Multiply by 2: 4 qt. 1 pt.; 4 ft. 1 in.; 4 lb. 1 oz.
2. Multiply by 4: 3 qt. 1 pt.; 3 ft. 1 in.; 3 gal. 1 qt.
3. Multiply by 6: 1 ft. 2 in.; 1 lb. 2 oz.; 1 gal. 2 qt.

*Multiply:*

| 4. | 5. | 6. |
|---|---|---|
| 23 mi. 125 ft. | 37 gal. 2 qt. | 26 min. 30 sec. |
| 5 | 15 | 8 |

| 7. | 8. | 9. |
|---|---|---|
| 25 bu. 2 pk. | 48 da. 2 hr. | 12 hr. 20 min. |
| 12 | 12 | 3 |

### 122. Multiplication

*Examples 1 to 3, oral — Examples 4 to 11, written*

1. Multiply by 3: 1 qt. 1 pt.; 1 lb. 1 oz.; $1\frac{1}{2}$.
2. Multiply by 8: 1 lb. 2 oz.; 1 ft. 2 in.
3. Multiply by 10: \$1.20; 1 mi. 20 ft.
4. If each side of a triangle is 1 ft. 4 in., how far is it around the triangle?
5. If a square is 2 ft. 3 in. on a side, how far is it around the square?

6. $7 \times 16$ ft. 8 in.
7. $9 \times 21$ ft. 2 in.
8. $5 \times 36$ ft. 8 in.
9. $12 \times 5$ ft. 6 in.
10. $15 \times 2$ lb. 1 oz.
11. $25 \times 3$ yd. 1 in.

### 123. Division

*Examples 1 to 3, oral — Examples 4 to 14, written*

1. How much is $\frac{1}{2}$ of 8 ft.? of 8 ft. 8 in.?
2. How much is $\frac{1}{3}$ of 9 lb.? of 9 lb. 9 oz.?
3. How much is $\frac{1}{4}$ of 16 yd.? of 16 yd. 16 in.?

To divide 25 ft. 10 in. by 5, we divide the two parts separately. Then 25 ft. 10 in. ÷ 5 = 5 ft. 2 in.

4. 10 ft. 5 in. ÷ 5.
5. 18 ft. 6 in. ÷ 6.
6. 21 ft. 9 in. ÷ 3.
7. 36 ft. 8 in. ÷ 4.
8. 35 ft. 7 in. ÷ 7.
9. 16 lb. 8 oz. ÷ 2.
10. 24 lb. 9 oz. ÷ 3.
11. 36 lb. 8 oz. ÷ 4.
12. 35 lb. 10 oz. ÷ 5.
13. 48 lb. 12 oz. ÷ 6.
14. Divide 2 ft. 3 in. + 12 ft. 4 in. by 7.

### 124. Division

*Examples 1 to 3, oral — Examples 4 to 13, written*

1. How much is $\frac{1}{2}$ of 3? of 3 ft.? of 2 ft. 12 in.?
2. How much is $\frac{1}{3}$ of 4? of 4 ft.? of 3 ft. 12 in.?
3. How much is $\frac{1}{4}$ of 5? of 5 ft.? of 4 ft. 12 in.?

To divide 7 ft. by 6, we think of 7 ft. as 6 ft. 12 in. Then 6 ft. 12 in. ÷ 6 = 1 ft. 2 in.

4. 9 lb. ÷ 8.
5. 7 lb. ÷ 2.
6. 17 lb. ÷ 4.
7. 13 bu. ÷ 4.
8. 17 bu. ÷ 4.
9. 16 yd. ÷ 3.
10. 19 yd. ÷ 3.
11. 13 ft. ÷ 6.
12. 19 ft. ÷ 4.
13. 25 ft. ÷ 3.

### 125. Division

*Examples 1 to 3, oral — Examples 4 to 15, written*

1. How much is $\frac{1}{2}$ of 14 in.? of 1 ft. 2 in.?
2. How much is $\frac{1}{3}$ of 15 in.? of 1 ft. 3 in.?
3. How much is $\frac{1}{5}$ of 1 ft. 8 in.? of 1 ft. 3 in.?

To divide 2 ft. 6 in. by 5, think of 2 ft. as 24 in. Then 24 in. + 6 in. = 30 in., and 30 in. ÷ 5 = 6 in.

4. 2 ft. 6 in. ÷ 6.
5. 2 ft. 4 in. ÷ 7.
6. 2 ft. 9 in. ÷ 3.
7. 3 ft. 4 in. ÷ 5.
8. 5 ft. 4 in. ÷ 8.
9. 3 lb. 2 oz. ÷ 5.
10. 4 lb. 6 oz. ÷ 7.
11. 3 yd. 2 ft. ÷ 11.
12. 4 bu. 2 pk. ÷ 9.
13. 7 gal. 2 qt. ÷ 10.
14. 8 ft. 4 in. ÷ 20.
15. 16 ft. 8 in. ÷ 25.

### 126. Division

*Examples 1 to 3, oral — Examples 4 to 8, written*

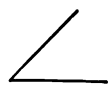
1. The sum of the sides of a square is 1 ft. 4 in. How long is each side?
2. If 4 oranges weigh 2 lb., how many ounces does each one weigh?
3. If 3 collars require 1 yd. of cloth, how many inches does each one require?
4. If 4 chairs weigh 60$\frac{1}{2}$ lb., how many pounds and ounces does each one weigh?

5. 1 lb. 6 oz. ÷ 11.
6. 1 ft. 6 in. ÷ 18.
7. 3 lb. 2 oz. ÷ 25.
8. 7 ft. 6 in. ÷ 45.

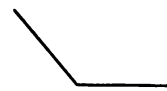
## IX. MENSURATION

These are the most important angles:

Right Angle

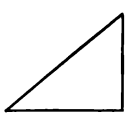


Acute Angle



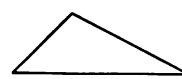
Obtuse Angle

These are the most important triangles:



Right Triangle

Acute Triangle



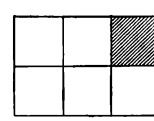
Obtuse Triangle

A *right triangle* has one right angle.

An *acute triangle* has *all* acute angles.

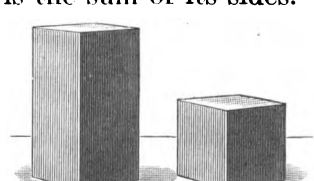
An *obtuse triangle* has one obtuse angle.

The most important four-sided figures are the square and the rectangle. Here is a rectangle made up of squares, one square being shaded.



The *perimeter* of a figure is the sum of its sides.

The most important solid figures are the rectangular solid and the cube. Here is a rectangular solid and a cube. This cube is half as high as the rectangular solid. Where have you seen a cube? Where is there a rectangular solid in the schoolroom?



### 127. Perimeters

*Examples 1 to 4, oral — Examples 5 to 10, written*

1. Measure this room. What is the perimeter?

2. What is the perimeter of a square that is $1\frac{1}{4}$ in. on a side?

3. What is the perimeter of a triangle whose sides are 5 in., 6 in., and 7 in.?

4. Find the perimeter of a baseball diamond that is 90 ft. on a side.

*Find the perimeters of rectangles whose sides are:*

5. 7 in., 9 in.
6. $8\frac{1}{2}$ in., $10\frac{1}{4}$ in.
7. 1 ft. 2 in., 9 in.
8. 2 ft. 7 in., 2 ft.
9. 39 in., 47 in.
10. $62\frac{1}{2}$ in., $39\frac{3}{4}$ in.

### 128. Perimeters

*Examples 1 to 3, oral — Examples 4 to 6, written*

1. Find the perimeter of a rectangle 10 ft. by 5 ft.

2. How much fringe will it take to go around a table cover that is 4 ft. 6 in. square?

3. How much border will it take to go around the carpet for a room 20 ft. by 15 ft.?

4. A triangular flower bed is 17 ft. 6 in. on a side. What is the perimeter?

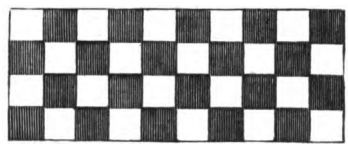
*Find the perimeters of triangles whose sides are:*

5. 7 ft. 3 in., 8 ft. 5 in., 6 ft. 8 in.
6. 9 ft. 2 in., 8 ft. 7 in., 8 ft. 4 in.

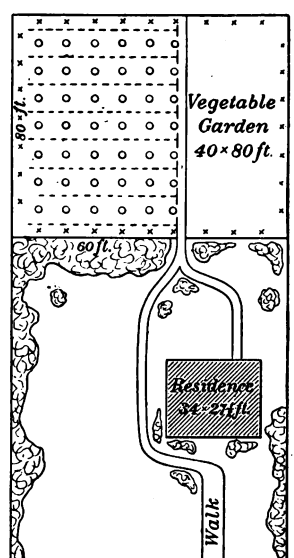
### 129. Areas

*Examples 1 to 4, oral — Examples 5 to 9, written*

1. What is the area of a rectangle 2 in. by 3 in.?
2. What is the area of a rectangle 2 in. by $2\frac{1}{2}$ in.?
3. What is the area of a rectangle 3 in. by $3\frac{1}{2}$ in.?
4. A hall floor 4 ft. by 10 ft. is covered with marble squares 1 ft. on a side, as here shown. How many pieces of marble are there? How many square feet?



5. This is the plan of the grounds about a village house. The lot is 100 ft. wide and 200 ft. long. How many square feet does it contain?
6. The vegetable garden is 40 ft. by 80 ft. How many square feet does it contain?
7. The orchard is 60 ft. by 80 ft. How many square feet does it contain?
8. The residence is 34 ft. by $27\frac{1}{2}$ ft. How many square feet does it cover?
9. The grounds about the house are $33\frac{1}{3}$ yd. by 40 yd. Find the area.



### 130. Areas

*Examples 1 to 7, oral — Examples 8 to 13, written*

1. A piece of lawn is 33 ft. long and 27 ft. wide. What are its dimensions in yards? What is its area in square yards?

*Find the areas of rectangles:*

2. 7 in. by 9 in.
3. 6 in. by 8 in.
4. 4 in. by 12 in.
5. 9 ft. by 11 ft.
6. 7 ft. by 10 ft.
7. 10 ft. by 12 ft.

8. A room has one door 3 ft. wide and 8 ft. high, and two windows each 3 ft. by 6 ft. How many square feet of openings in the walls?

9. At 20¢ a square yard, what will it cost to oil a floor 6 yd. long and 4 yd. wide?

10. Express in inches the dimensions of a rectangle 1 ft. 2 in. by 1 ft. 7 in., and then find the area in square inches.

11. Express in inches the dimensions of a table top 2 ft. 6 in. by 3 ft. 9 in., and then find the area in square inches.

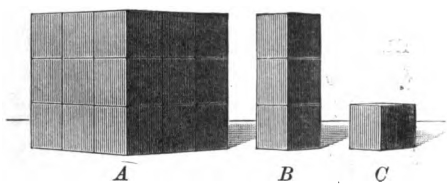
12. A cleaner charges 15¢ a square yard for cleaning rugs. A rug is $7\frac{1}{2}$ ft. by 6 ft. Find the cost of cleaning it.

13. The ceiling of a hall is to be decorated at a cost of 50¢ a square yard. The hall is 120 ft. long and 90 ft. wide. How much will it cost to decorate the ceiling?

### 131. Volumes

*Examples 1 to 3, oral — Examples 4 to 7, written*

1. What is the volume of a cube 1 in. on an edge?
2. If $C$ is 1 cu. in., what is $B$? what is $A$?




3. How much is $4 \times 3 \times 2$ cu. in.?

*Find the volumes of solids with these dimensions:*

4. 7 in., 9 in., 14 in.
5. 9 in., 15 in., 23 in.
6. 8 in., 17 in., 26 in.
7. 3 ft., 15 ft., 29 ft.

### 132. Volumes

*Examples 1 to 3, oral — Examples 4 to 6, written*

1. How much is $2 \times 7 \times 10$ cu. in.?
2. What is the volume of a box that is 2 in. by 5 in. by 6 in.?
3. What is the volume of a bin that is 5 ft. by 6 ft. by 10 ft.?
4. How many cubic feet in a schoolroom that is 42 ft. by 24 ft. by 15 ft.?

*Find the volumes of solids with these dimensions:*

5. 27 in., 31 in., 56 in.
6. 39 in., 43 in., 57 in.

### 133. Volumes

*Examples 1 to 4, oral — Examples 5 to 12, written*

1. How many cubic feet in 1 cu. yd.? in 10 cu. yd.?

2. How many cubic yards in a cellar 2 yd. by 4 yd. by 5 yd.?

3. How many cubic inches in a box 3 in. by 4 in. by 5 in.?

4. How many cubic inches in a cube that is 2 in. on an edge? 3 in. on an edge?

5. How many cubic inches in an aquarium that is 16 in. long, 8 in. wide, and 9 in. deep?

6. How many cubic feet in a wall that is 36 ft. long, 30 ft. wide, and 2 ft. thick?

7. A cellar is to be dug 25 ft. long, 19 ft. wide, and 6 ft. deep. How many cubic feet of earth must be taken out?

8. A cistern is 6 ft. square at the bottom and $5\frac{1}{2}$ ft. deep. How many cubic feet does it contain?

9. An iron water tank is 8 ft. long, 6 ft. wide, and $4\frac{1}{2}$ ft. deep. How many cubic feet does it contain?

10. A coal bin is 22 ft. long, 15 ft. wide, and 7 ft. deep. How many cubic feet does it contain?

11. A schoolroom is 38 ft. long, 30 ft. wide, and $12\frac{1}{2}$ ft. high. How many cubic feet does it contain?

12. A haymow is 24 ft. long, 15 ft. wide, and 9 ft. high. Express the dimensions in yards, and find the number of cubic yards it contains.

## X. BILLS AND RECEIPTS

When a person buys goods at a store he sometimes pays for them at that time, and sometimes he has them *charged*.

To charge goods means that their cost is added to the purchaser's *account* at the store, an account being a statement of what he owes there.

The store sends the purchaser a *bill*, sometimes every month, showing him how much he owes, and asking him to pay.

In the bill given below the symbol @ means "at." For example, 16 cans of soup @ 10¢ means that the soup cost 10¢ a can; 12 doz. eggs @ 30¢ means 12 doz. eggs at 30¢ a dozen.

To *fill a bill*, or *make the extensions*, means to write the cost after each item.

To *foot a bill*, means to add the items and find the total cost.

To *receipt a bill* means to stamp or write the words "Paid" or "Received Payment," this being signed by the one to whom it is due.

This is a receipted bill:

CHICAGO, *January 21*, 1915

Mr. *David Brownson*

***Bought of*** **CHARLES DUNHAM**

| | | | | |
|---|---|---|---|---|
| *Jan.* | *5* | *16 cans soup* | *@ 10¢* | *$1 60* |

*Rec'd Payment, Feb. 1, 1915*

*Chas. Dunham*

### 134. Bills

*Examples 1 to 4, oral — Examples 5 and 6, written*

1. What is meant by filling a bill?
2. What is meant by footing a bill?
3. What is meant by receipting a bill?
4. What is meant by charging a purchase?
5. Fill and foot this bill:

INDIANAPOLIS, *January 8*, 1916

Mr. *Joseph Laylander*

Bought of **GEORGE HALL**

| | | | | | |
|---|---|---|---|---|---|
| *Jan.* | *2* | *12 doz. eggs* | *@ 32¢* | | |
| | | *9 lb. butter* | *@ 33¢* | | |
| | *5* | *6 lb. cheese* | *@ 9¢* | | |

*Received Payment*

*George Hall*

*By John Jewett*

6. Copy, fill, and foot this bill. Date it where you live, and sign your name as the clerk who received the money:

Mr. *J. P. Halsey*

*Bought of* THURBER & CO.

| | | | | | |
|---|---|---|---|---|---|
| *Apr.* | *6* | *3 yd. silk* | *@ 80¢* | | |
| | | *2 doz. buttons* | *@ 45¢* | | |
| | *15* | *12 yd. calico* | *@ 7¢* | | |
| | | *5½ yd. lace* | *@ 40¢* | | |
| *May* | *10* | *9½ yd. linen* | *@ 60¢* | | |
| | | *2 yd. ribbon* | *@ 75¢* | | |

## 135. Bills

*Examples 1 to 3, oral — Examples 4 and 5, written*

1. What is meant by the symbol @?
2. What is meant by having an account?
3. How is a bill receipted when it is paid?

*Copy, fill, foot, and receipt the following, inserting the names of dealers:*

**4.**

[*Name of place, and date*].....19.....

M.....[*Mr. or Miss. Insert your name*].....[*Give your address*]

Bought of.....[*Insert name of some grocer*]....., Grocer

| | | | | |
|---|---|---|---|---|
| .....[*Date*]..... | *4 lb. powdered sugar* | @ $7\frac{1}{2}¢$ | $ | |
| " | *3 doz. eggs* | @ *35¢* | | |
| " | $\frac{1}{2}$ *doz. oranges* | @ *60¢* | | |
| | [*Receipt*]..... | | $ | |

**5.**

[*Name of place, and date*].....19.....

M.....[*Name*].....[*Give your address*]

Bought of.....[*Name*]....., Grocer

| | | | | |
|---|---|---|---|---|
| .....[*Date*]..... | *2 heads lettuce* | @ *5¢* | $ | |
| " | *6 lb. butter* | @ *32¢* | | |
| " | *4 gal. oil* | @ *18¢* | | |
| " | *8 lb. raisins* | @ $12\frac{1}{2}¢$ | | |
| " | *2 lb. coffee* | @ *30¢* | | |
| | [*Receipt*]..... | | $ | |

## 136. Bills

*Examples 1 to 3, oral — Examples 4 and 5, written*

1. What will 7 lb. of beef cost at 20¢ a pound?
2. What will 4 lb. of chicken cost at 22¢ a pound?
3. What will 6 lb. of lamb cost at 20¢ a pound?

*Copy, complete, fill, and foot these bills:*

**4.**

[*Name of place, and date*].....19.....

.....[*Name of your school*].....

Bought of.....[*Name*].....Bookseller

| | | | | |
|---|---|---|---|---|
| .....[*Date*].... | *40 arithmetics* | @ *35¢* | $ | |
| " | *3 doz. tablets* | @ *50¢* | | |
| | [*Receipt*]..... | | $ | |

**5.**

[*Name of place, and date*].....19.....

M.....[*Name*].....

Bought of.....[*Name*].....Dealer in Dry Goods

| | | | | |
|---|---|---|---|---|
| .....[*Date*].... | *2½ yd. flannel* | @ *$1.00* | $ | |
| " | *3½ yd. braid* | @ *12¢* | | |
| " | *10 yd. embroidery* | @ *12½¢* | | |
| " | *15 yd. silk* | @ *$1.35* | | |
| " | *4 spools thread* | @ *4¢* | | |
| | [*Receipt*]..... | | $ | |

The teacher should encourage the pupils to inquire outside of school about prices, so as to make out real bills of goods as they may be purchased in the place where they live. The meaning of the term "debtor" and the abbreviation "Dr." should be explained.

### 137. Bills

*Examples 1 to 5, oral — Examples 6 to 8, written*

1. What will $1\frac{1}{2}$ lb. of candy cost at 40¢ a pound?
2. What will 2 doz. oranges cost at 50¢ a dozen?
3. What will $1\frac{1}{2}$ gal. of oil cost at \$1.50 a gallon?
4. What will 3 boxes of berries cost at 15¢ a box?
5. What will 2 pairs of shoes cost at \$3.20 a pair?

*Make out bills for the following, inserting dates and names:*

6.

| | |
|---|---|
| 2 pair rubbers | at 75¢ |
| 2 pair shoes | at \$3.50 |
| 1 pair slippers | at \$2.00 |
| 4 pair shoe laces | at 5¢ |
| 2 boxes blacking | at 10¢ |

7.

| | |
|---|---|
| $4\frac{1}{2}$ lb. ham | at 24¢ |
| 2 lb. leaf lard | at 18¢ |
| $5\frac{1}{2}$ lb. roast beef | at 22¢ |
| 5 lb. mutton | at 18¢ |
| $4\frac{1}{2}$ lb. sirloin steak | at 26¢ |
| 3 lb. tenderloin | at 26¢ |
| 6 lb. pork | at 22¢ |

8.

| | |
|---|---|
| 5 spools thread | at 5¢ |
| 4 bunches tape | at 3¢ |
| 20 yd. cambric | at $8\frac{1}{2}$¢ |
| $6\frac{1}{2}$ yd. canvas | at 10¢ |
| $8\frac{1}{2}$ yd. flannel | at \$1.20 |
| $3\frac{1}{4}$ doz. buttons | at 40¢ |

### 138. Bills

*Examples 1 to 5, oral — Examples 6 to 8, written*

1. What will $1\frac{1}{2}$ lb. of tea cost at 40¢ a pound?
2. What will $2\frac{1}{2}$ lb. of coffee cost at 30¢ a pound?
3. What will $1\frac{1}{2}$ lb. of cheese cost at 16¢ a pound?
4. What will 2 lb. of raisins cost at 13¢ a pound?
5. What will 2 lb. of walnuts cost at 15¢ a pound?

*Make out bills for the following, inserting dates and names:*

6.

| | |
|---|---|
| 8 lb. raisins | at $12\frac{1}{2}$¢ |
| $4\frac{1}{2}$ gal. gasoline | at 20¢ |
| $4\frac{1}{2}$ lb. butter | at 32¢ |
| 4 lb. coffee | at $28\frac{1}{2}$¢ |
| 6 heads lettuce | at 5¢ |
| 10 lb. sugar | at $6\frac{1}{2}$¢ |

7.

| | |
|---|---|
| 20 lb. sugar | at $6\frac{1}{2}$¢ |
| 8 lb. coffee | at $32\frac{1}{2}$¢ |
| $2\frac{1}{2}$ lb. tea | at 50¢ |
| 6 lb. butter | at 30¢ |
| 1 barrel flour | at $5.80 |

8.

| | |
|---|---|
| 16 yd. velvet | at $2.30 |
| 15 yd. flannel | at 55¢ |
| 26 yd. cotton | at 15¢ |
| $7\frac{1}{2}$ yd. dimity | at 24¢ |
| 9 yd. ribbon | at 25¢ |
| 7 spools of silk | at 9¢ |
| 18 yd. India linen | at 26¢ |

## XI. PROBLEM SOLVING

### 139. Cancellation

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. If 2 books cost 60¢, what will 1 book cost? What will 3 books cost?

2. If 4 oranges cost 20¢, what will 1 orange cost? What will 7 oranges cost?

3. If we divide both numerator and denominator of a fraction by the same number, what may be said as to the value of the fraction?

*It shortens the work to cancel wherever possible.* For example, if 7 tons of coal cost \$35, what will 12 tons cost?

1 ton costs \$35 ÷ 7, and 12 tons cost 12 times this result, or \$60.

$$12 \times \frac{\overset{5}{\$35}}{\underset{1}{7}} = \$60$$

4. If 7 tons of coal cost \$38.50, what will 12 tons cost?

5. If 7 acres of land cost \$315, what will 9 acres cost?

6. If 11 school desks cost \$44, what will 8 desks cost? What will 22 desks cost?

7. If 6 yd. of velvet cost \$7.50, what will 15 yd. cost? What will 24 yd. cost?

8. If 9 bu. of wheat cost \$8.55, what will 15 bu. cost? What will 18 bu. cost?

9. If a conductor collects 75¢ from 15 people, how much will he collect from 25 people?

### 140. Cancellation

*Examples 1 to 4, oral — Examples 5 to 10, written*

1. Reduce to lowest terms: $\frac{2}{4}$; $\frac{4}{8}$; $\frac{3}{9}$; $\frac{3}{12}$; $\frac{4}{12}$; $\frac{4}{16}$.

2. Reduce to lowest terms: $\frac{5}{10}$; $\frac{3}{15}$; $\frac{5}{15}$; $\frac{6}{15}$; $\frac{12}{15}$.

3. The product of two numbers is 75. One of the numbers is 3. What is the other number?

4. The product of three numbers is 30. Two of the numbers are 2 and 5. What is the third number?

We may apply cancellation to cases like Ex. 4. Thus, if the product of three numbers is 384, and if two of the numbers are 12 and 8, the third number is 384 divided by 12 × 8, or 4.

$$\frac{\overset{4}{\cancel{384}}}{\cancel{12} \times \cancel{8}} = 4$$

5. The product of three numbers is 396. Two of the numbers are 3 and 12. What is the third number?

6. The product of three numbers is 612. Two of the numbers are 4 and 9. What is the third number?

7. The volume of a box is 900 cu. in. The width is 12 in. and the depth is 5 in. What is the length?

8. The volume of a bin is 216 cu. ft. The length is 9 ft. and the depth is 4 ft. What is the width?

9. A schoolroom contains 9600 cu. ft. It is 40 ft. long and 20 ft. wide. How high is it?

10. A bar of iron 12 ft. long contains 3456 cu. in. The bar is rectangular and is 1 in. thick. How wide is it?

### 141. Problems in Capacity

*Examples 1 to 4, oral — Examples 5 to 11, written*

1. There are 231 cu. in. in 1 gal. How many cubic inches are there in 10 gal.?

2. A box is 2 in. deep, 3 in. wide, and 4 in. long. How many cubic inches in the box?

3. At 22 bricks to a cubic foot, how many bricks will be needed for 100 cu. ft. of wall? for half of this amount of wall?

4. At \$3 per cubic foot, how much must a builder pay for 1000 cu. ft. of wall? for 2000 cu. ft.?

5. Allowing $2150\frac{1}{2}$ cu. in. to a bushel, how many cubic inches are there in a bin that holds 50 bu.?

6. Allowing $1\frac{1}{4}$ cu. ft. to a bushel, how many cubic inches are there in a bin that holds 280 bu.?

7. A bin is 6 ft. long, 4 ft. wide, and 4 ft. deep. Allowing $1\frac{1}{4}$ cu. ft. to a bushel, how many bushels will the bin hold?

8. At \$2.80 per cubic foot, how much must a builder pay for a wall 30 ft. long, 7 ft. high, and $1\frac{1}{2}$ ft. thick?

9. There being 231 cu. in. in a gallon, how many gallons are there in a cistern containing 231 cu. ft.?

10. How many gallons are there in a cistern holding 2079 cu. in.?

11. A rectangular watering trough is 8 ft. long, 16 in. wide, and 14 in. deep. How many gallons will it hold?

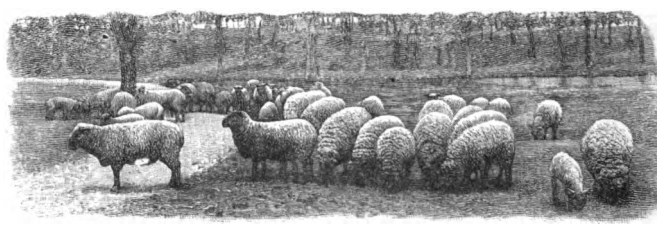
### 142. Problems of the Farm

*Examples 1 to 3, oral — Examples 4 to 9, written*

1. How many sheep are 46 sheep and 24 sheep?

2. If there are 24 sheep in one flock and half as many in another flock, how many sheep are there in both flocks?

3. If each of 70 sheep yields 9 lb. of wool, how much do they all yield?



4. If a farmer pays \$6.30 a head for his sheep, how much will he pay for 70 sheep?

5. If 24 of his sheep yield $9\frac{1}{4}$ lb. of wool apiece, how much wool does he get from the 24 sheep?

6. If a farmer sells 725 lb. of wool at 45¢ a pound, how much does he receive?

7. If it costs a farmer 36¢ per hundred pounds to get his wool to market, and he has 675 lb. to send, how much will it cost for all this wool?

8. When wool is worth 38¢ a pound, what is the value of the wool from a sheep that yields $7\frac{1}{2}$ lb.?

9. If a farmer receives \$268.80 for 640 lb. of wool, how much does he receive per pound?

### 143. Problems of the Farm

*Examples 1 to 3, oral — Examples 4 to 7, written*

**1.** A farmer has 12 acres in one lot and twice as much in another lot. How much has he in both?

**2.** A farmer has 30 cows and twice as many sheep. How many sheep has he? How many cows and sheep together?

**3.** A farmer has a windmill that pumps 3 gal. of water a minute. At this rate, how much water will it pump in 1 hr.?

**4.** A farmer has a water tank that holds 120 cu. ft. of water. What is the weight of the water, 1 cu. ft. weighing $62\frac{1}{2}$ lb.?

**5.** A farmer finds that 1 qt. of corn will plant 240 hills. How much corn will he need to plant 480 hills? to plant 2760 hills?

**6.** A farmer allows $2\frac{1}{4}$ bu. of oats for sowing an acre. How much will he need for sowing 64 A.?

**7.** A farmer cares for the birds because a tree sparrow eats in a day enough seeds to produce 75 weeds. At this rate, 25 such birds will destroy in 2 wk. enough seeds to produce how many weeds?

### 144. Review

*Examples 1 to 4, oral — Examples 5 to 9, written*

1. In a class of 20 pupils $\frac{3}{5}$ are boys. How many boys are there? How many girls are there?

2. In a school of 150 pupils $\frac{2}{5}$ are boys. How many boys are there? How many girls are there?

3. A schoolroom is 30 ft. long and 20 ft. wide. How many square feet in the area of the floor?

4. A blackboard is 20 ft. long and 3 ft. high. How many square feet in the area of the blackboard?

5. A schoolroom has 5 windows. Each window is 3 ft. by 6 ft. What is the area of each window? of all the windows together?

6. A milk dealer in a city buys milk for 5¢ a quart. It costs him 1¢ a quart to deliver it. He sells it for 7¢ a quart. How much does he make on 1 qt.? on 175 gal.?

7. A man leaves his office at 5.30 P.M. and reaches home 35 min. later. At what time does he reach home?

8. A boy sawed the wood in a pile 8 ft. long, 4 ft. wide, and 2 ft. high. What part of a cord did he saw?

9. It is 85 mi. from Chicago to Milwaukee. A man went from Milwaukee to Chicago and back again 3 times a week for 4 weeks. How many miles did he travel in all?

### 145. Miscellaneous Problems

*Examples 1 to 4, oral — Examples 5 to 10, written*

1. A man pays \$15 a month for the rent of his house. How much does he pay in 2 mo.?

2. A gasoline stove uses 2 qt. of gasoline daily. How many quarts will it use in 30 da.?

3. A man saves \$200 a year for 8 yr. How much does he save in all?

4. On a lot costing \$600 is built a house costing \$3400 and containing furniture costing \$860. What is the value of the house, lot, and furniture?

5. A factory paid \$23,475 in wages in 313 da. What was the average amount paid each day?

6. A carload of coal containing 34,000 lb. is sold at \$5.45 a ton. How much is received for the carload?

7. A coal dealer sold 41,000 lb. of coal at \$7.25 a ton. How much did he receive for the coal?

8. In a certain school there are 362 pupils. It costs \$5430 a year to run the school. How much is the cost for each pupil?

9. A tank is 15 ft. long, 9 ft. wide, and 7 ft. deep. A cubic foot of water weighs $62\frac{1}{2}$ lb. What is the weight of water necessary to fill the tank?

10. Two automobiles are 90 mi. apart. They travel towards each other, one at the rate of 16 mi. an hour and the other at the rate of 14 mi. an hour. How long before they will meet?

## XII. GENERAL REVIEW

### 146. Review

*Examples 1 to 3, oral — Examples 4 to 8, written*

1. At \$1.20 a bag, what will 2 bags of corn cost?
2. At \$3 a cord, what will 9 cords of wood cost?
3. At \$15 a ton, what will 10 tons of hay cost?
4. At \$1.15 a bag, what will 27 bags of corn cost?
5. At \$5.85 a ton, what will 37 tons of coal cost?
6. At \$11.25 a ton, what will 28 tons of plaster cost? What will 46 tons cost?
7. At \$3.25 a box, what will 44 boxes of oranges cost? What will 68 boxes cost?
8. At \$0.32 a dozen, what will 85 doz. eggs cost?

### 147. Review

*Examples 1 to 3, oral — Examples 4 to 8, written*

1. At 10¢ a pound, what is a bale (500 lb.) of cotton worth?
2. At \$2 a yard, what will 20 yd. of carpet cost?
3. At \$3.20 a day, what will a man earn in 10 da.?
4. If it takes 6 strips of carpet, each $6\frac{1}{2}$ yd. long, to carpet a room, how many yards are needed?
5. At 48¢ a yard, what will $15\frac{1}{2}$ yd. of linen cost?
6. At 24¢ a pound, what will $2\frac{3}{4}$ lb. of meat cost?
7. At \$4.25 a day, what will a man earn in 26 da.?
8. At \$20.25 a week, what will a man earn in 32 weeks? in 48 weeks? in 52 weeks?

## 148. Drill Work in Addition

*Examples 1 to 8, oral — Examples 9 to 28, written*

| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|---|---|---|
| 2 | 1 | 2 | 5 | 2 | 9 | 3 | 8 |
| 3 | 9 | 1 | 1 | 4 | 9 | 2 | 2 |
| 5 | 3 | 7 | 4 | 4 | 9 | 8 | 5 |
| 7 | 2 | 9 | 5 | 3 | 9 | 7 | 6 |
| 3 | 5 | 1 | 5 | 3 | 9 | 6 | 9 |
| 8 | 6 | 2 | 2 | 2 | 9 | 1 | 7 |
| 2 | 4 | 8 | 3 | 2 | 9 | 8 | 8 |

| 9. | 10. | 11. | 12. | 13. | 14. | 15. | 16. |
|---|---|---|---|---|---|---|---|
| 22 | 48 | 74 | 59 | 37 | 54 | 77 | 67 |
| 34 | 37 | 83 | 36 | 42 | 68 | 42 | 92 |
| 76 | 63 | 26 | 49 | 96 | 98 | 81 | 87 |
| 81 | 92 | 90 | 80 | 81 | 92 | 63 | 36 |
| 92 | 80 | 32 | 91 | 73 | 39 | 59 | 54 |

| 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. |
|---|---|---|---|---|---|---|---|
| $6\frac{3}{4}$ | $7\frac{2}{3}$ | $9\frac{3}{5}$ | $7\frac{1}{5}$ | $5\frac{3}{5}$ | $6\frac{7}{8}$ | $5\frac{3}{4}$ | $6\frac{5}{6}$ |
| $7\frac{1}{2}$ | $5\frac{1}{3}$ | $4\frac{1}{5}$ | $2\frac{1}{2}$ | $4\frac{2}{3}$ | $4\frac{3}{4}$ | $6\frac{2}{3}$ | $4\frac{2}{3}$ |
| $8\frac{3}{8}$ | $6\frac{5}{6}$ | $6\frac{2}{5}$ | $3\frac{3}{5}$ | $3\frac{4}{5}$ | $9\frac{1}{2}$ | $4\frac{1}{6}$ | $8\frac{1}{4}$ |

| 25. | 26. | 27. | 28. |
|---|---|---|---|
| $3.75 | $8.27 | $5.98 | $9.29 |
| 4.86 | 9.06 | 6.37 | 8.96 |
| 9.38 | 3.54 | 8.90 | 9.34 |

### 149. Drill Work in Subtraction

*Examples 1 to 8, oral — Examples 9 to 30, written*

| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|---|---|---|
| 60 | 69 | 69 | 70 | 74 | 74 | 78 | 79 |
| 30 | 30 | 35 | 20 | 20 | 23 | 27 | 21 |

**9.** If a man has \$74.85 and spends \$21.65 of it, how much has he left?

| 10. | 11. | 12. | 13. |
|---|---|---|---|
| \$31.75 | \$48.62 | \$39.80 | \$80.00 |
| 26.54 | 32.75 | 19.95 | 27.63 |

**14.** How much must be added to $4\frac{3}{4}$ to make $9\frac{1}{8}$?

| 15. | 16. | 17. | 18. | 19. | 20. |
|---|---|---|---|---|---|
| $25\frac{1}{2}$ | $38\frac{1}{4}$ | $57\frac{3}{5}$ | $90\frac{1}{5}$ | $81\frac{3}{5}$ | $47\frac{5}{8}$ |
| $16\frac{3}{8}$ | $22\frac{3}{8}$ | $39\frac{1}{3}$ | $62\frac{1}{2}$ | $36\frac{3}{4}$ | $29\frac{2}{3}$ |

**21.** From the sum of $35\frac{1}{2}$ and $42\frac{7}{8}$ take $39\frac{3}{4}$.

| 22. | 23. | 24. | 25. | 26. | 27. |
|---|---|---|---|---|---|
| $80\frac{1}{6}$ | $47\frac{5}{6}$ | $34\frac{3}{4}$ | $60\frac{1}{5}$ | $72\frac{3}{4}$ | $83\frac{1}{6}$ |
| $35\frac{1}{4}$ | $29\frac{7}{8}$ | $19\frac{5}{8}$ | $39\frac{3}{4}$ | $49\frac{7}{8}$ | $35\frac{3}{4}$ |

**28.** From the sum of \$35.75 and \$48.96 take the sum of \$13.86 and \$26.49.

**29.** From the sum of \$26.35 and \$29.62 take the sum of \$13.27 and \$12.46.

**30.** From \$96.40 take the sum of \$2.75, \$3.82, \$4.25, and \$5.18.

### 150. Drill Work in Multiplication

*Examples 1 to 16, oral — Examples 17 to 40, written*

1. Multiply 30 by 2; by 3; by 4; by 5; by 7.
2. Multiply 50 by 2; by 3; by 5; by 6; by 8.

| 3. | 4. | 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|---|---|
| 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| 3 | 2 | 3 | 4 | 2 | 3 | 4 |

| 10. | 11. | 12. | 13. | 14. | 15. | 16. |
|---|---|---|---|---|---|---|
| 21 | 32 | 41 | 52 | 63 | 72 | 81 |
| 3 | 2 | 3 | 4 | 2 | 3 | 4 |

17. Multiply 640 by 2; by $2\frac{1}{2}$; by 3; by $3\frac{1}{2}$.
18. Multiply \$2.40 by 2; by $2\frac{1}{4}$; by 3; by $3\frac{1}{3}$.
19. Multiply \$14.40 by 3; by $3\frac{1}{2}$; by $3\frac{1}{3}$; by $3\frac{1}{4}$.
20. Multiply \$36.60 by 4; by $4\frac{1}{2}$; by $4\frac{1}{4}$; by $4\frac{3}{4}$.
21. Multiply \$48.24 by 5; by $5\frac{1}{2}$; by $5\frac{1}{8}$; by $5\frac{3}{8}$.
22. Multiply \$96.40 by 7; by $8\frac{1}{2}$; by $9\frac{1}{8}$; by $9\frac{5}{8}$.

| 23. | 24. | 25. | 26. | 27. | 28. |
|---|---|---|---|---|---|
| \$2.75 | \$3.68 | \$4.86 | \$21.75 | \$30.70 | \$70.06 |
| 12 | 32 | 53 | 24 | 49 | 39 |

| 29. | 30. | 31. | 32. | 33. | 34. |
|---|---|---|---|---|---|
| \$3.82 | \$4.29 | \$9.82 | \$46.28 | \$40.06 | \$80.72 |
| 15 | 27 | 64 | 32 | 78 | 35 |

| 35. | 36. | 37. | 38. | 39. | 40. |
|---|---|---|---|---|---|
| \$4.50 | \$5.80 | \$8.97 | \$59.61 | \$32.09 | \$98.80 |
| 22 | 36 | 75 | 76 | 20 | 62 |

### 151. Drill Work in Division

*Examples 1 to 18, oral — Examples 19 to 50, written*

1. Divide 120 by 2; by 3; by 4; by 10; by 12.
2. Divide 480 by 2; by 4; by 6; by 8; by 10.
3. Divide 320 by 4; by 8; by 10; by 16; by 32.
4. Divide 440 by 2; by 4; by 10; by 44; by 40.
5. Divide 150 by 3; by 5; by 10; by 15; by 75.
6. Divide 500 by 2; by 5; by 10; by 50; by 100.

| 7. | 9. | 11. | 13. | 15. | 17. |
|---|---|---|---|---|---|
| $2\overline{)80}$ | $3\overline{)60}$ | $4\overline{)80}$ | $5\overline{)50}$ | $6\overline{)60}$ | $7\overline{)70}$ |
| **8.** | **10.** | **12.** | **14.** | **16.** | **18.** |
| $2\overline{)90}$ | $3\overline{)72}$ | $4\overline{)92}$ | $5\overline{)60}$ | $6\overline{)72}$ | $7\overline{)91}$ |

19. Divide 1440 by 12; by 24; by 36; by 48; by 60.
20. Divide 1320 by 11; by 12; by 22; by 24; by 110.
21. Divide \$1.75 by 5; by 25; by 7; by 35.
22. Divide \$6.40 by 2; by 4; by 8; by 20; by 40.
23. Divide \$15.60 by 2; by 4; by 3; by 9; by 13.

| | | |
|---|---|---|
| **24.** $378 \div 21$. | **33.** $2706 \div 41$. | **42.** $2925 \div 225$. |
| **25.** $656 \div 41$. | **34.** $3366 \div 51$. | **43.** $2937 \div 225$. |
| **26.** $1274 \div 91$. | **35.** $5368 \div 61$. | **44.** $3721 \div 225$. |
| **27.** $1922 \div 31$. | **36.** $2754 \div 81$. | **45.** $4136 \div 125$. |
| **28.** $1134 \div 42$. | **37.** $8118 \div 82$. | **46.** $2739 \div 211$. |
| **29.** $2624 \div 82$. | **38.** $3320 \div 83$. | **47.** $4136 \div 230$. |
| **30.** $2548 \div 91$. | **39.** $1764 \div 84$. | **48.** $6275 \div 125$. |
| **31.** $7688 \div 62$. | **40.** $3600 \div 48$. | **49.** $4108 \div 333$. |
| **32.** $5670 \div 84$. | **41.** $2925 \div 75$. | **50.** $5656 \div 231$. |

### 152. Review

*Examples 1 to 4, oral — Examples 5 to 16, written*

1. At 32¢ a pound, what will a 10-lb. turkey cost?
2. At 40¢ a yard, what will $1\frac{1}{2}$ yd. of cloth cost?
3. My purchases cost 32¢ and 28¢. How much change do I get from \$1?
4. My purchases cost \$2.75 and 50¢. How much change do I get from \$5?

5. $6\frac{1}{4} \times \$16$.
6. $12\frac{1}{2} \times \$8$.
7. $37\frac{1}{2} \times \$24$.
8. $42\frac{1}{2} \times \$16$.
9. $62\frac{1}{2} \times \$32$.
10. $33\frac{1}{3} \times \$21$.
11. $66\frac{2}{3} \times \$24$.
12. $87\frac{1}{2} \times \$48$.
13. $3\frac{1}{8} \times \$320$.
14. $7\frac{1}{2} \times \$448$.
15. $18\frac{3}{4} \times \$336$.
16. $22\frac{3}{4} \times \$308$.

### 153. Review

*Examples 1 to 7, oral — Examples 8 to 19, written*

1. The last chapter in a book is Chapter XXXIV. If you have finished Chapter XXI, how many more chapters have you to read?

2. $37 + 13$.
3. $48 + 12$.
4. $247 - 31\frac{1}{2}$.
5. $386 - 42\frac{1}{4}$.
6. $591 - 86\frac{1}{5}$.
7. $23 + 27$.
8. $32 + 28$.
9. $29\frac{3}{4} - 1\frac{1}{8}$.
10. $34\frac{3}{8} - 2\frac{1}{4}$.
11. $48\frac{1}{4} - 7\frac{1}{8}$.
12. $41 + 29$.
13. $63 + 37$.
14. $24\frac{3}{8} - 16\frac{1}{2}$.
15. $32\frac{2}{5} - 14\frac{3}{5}$.
16. $49\frac{1}{8} - 26\frac{3}{4}$.

17. Multiply $32\frac{1}{2}$ by 4; by 5; by 10.
18. Divide 15 by 2; by $2\frac{1}{2}$; by $7\frac{1}{2}$; by $1\frac{1}{2}$.
19. Multiply $7\frac{1}{2}$ by 4; then divide by 5.

### 154. Review

*Examples 1 to 4, oral — Examples 5 to 18, written*

1. How much is $\frac{1}{2}$ of $\frac{1}{2}$ in.? $\frac{1}{2}$ of $\frac{1}{4}$ in.?
2. How much is $\frac{1}{2}$ of $\frac{2}{3}$ in.? $\frac{1}{2}$ of $\frac{2}{5}$ in.?
3. How much is $\frac{1}{4}$ of $\frac{1}{2}$ in.? $\frac{1}{4}$ of $\frac{4}{5}$ in.?
4. How much is $\frac{2}{3}$ of $\frac{3}{4}$ in.? $\frac{3}{4}$ of $\frac{2}{3}$ in.?

*Take:*

5. $\frac{2}{3}$ of $\frac{3}{8}$.
6. $\frac{3}{8}$ of $\frac{2}{3}$.
7. $\frac{2}{3}$ of $\frac{3}{5}$.
8. $\frac{3}{4}$ of $\frac{4}{5}$.
9. $\frac{4}{5}$ of $\frac{3}{4}$.
10. $\frac{3}{4}$ of $\frac{4}{7}$.
11. $\frac{1}{5}$ of $\frac{5}{8}$.
12. $\frac{3}{5}$ of $\frac{5}{8}$.
13. $\frac{4}{5}$ of $\frac{5}{8}$.
14. $\frac{1}{8}$ of $\frac{8}{9}$.
15. $\frac{3}{8}$ of $\frac{8}{9}$.
16. $\frac{5}{8}$ of $\frac{8}{9}$.
17. How much is $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{4}{5}$? $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$?
18. How much is $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{4}{5}$? $\frac{1}{4}$ of $\frac{4}{5}$?

### 155. Review

*Examples 1 to 4, oral — Examples 5 to 19, written*

1. How much is $2\frac{1}{2} \times 2$ in.? $2\frac{1}{2} \times 4$ in.?
2. How much is $2\frac{1}{4} \times 4$ in.? $2\frac{1}{4} \times 8$ in.?
3. How much is $\frac{3}{4}$ of 4? $2\frac{3}{4} \times 4$? $2\frac{2}{3} \times 6$?
4. How much is $\frac{1}{8}$ of 8? $2\frac{1}{8} \times 8$? $2\frac{1}{8} \times 16$?

*Multiply:*

5. $2\frac{1}{4} \times 20$.
6. $2\frac{1}{4} \times 24$.
7. $2\frac{3}{4} \times 24$.
8. $3\frac{3}{4} \times \$32$.
9. $5\frac{3}{4} \times 48$ ft.
10. $3\frac{1}{8} \times 16$.
11. $3\frac{3}{8} \times 16$.
12. $3\frac{5}{8} \times 32$.
13. $4\frac{7}{8} \times \$96$.
14. $9\frac{7}{8} \times \$48$.
15. $2\frac{2}{3} \times \$9$.
16. $3\frac{1}{2} \times \$17$.
17. $4\frac{3}{5} \times \$25$.
18. $9\frac{3}{4} \times \$68$.
19. $8\frac{5}{9} \times \$72$.

# APPENDIX

Although there is an unusually large amount of drill work in the body of the book, it frequently happens that some pupil, or even a whole class, needs extra drill upon the fundamental operations. On this account nearly six hundred additional problems are included in the exercises on pages 278 and 279.

There is a growing tendency to omit the subjects of greatest common divisor, least common multiple, prime numbers, factors, and tests of divisibility until a more advanced book is studied. Some courses of study require these topics at this time, however, and they are therefore treated here.

Most schools do not take up the study of decimal fractions until the second book in arithmetic is studied. Some schools, however, require this work while the first book is in the hands of the pupils. On this account some work in decimal fractions is given in this Appendix, to be used or not, as may be desired.

Work of this kind should be introduced as required while the regular text is being studied, or else it should be omitted entirely.

## I. DRILL WORK

### 156. Drill Work in Addition and Subtraction

| | I | II | III | IV | V | VI |
|---|---|---|---|---|---|---|
| *a* | 87 | 892 | 901 | 981 | 9070 | $90.07 |
| *b* | 74 | 784 | 873 | 948 | 8961 | 86.50 |
| *c* | 68 | 676 | 809 | 850 | 8097 | 84.62 |
| *d* | 59 | 649 | 770 | 839 | 7808 | 78.43 |
| *e* | 54 | 587 | 748 | 790 | 7099 | 70.56 |
| *f* | 47 | 509 | 690 | 709 | 6600 | 68.07 |
| *g* | 45 | 473 | 657 | 671 | 6487 | 61.23 |
| *h* | 40 | 440 | 609 | 658 | 6099 | 58.34 |
| *i* | 36 | 419 | 583 | 579 | 5801 | 50.69 |
| *j* | 34 | 396 | 507 | 500 | 5074 | 49.70 |
| *k* | 27 | 349 | 462 | 481 | 4765 | 40.96 |
| *l* | 24 | 278 | 375 | 397 | 3888 | 38.09 |

*In each of the six columns add all the numbers opposite the letters, from the first letter to the last:*

**1.** *a* to *c*. **6.** *a* to *e*. **11.** *b* to *g*. **16.** *a* to *j*. **21.** *a* to *k*.
**2.** *b* to *d*. **7.** *c* to *g*. **12.** *d* to *i*. **17.** *b* to *k*. **22.** *b* to *l*.
**3.** *c* to *e*. **8.** *e* to *i*. **13.** *f* to *k*. **18.** *c* to *l*. **23.** *a* to *l*.
**4.** *d* to *f*. **9.** *g* to *k*. **14.** *h* to *k*. **19.** *d* to *k*. **24.** *c* to *k*.
**5.** *e* to *g*. **10.** *i* to *l*. **15.** *h* to *l*. **20.** *e* to *l*. **25.** *d* to *l*.

*In each of the six columns subtract:*

**26.** $a-b$. **29.** $d-e$. **32.** $c-h$. **35.** $g-h$. **38.** $a-k$.
**27.** $b-c$. **30.** $a-f$. **33.** $d-i$. **36.** $h-i$. **39.** $a-l$.
**28.** $c-d$. **31.** $b-g$. **34.** $f-g$. **37.** $i-j$. **40.** $b-l$.

### 157. Drill Work in Multiplication and Division

| | I | II | III | IV | V | VI |
|---|---|---|---|---|---|---|
| $a$ | 912 | 1776 | 1488 | 2064 | 2448 | 5808 |
| $b$ | 456 | 888 | 744 | 1032 | 1224 | 2904 |
| $c$ | 228 | 444 | 372 | 516 | 612 | 1452 |
| $d$ | 152 | 296 | 248 | 344 | 408 | 968 |
| $e$ | 114 | 222 | 186 | 258 | 306 | 726 |
| $f$ | 76 | 148 | 124 | 172 | 204 | 484 |
| $g$ | 38 | 74 | 62 | 86 | 102 | 242 |
| $h$ | 19 | 37 | 31 | 43 | 51 | 121 |

*In each of the six columns multiply as follows:*

| | | | |
|---|---|---|---|
| **1.** $a \times b$. | **9.** $b \times d$. | **17.** $c \times g$. | **25.** $e \times h$. |
| **2.** $a \times c$. | **10.** $b \times e$. | **18.** $c \times h$. | **26.** $f \times g$. |
| **3.** $a \times d$. | **11.** $b \times f$. | **19.** $d \times e$. | **27.** $f \times h$. |
| **4.** $a \times e$. | **12.** $b \times g$. | **20.** $d \times f$. | **28.** $a \times b \times h$. |
| **5.** $a \times f$. | **13.** $b \times h$. | **21.** $d \times g$. | **29.** $b \times c \times h$. |
| **6.** $a \times g$. | **14.** $c \times d$. | **22.** $d \times h$. | **30.** $c \times d \times g$. |
| **7.** $a \times h$. | **15.** $c \times e$. | **23.** $e \times f$. | **31.** $c \times d \times f$. |
| **8.** $b \times c$. | **16.** $c \times f$. | **24.** $e \times g$. | **32.** $d \times e \times f$. |

*In each of the six columns divide as follows:*

| | | | |
|---|---|---|---|
| **33.** $a \div h$. | **39.** $a \div c$. | **45.** $b \div g$. | **51.** $a \div e$. |
| **34.** $b \div h$. | **40.** $a \div g$. | **46.** $c \div g$. | **52.** $a \div f$. |
| **35.** $c \div h$. | **41.** $b \div f$. | **47.** $d \div g$. | **53.** $a \div d$. |
| **36.** $d \div h$. | **42.** $a \div b$. | **48.** $e \div g$. | **54.** $b \div d$. |
| **37.** $e \div h$. | **43.** $c \div f$. | **49.** $b \div e$. | **55.** $g \div h$. |
| **38.** $f \div h$. | **44.** $d \div f$. | **50.** $c \div e$. | **56.** $b \div c$. |

## II. DIVISORS, MULTIPLES, FACTORS

The *greatest common divisor* (G.C.D.) of two or more numbers is the greatest number that is exactly contained in each of them.

Thus 6 is the G.C.D. of 12 and 18, although 2 and 3 are also divisors of these numbers.

The *least common multiple* (L.C.M.) of two or more numbers is the least number that exactly contains each of them.

Thus 30 is the L.C.M. of 10 and 15, although these numbers are also contained in 60, 90, and so on.

The least common denominator of several fractions is the least common multiple of the denominators.

Thus the least common denominator of $\frac{7}{10}$ and $\frac{11}{15}$ is 30, and this is the L.C.M. of the denominators.

An exact divisor of a number is also called a *factor* of the number.

Thus the factors of 30 are 2, 3, 5, 6, 10, and 15. This is expressed as follows: $30 = 2 \times 3 \times 5$, in which we see that $2 \times 3 = 6$, $2 \times 5 = 10$, $3 \times 5 = 15$.

The G.C.D. and L.C.M. of 30 and 45 may be found as follows:

$30 = 2 \times 3 \times 5$. G.C.D. $= 3 \times 5 = 15$.

$45 = 3 \times 3 \times 5$. L.C.M. $= 2 \times 3 \times 3 \times 5 = 90$.

The G.C.D. must contain all the *common* factors of 30 and 45, that is, all of the factors that are found in each. Therefore it equals $3 \times 5$, or 15.

The L.C.M. must contain *every* factor found in either 30 or 45. Therefore it equals $2 \times 3 \times 3 \times 5$, or 90.

A number that has no factors excepting itself and 1 is called a *prime number.*

The prime numbers below 100 are as follows: 1, 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97.

It is convenient to know these prime numbers because of their use in cancellation.

The numbers represented by 1, 2, 3, 4, 5, 6, 7, 8, and 9 are called *digits.*

*A number is divisible by 2 if the last digit is divisible by 2, or if the number ends in 0.*

Thus 12, 40, 96, and 1134 are all divisible by 2.

*A number is divisible by 4 if the last two digits form a number divisible by 4, or if the number ends in two zeros.*

Thus 724 and 1100 are both divisible by 4.

*A number is divisible by 5 if it ends in 0 or 5.*

Thus 11,135 and 24,410 are divisible by 5.

*A number is divisible by 3 if the sum of its digits is divisible by 3.*

Thus 72,111 is divisible by 3 because $7 + 2 + 1 + 1 + 1$, or 12, is divisible by 3.

*A number is divisible by 9 if the sum of its digits is divisible by 9.*

Thus 42,111 is divisible by 9 because $4 + 2 + 1 + 1 + 1$, or 9, is divisible by 9. In the same way we see that 10,800, 40,005, and 36,423 are all divisible by 9.

*A number is divisible by 10 if it ends in 0.*

Thus 3110 and 41,000 are both divisible by 10.

### 158. Divisors, Multiples, Factors

*Examples 1 to 8, oral — Examples 9 to 38, written*

1. State two factors of 35; of 40; of 45; of 56.

2. State three factors of 32; of 48; of 100.

3. State all of the factors of 16; of 32.

4. State the numbers divisible by 2 among the following: 48, 75, 82, 90, 103.

5. State the numbers divisible by 5 among the following: 64, 75, 106, 215.

6. State the numbers divisible by 10 among the following: 70, 400, 605, 930.

7. State the numbers divisible by 3 among the following: 45, 52, 57, 63, 71, 72, 73, 80, 81, 82.

8. State the numbers divisible by 9 among the following: 45, 54, 61, 63, 71, 72, 80, 81, 82, 1116.

*Find the G.C.D. of the following:*

| | | |
|---|---|---|
| **9.** 30, 42. | **12.** 30, 60. | **15.** 24, 36. |
| **10.** 27, 72. | **13.** 24, 32. | **16.** 32, 48. |
| **11.** 24, 64. | **14.** 36, 45. | **17.** 48, 64. |

*Find the L.C.M. of the following:*

| | | |
|---|---|---|
| **18.** 30, 40. | **21.** 18, 27. | **24.** 18, 42. |
| **19.** 27, 36. | **22.** 14, 32. | **25.** 11, 13. |
| **20.** 24, 36. | **23.** 15, 35. | **26.** 11, 17. |

*Find all of the factors of each of the following:*

**27.** 30. **29.** 56. **31.** 72. **33.** 96. **35.** 125. **37.** 156.
**28.** 48. **30.** 65. **32.** 81. **34.** 104. **36.** 144. **38.** 250.

## III. DECIMAL FRACTIONS

A dime is $\frac{1}{10}$ of \$1, and we write it thus: \$0.10.

A cent is $\frac{1}{100}$ of \$1, and we write it thus: \$0.01.

In the same way, $\frac{1}{10}$ of a foot may be written 0.10 ft., or merely 0.1 ft., and $\frac{1}{100}$ of a foot may be written 0.01 ft.

So we write

0.1, or .1, for $\frac{1}{10}$,
0.2, or .2, for $\frac{2}{10}$,
0.3, or .3, for $\frac{3}{10}$, and so on;
0.01, or .01, for $\frac{1}{100}$,
0.02, or .02, for $\frac{2}{100}$, and so on;
0.001, or .001, for $\frac{1}{1000}$,
0.125, or .125, for $\frac{125}{1000}$, and so on.

Fractions like .5, .25, and .125 are called *decimal fractions.*

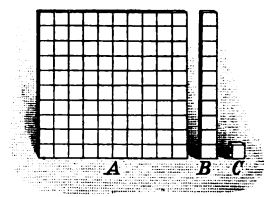
Fractions like $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{5}{12}$, where the numerator is written over the denominator, are called *common fractions.*

*Study the following:*

0.4, or .4, means $\frac{4}{10}$, or $\frac{2}{5}$;
0.5, or .5, means $\frac{5}{10}$, or $\frac{1}{2}$;
0.6, or .6, means $\frac{6}{10}$, or $\frac{3}{5}$;
0.7, or .7, means $\frac{7}{10}$;
0.8, or .8, means $\frac{8}{10}$, or $\frac{4}{5}$;
0.9, or .9, means $\frac{9}{10}$;
1.0 means $\frac{10}{10}$, or 1.

### 159. Decimal Fractions

*Examples 1 to 3, oral — Examples 4 to 13, written*




1. In this picture, if $C$ is 1, what is $B$? what is $A$?

2. If $A$ is 1, what is $B$? what is $C$?

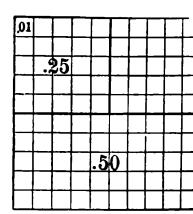
3. Read aloud: $B$ is .1 of $A$, and $C$ is .01 of $A$.

*Write as common fractions:*

| | | | | |
|---|---|---|---|---|
| **4.** .3. | **6.** .9. | **8.** .07. | **10.** .11. | **12.** .47. |
| **5.** .7. | **7.** .03. | **9.** .09. | **11.** .21. | **13.** .91. |

### 160. Decimal Fractions

*Examples 1 to 6, oral — Examples 7 to 11, written*




1. In this picture point to $\frac{1}{100}$ of the large square.

2. Point to .25 of the large square.

3. Point to .50 of the large square.

4. Point to .75 of the large square.

5. Show from the picture that $.25 = \frac{1}{4}$.

6. Show from the picture that $.50 = \frac{1}{2}$.

*Study the picture and write common fractions in lowest terms equal to:*

| | | | | |
|---|---|---|---|---|
| **7.** .75. | **8.** .10. | **9.** .20. | **10.** .40. | **11.** .05. |

### 161. Decimal Fractions

*Examples 1 to 3, oral — Examples 4 to 18, written*

**1.** To what other common fraction is $\frac{5}{10}$ equal?

**2.** To what common fraction in lowest terms is .5 equal?

**3.** To what common fraction is .4 equal?

The name "common fraction" refers to the way in which the fraction is written. Thus $\frac{5}{10}$ is a common fraction, although it is only another way of writing the decimal fraction .5.

We now see why the period (.) after dollars, as in \$2.50, is called a *decimal point.* It separates the decimal fraction from the dollars.

In the number 21,345.789 we have

| | Periods | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Thousands | | | Units | | | Thousandths | |
| Orders: | Tens | Units | Hundreds | Tens | Units | *Decimal point* | Hundreds | Tens | Units |
| | 2 | 1, | 3 | 4 | 5 | . | 7 | 8 | 9 |

.789 is 789 thousandths, or $\frac{789}{1000}$;
.123 is 123 thousandths, or $\frac{123}{1000}$;
.021 is 21 thousandths, or $\frac{21}{1000}$.

*Write as decimal fractions:*

**4.** $\frac{3}{10}$. **5.** $\frac{4}{10}$. **6.** $\frac{5}{10}$. **7.** $\frac{6}{10}$. **8.** $\frac{7}{10}$. **9.** $\frac{9}{10}$. **10.** $\frac{47}{100}$. **11.** $\frac{51}{100}$. **12.** $\frac{75}{100}$. **13.** $1\frac{3}{10}$. **14.** $3\frac{4}{10}$. **15.** $7\frac{9}{10}$. **16.** $\frac{125}{1000}$. **17.** $\frac{75}{1000}$. **18.** $\frac{7}{1000}$.

### 162. Decimal Fractions

*Examples 1 to 16, oral — Examples 17 to 36, written*

1. Read: .1 ft., .3 yd., .7 mi., .9 bu.

*Read:*

| | | | | |
|---|---|---|---|---|
| 2. .3. | 5. 2.6. | 8. .16. | 11. 3.41. | 14. .135. |
| 3. .7. | 6. 3.4. | 9. .72. | 12. 4.67. | 15. .072. |
| 4. .9. | 7. 7.8. | 10. .39. | 13. 7.09. | 16. .006. |

*Write as decimal fractions:*

| | | | | |
|---|---|---|---|---|
| 17. $\frac{2}{10}$. | 21. $7\frac{3}{10}$. | 25. $6\frac{3}{100}$. | 29. $8\frac{49}{100}$. | 33. $2\frac{5}{1000}$. |
| 18. $\frac{8}{10}$. | 22. $9\frac{8}{10}$. | 26. $7\frac{9}{100}$. | 30. $7\frac{53}{100}$. | 34. $3\frac{11}{1000}$. |
| 19. $6\frac{4}{10}$. | 23. $5\frac{2}{10}$. | 27. $9\frac{15}{100}$. | 31. $11\frac{11}{100}$. | 35. $7\frac{777}{1000}$. |
| 20. $4\frac{7}{10}$. | 24. $8\frac{5}{10}$. | 28. $8\frac{36}{100}$. | 32. $10\frac{1}{100}$. | 36. $9\frac{9}{1000}$. |

### 163. Decimal Fractions

*Examples 1 to 7, oral — Examples 8 to 11, written*

1. Read: .007, .07, .7, 700.07, 7000.007.

*Read:*

| | | |
|---|---|---|
| 2. 100.01. | 4. 77.077. | 6. 100.100. |
| 3. 200.02. | 5. 89.089. | 7. 999.999. |

*Write as decimal fractions:*

8. Seventy-seven hundredths.
9. Five thousandths; nine thousandths.
10. Eighty-four thousandths; one thousandth.
11. One hundred three and one hundred three thousandths.

### 164. Addition

*Examples 1 to 4, oral — Examples 5 to 9, written*

1. Express 0.200 + 0.700 as tenths.
2. Express 0.220 + 0.110 as hundredths.
3. Express 0.3 + 0.5 as hundredths.
4. Express 0.7 + 0.1 as thousandths.

*Add:*

| 5. | 6. | 7. | 8. | 9. |
|---|---|---|---|---|
| 2.732 | 8.136 | 8.723 | 3.928 | 4.7926 |
| 4.600 | 4.07 | 6.489 | .087 | 3.9874 |
| .730 | .007 | 5.346 | 2. | 5.2074 |
| .009 | .697 | 8.762 | 6.239 | 6.0126 |

### 165. Addition

*Examples 1 to 3, oral — Examples 4 to 8, written*

1. Add: 0.3 + 0.03 + 0.003.
2. Add: 5 + 0.5 + 0.05 + 0.005.
3. Express 0.2 + 0.3 as hundredths; as halves.

*Add:*

| 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|
| 49.62 | 8.123 | 4.783 | 3.280 | 4.813 |
| 37.48 | 7.683 | .698 | 4. | 5.987 |
| 77.77 | 3.333 | .072 | .8 | 9.999 |
| 62.52 | 1.877 | .6 | .075 | 5.187 |
| 50.38 | 2.316 | 5. | .086 | 4.013 |
| 50.00 | 6.668 | 7.000 | 2.708 | 70. |

### 166. Addition

*Examples 1 to 3, oral — Examples 4 to 8, written*

1. How have you found the decimal points arranged in all of the examples in addition?

2. How would you arrange the decimal points in subtracting one number from another?

3. Add 0.2 and 0.02; 0.7 and 0.07.

*In adding decimals write the numbers so that the decimal points come directly under one another.*

*Then add as with whole numbers, placing the decimal point in the sum exactly under the other decimal points.*

*Zeros may be annexed to a decimal fraction without changing its value.*

*Add:*

| 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|
| 2.75 | 2.87 | 3.06 | 0.075 | 8.375 |
| 3.06 | 3.63 | 4. | 0.026 | 6.482 |
| 4.21 | 5.71 | 0.3 | 0.039 | 7.896 |
| 8.42 | 8.42 | 0.07 | 0.082 | 4.377 |
| 7.36 | 1.58 | 6.94 | 9.925 | 5.623 |
| 3.32 | 4.28 | 5. | 9.974 | 3.518 |
| 4.21 | 6.37 | 9.7 | 9.961 | 2.104 |
| 8.42 | 7.13 | 9.93 | 9.918 | 5.622 |
| 2.72 | 4.23 | 3.09 | 9.999 | 2.601 |
| 3.41 | 5.37 | 7.91 | 10.000 | 3.705 |

### 167. Subtraction

*Examples 1 to 3, oral — Examples 4 to 40, written*

1. Subtract: \$2.25 − \$0.11; 2.25 − 0.11.
2. From \$3.33 take \$1.11; from 3.33 take 1.11.
3. Subtract: \$2.80 − \$0.70; 2.8 ft. − 0.7 ft.

*In subtracting decimals write the numbers so that the decimal points come directly under one another, and then proceed as with whole numbers.*

*Subtract:*

| 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|
| \$2.75 | 2.75 ft. | 3.68 | 4.86 | 5.74 |
| 1.22 | 1.22 | 1.42 | 3.18 | 2.8 |

9. 3.40 − 1.99; 3.4 − 1.99; 3 − 1.99.
10. If the distance from A to C is 17.3 mi., and the distance from A to B (in the line from A to C) is 9.6 mi., how far is it from B to C?

| | | |
|---|---|---|
| 11. 3.7 − 2.5. | 21. 8.1 − 5.04. | 31. 28 − 2.41. |
| 12. 3.7 − 2.9. | 22. 7.4 − 2.39. | 32. 29 − 5.418. |
| 13. 3.70 − 2.05. | 23. 6.2 − 4.36. | 33. 30 − 2.792. |
| 14. 3.7 − 2.09. | 24. 5.3 − 2.96. | 34. 50 − 5.809. |
| 15. 4.80 − 1.95. | 25. 4.1 − 3.08. | 35. 75 − 4.28. |
| 16. 4.8 − 1.86. | 26. 5.7 − 4.96. | 36. 7.5 − 0.428. |
| 17. 8.10 − 3.07. | 27. 48 − 4.1. | 37. 750 − 42.8. |
| 18. 8.1 − 3.09. | 28. 49 − 4.12. | 38. 375 − 21.5. |
| 19. 8.8 − 7.75. | 29. 50 − 4.125. | 39. 37.5 − 2.15. |
| 20. 9.2 − 6.82. | 30. 27 − 3.4. | 40. 3.75 − 0.215. |

### 168. Multiplying by an Integer

*Examples 1 to 3, oral — Examples 4 to 22, written*

1. How much is $2 \times \$1.11$? $2 \times 1.11$ ft.?
2. How much is $3 \times \$2.22$? $3 \times 2.22$ mi.?
3. How much is $4 \times \$1.11$? $4 \times 1.11$ yd.?

*Multiply:*

| 4. | 5. | 6. | 7. | 8. |
|---|---|---|---|---|
| \$2.50 | \$1.20 | \$1.22 | \$3.60 | \$5.75 |
| 2 | 3 | 4 | 5 | 7 |

| 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|
| \$3.20 | \$2.50 | \$2.25 | \$4.80 | \$1.25 |
| 2 | 3 | 4 | 6 | 8 |

To multiply 2.98 by 7, we proceed in the same way as in multiplying \$2.98 by 7. We have $7 \times 8$ hundredths $= 56$ hundredths. We write the 6 under hundredths. Then $7 \times 9$ tenths $= 63$ tenths, to which we add 5 tenths from the 56 hundredths, making 68 tenths, or 6.8. We write the 8 under tenths. Then $7 \times 2 = 14$, to which we add 6 from the 6.8, making 20, which we write to the left of the decimal point.

$$\begin{array}{r} 2.98 \\ 7 \\ \hline 20.86 \end{array}$$

*Multiply:*

| | | |
|---|---|---|
| **14.** $2 \times 9.87$. | **17.** $3 \times 2.49$. | **20.** $7 \times 21.4$. |
| **15.** $9 \times 8.62$. | **18.** $4 \times 7.86$. | **21.** $8 \times 30.9$. |
| **16.** $8 \times 4.09$. | **19.** $7 \times 8.09$. | **22.** $9 \times 99.9$. |

### 169. Dividing by an Integer

*Examples 1 to 3, oral — Examples 4 to 34, written*

1. Divide \$1.20 by 2; 12 by 2; 1.2 by 2.
2. Divide 8 by 4; 8 ft. by 4; 0.08 by 4.
3. Divide 25 by 5; \$25 by 5; 0.025 by 5.

We divide a decimal fraction by an integer in the same way that we divide United States money by an integer.

$$6\overline{)24.72}\quad 4.12$$

*Divide:*

| | | |
|---|---|---|
| **4.** $4.41 \div 3$. | **6.** $7.85 \div 5$. | **8.** $1.624 \div 7$. |
| **5.** $4.32 \div 4$. | **7.** $18.72 \div 6$. | **9.** $184.8 \div 8$. |

**10.** What is the short way of dividing by 10? by 100? Divide 25 by 10; 2.5 by 10.

**11.** If the perimeter of a square is 9.48 ft., what is the length of each side?

**12.** If the perimeter of an equal-sided triangle is 37.11 in., what is the length of each side?

**13.** If the distance that a man has to travel is 80.73 mi., how far has he traveled when he has gone $\frac{1}{9}$ of the distance?

| | | |
|---|---|---|
| **14.** $17.92 \div 16$. | **21.** $7.095 \div 15$. | **28.** $41.664 \div 112$. |
| **15.** $31.36 \div 14$. | **22.** $4.212 \div 18$. | **29.** $40.898 \div 121$. |
| **16.** $35.84 \div 16$. | **23.** $3.434 \div 17$. | **30.** $25.086 \div 113$. |
| **17.** $62.72 \div 28$. | **24.** $7.809 \div 19$. | **31.** $24.804 \div 117$. |
| **18.** $71.68 \div 32$. | **25.** $2.667 \div 21$. | **32.** $44.944 \div 212$. |
| **19.** $45.51 \div 41$. | **26.** $747.4 \div 37$. | **33.** $24.975 \div 225$. |
| **20.** $83.49 \div 69$. | **27.** $247.5 \div 75$. | **34.** $88.880 \div 404$. |

## IV. TABLES FOR REFERENCE

### Length

12 inches (in.) = 1 foot (ft.)
3 feet = 1 yard (yd.)
$5\frac{1}{2}$ yards, or $16\frac{1}{2}$ feet = 1 rod (rd.)
320 rods, or 5280 feet = 1 mile (mi.)

### Square Measure

144 square inches (sq. in.) = 1 square foot (sq. ft.)
9 square feet = 1 square yard (sq. yd.)
$30\frac{1}{4}$ square yards = 1 square rod (sq. rd.)
160 square rods = 1 acre (A.)
640 acres = 1 square mile (sq. mi.)

A strip of land 4 rd. wide and 40 rd. long contains an acre.

### Cubic Measure

1728 cubic inches (cu. in.) = 1 cubic foot (cu. ft.)
27 cubic feet = 1 cubic yard (cu. yd.)
128 cubic feet = 1 cord (cd.)

A pile of wood 8 ft. by 4 ft. by 4 ft. contains 1 cord.

### Weight

16 ounces (oz.) = 1 pound (lb.)
2000 pounds = 1 ton (T.)

2240 pounds = 1 long ton, used sometimes for very heavy substances, such as ore.

### Liquid Measure

4 gills (gi.) = 1 pint (pt.)
2 pints = 1 quart (qt.)
4 quarts = 1 gallon (gal.)

### Dry Measure

2 pints (pt.) = 1 quart (qt.)
8 quarts = 1 peck (pk.)
4 pecks = 1 bushel (bu.)

### Time

60 seconds (sec.) = 1 minute (min.)
60 minutes = 1 hour (hr.)
24 hours = 1 day (da.)
7 days = 1 week (wk.)
365 days = 1 common year (yr.)
366 days = 1 leap year
About 30 days = 1 month (mo.)
12 months = 1 year

### Value

10 cents (ct. or ¢) = 1 dime (d.)
10 dimes = 1 dollar ($)

### Temperature

On the common (Fahrenheit) thermometer water freezes at 32° and boils at 212°. The temperature of the human body is about 98.6°.

## Multiplication and Division

| | | | |
|---|---|---|---|
| $1 \times 2 = 2$ | $2 \div 2 = 1$ | $1 \times 3 = 3$ | $3 \div 3 = 1$ |
| $2 \times 2 = 4$ | $4 \div 2 = 2$ | $2 \times 3 = 6$ | $6 \div 3 = 2$ |
| $3 \times 2 = 6$ | $6 \div 2 = 3$ | $3 \times 3 = 9$ | $9 \div 3 = 3$ |
| $4 \times 2 = 8$ | $8 \div 2 = 4$ | $4 \times 3 = 12$ | $12 \div 3 = 4$ |
| $5 \times 2 = 10$ | $10 \div 2 = 5$ | $5 \times 3 = 15$ | $15 \div 3 = 5$ |
| $6 \times 2 = 12$ | $12 \div 2 = 6$ | $6 \times 3 = 18$ | $18 \div 3 = 6$ |
| $7 \times 2 = 14$ | $14 \div 2 = 7$ | $7 \times 3 = 21$ | $21 \div 3 = 7$ |
| $8 \times 2 = 16$ | $16 \div 2 = 8$ | $8 \times 3 = 24$ | $24 \div 3 = 8$ |
| $9 \times 2 = 18$ | $18 \div 2 = 9$ | $9 \times 3 = 27$ | $27 \div 3 = 9$ |
| $10 \times 2 = 20$ | $20 \div 2 = 10$ | $10 \times 3 = 30$ | $30 \div 3 = 10$ |
| $11 \times 2 = 22$ | $22 \div 2 = 11$ | $11 \times 3 = 33$ | $33 \div 3 = 11$ |
| $12 \times 2 = 24$ | $24 \div 2 = 12$ | $12 \times 3 = 36$ | $36 \div 3 = 12$ |
| $13 \times 2 = 26$ | $26 \div 2 = 13$ | $13 \times 3 = 39$ | $39 \div 3 = 13$ |
| $14 \times 2 = 28$ | $28 \div 2 = 14$ | $14 \times 3 = 42$ | $42 \div 3 = 14$ |
| $15 \times 2 = 30$ | $30 \div 2 = 15$ | $15 \times 3 = 45$ | $45 \div 3 = 15$ |

| | | | |
|---|---|---|---|
| $1 \times 4 = 4$ | $4 \div 4 = 1$ | $1 \times 5 = 5$ | $5 \div 5 = 1$ |
| $2 \times 4 = 8$ | $8 \div 4 = 2$ | $2 \times 5 = 10$ | $10 \div 5 = 2$ |
| $3 \times 4 = 12$ | $12 \div 4 = 3$ | $3 \times 5 = 15$ | $15 \div 5 = 3$ |
| $4 \times 4 = 16$ | $16 \div 4 = 4$ | $4 \times 5 = 20$ | $20 \div 5 = 4$ |
| $5 \times 4 = 20$ | $20 \div 4 = 5$ | $5 \times 5 = 25$ | $25 \div 5 = 5$ |
| $6 \times 4 = 24$ | $24 \div 4 = 6$ | $6 \times 5 = 30$ | $30 \div 5 = 6$ |
| $7 \times 4 = 28$ | $28 \div 4 = 7$ | $7 \times 5 = 35$ | $35 \div 5 = 7$ |
| $8 \times 4 = 32$ | $32 \div 4 = 8$ | $8 \times 5 = 40$ | $40 \div 5 = 8$ |
| $9 \times 4 = 36$ | $36 \div 4 = 9$ | $9 \times 5 = 45$ | $45 \div 5 = 9$ |
| $10 \times 4 = 40$ | $40 \div 4 = 10$ | $10 \times 5 = 50$ | $50 \div 5 = 10$ |
| $11 \times 4 = 44$ | $44 \div 4 = 11$ | $11 \times 5 = 55$ | $55 \div 5 = 11$ |
| $12 \times 4 = 48$ | $48 \div 4 = 12$ | $12 \times 5 = 60$ | $60 \div 5 = 12$ |
| $13 \times 4 = 52$ | $52 \div 4 = 13$ | $13 \times 5 = 65$ | $65 \div 5 = 13$ |
| $14 \times 4 = 56$ | $56 \div 4 = 14$ | $14 \times 5 = 70$ | $70 \div 5 = 14$ |
| $15 \times 4 = 60$ | $60 \div 4 = 15$ | $15 \times 5 = 75$ | $75 \div 5 = 15$ |

## Multiplication and Division

| | | | |
|---|---|---|---|
| 1×6= 6 | 6÷6= 1 | 1×7= 7 | 7÷7= 1 |
| 2×6= 12 | 12÷6= 2 | 2×7= 14 | 14÷7= 2 |
| 3×6= 18 | 18÷6= 3 | 3×7= 21 | 21÷7= 3 |
| 4×6= 24 | 24÷6= 4 | 4×7= 28 | 28÷7= 4 |
| 5×6= 30 | 30÷6= 5 | 5×7= 35 | 35÷7= 5 |
| 6×6= 36 | 36÷6= 6 | 6×7= 42 | 42÷7= 6 |
| 7×6= 42 | 42÷6= 7 | 7×7= 49 | 49÷7= 7 |
| 8×6= 48 | 48÷6= 8 | 8×7= 56 | 56÷7= 8 |
| 9×6= 54 | 54÷6= 9 | 9×7= 63 | 63÷7= 9 |
| 10×6= 60 | 60÷6=10 | 10×7= 70 | 70÷7=10 |
| 11×6= 66 | 66÷6=11 | 11×7= 77 | 77÷7=11 |
| 12×6= 72 | 72÷6=12 | 12×7= 84 | 84÷7=12 |
| 13×6= 78 | 78÷6=13 | 13×7= 91 | 91÷7=13 |
| 14×6= 84 | 84÷6=14 | 14×7= 98 | 98÷7=14 |
| 15×6= 90 | 90÷6=15 | 15×7=105 | 105÷7=15 |

| | | | |
|---|---|---|---|
| 1×8= 8 | 8÷8= 1 | 1×9= 9 | 9÷9= 1 |
| 2×8= 16 | 16÷8= 2 | 2×9= 18 | 18÷9= 2 |
| 3×8= 24 | 24÷8= 3 | 3×9= 27 | 27÷9= 3 |
| 4×8= 32 | 32÷8= 4 | 4×9= 36 | 36÷9= 4 |
| 5×8= 40 | 40÷8= 5 | 5×9= 45 | 45÷9= 5 |
| 6×8= 48 | 48÷8= 6 | 6×9= 54 | 54÷9= 6 |
| 7×8= 56 | 56÷8= 7 | 7×9= 63 | 63÷9= 7 |
| 8×8= 64 | 64÷8= 8 | 8×9= 72 | 72÷9= 8 |
| 9×8= 72 | 72÷8= 9 | 9×9= 81 | 81÷9= 9 |
| 10×8= 80 | 80÷8=10 | 10×9= 90 | 90÷9=10 |
| 11×8= 88 | 88÷8=11 | 11×9= 99 | 99÷9=11 |
| 12×8= 96 | 96÷8=12 | 12×9=108 | 108÷9=12 |
| 13×8=104 | 104÷8=13 | 13×9=117 | 117÷9=13 |
| 14×8=112 | 112÷8=14 | 14×9=126 | 126÷9=14 |
| 15×8=120 | 120÷8=15 | 15×9=135 | 135÷9=15 |

## Multiplication and Division

| | | | |
|---|---|---|---|
| 1×10= 10 | 10÷10= 1 | 1×11= 11 | 11÷11= 1 |
| 2×10= 20 | 20÷10= 2 | 2×11= 22 | 22÷11= 2 |
| 3×10= 30 | 30÷10= 3 | 3×11= 33 | 33÷11= 3 |
| 4×10= 40 | 40÷10= 4 | 4×11= 44 | 44÷11= 4 |
| 5×10= 50 | 50÷10= 5 | 5×11= 55 | 55÷11= 5 |
| 6×10= 60 | 60÷10= 6 | 6×11= 66 | 66÷11= 6 |
| 7×10= 70 | 70÷10= 7 | 7×11= 77 | 77÷11= 7 |
| 8×10= 80 | 80÷10= 8 | 8×11= 88 | 88÷11= 8 |
| 9×10= 90 | 90÷10= 9 | 9×11= 99 | 99÷11= 9 |
| 10×10=100 | 100÷10=10 | 10×11=110 | 110÷11=10 |
| 11×10=110 | 110÷10=11 | 11×11=121 | 121÷11=11 |
| 12×10=120 | 120÷10=12 | 12×11=132 | 132÷11=12 |
| 13×10=130 | 130÷10=13 | 13×11=143 | 143÷11=13 |
| 14×10=140 | 140÷10=14 | 14×11=154 | 154÷11=14 |
| 15×10=150 | 150÷10=15 | 15×11=165 | 165÷11=15 |

| | | | |
|---|---|---|---|
| 1×12= 12 | 12÷12= 1 | 1×13= 13 | 13÷13= 1 |
| 2×12= 24 | 24÷12= 2 | 2×13= 26 | 26÷13= 2 |
| 3×12= 36 | 36÷12= 3 | 3×13= 39 | 39÷13= 3 |
| 4×12= 48 | 48÷12= 4 | 4×13= 52 | 52÷13= 4 |
| 5×12= 60 | 60÷12= 5 | 5×13= 65 | 65÷13= 5 |
| 6×12= 72 | 72÷12= 6 | 6×13= 78 | 78÷13= 6 |
| 7×12= 84 | 84÷12= 7 | 7×13= 91 | 91÷13= 7 |
| 8×12= 96 | 96÷12= 8 | 8×13=104 | 104÷13= 8 |
| 9×12=108 | 108÷12= 9 | 9×13=117 | 117÷13= 9 |
| 10×12=120 | 120÷12=10 | 10×13=130 | 130÷13=10 |
| 11×12=132 | 132÷12=11 | 11×13=143 | 143÷13=11 |
| 12×12=144 | 144÷12=12 | 12×13=156 | 156÷13=12 |
| 13×12=156 | 156÷12=13 | 13×13=169 | 169÷13=13 |
| 14×12=168 | 168÷12=14 | 14×13=182 | 182÷13=14 |
| 15×12=180 | 180÷12=15 | 15×13=195 | 195÷13=15 |

# ANSWERS

## 1. Page 53

**8.** Two hundred six; seven hundred nine; five hundred twenty-seven; six hundred forty-two; eight hundred thirty-four.

## 2. Page 54

**15.** 700. **16.** 900. **17.** 555. **18.** 808.

## 3. Page 54

**10.** 303. **11.** 709. **12.** 732.

**13.** Five hundred fifty-five; one hundred one; three hundred twenty-one; one hundred twenty-three; nine hundred nine.

## 4. Page 55

**10.** 7000. **11.** 9000. **12.** 6000. **13.** 8000.

**14.** 1000; 2000; 3000; 4000; 5000; 6000; 7000; 8000; 9000.

**15.** 4000. **17.** 6000. **19.** 9000.

**16.** 6000. **18.** 9000. **20.** 8000.

## 5. Page 56

**15.** 1576. **16.** 2953. **17.** 1912. **18.** 9999.

## 6. Page 57

**10.** 7007. **11.** 8800. **12.** 6780.

## 7. Page 57

**8.** 1915. **9.** 1916. **10.** Two thousand seven.

**11.** Two thousand five hundred, or twenty-five hundred.

**12.** Three thousand two hundred, or thirty-two hundred.

**13.** Three thousand seven hundred fifty, or thirty-seven hundred fifty.

**14.** Six thousand two hundred thirty-two.

**8. Page 58**

| | | |
|---|---|---|
| **6.** XXXVII. | **8.** LXIII. | **10.** LXXVII. |
| **7.** XLIX. | **9.** XCIV. | **11.** LXXXIV. |

**9. Page 59**

| | | | | |
|---|---|---|---|---|
| **10.** 79. | **13.** 117. | **16.** 108. | **19.** 100. | **22.** 108. |
| **11.** 76. | **14.** 128. | **17.** 127. | **20.** 108. | **23.** 108. |
| **12.** 105. | **15.** 105. | **18.** 99. | **21.** 126. | **24.** 128. |
| | | | | **25.** 133. |

**10. Page 60**

| | | | |
|---|---|---|---|
| **10.** 78. | **12.** 85. | **14.** 125. | **16.** 100. |
| **11.** 79. | **13.** 103. | **15.** 86. | **17.** 140. |

**11. Page 61**

**9.** 77. **10.** 84. **11.** 92. **12.** 90. **13.** 90. **14.** 87. **15.** 83.

**12. Page 61**

**4.** 60. **5.** 100. **6.** 100. **7.** 102. **8.** 92. **9.** 91. **10.** 103.

**13. Page 62**

**9.** 80. **10.** 83. **11.** 88. **12.** 75. **13.** 70. **14.** 85.

**14. Page 63**

| | | | | |
|---|---|---|---|---|
| **6.** $91. | **8.** $86. | **10.** 82 ft. | **12.** 77¢. | **14.** 92¢. |
| **7.** $77. | **9.** 71 ft. | **11.** 100 ft. | **13.** 71¢. | |

**15. Page 63**

**5.** 75. **6.** 99. **7.** 96. **8.** 93. **9.** 100. **10.** 100. **11.** 100.

**16. Page 64**

| | | | |
|---|---|---|---|
| **6.** 517. | **8.** 748. | **10.** 589. | **12.** 165. |
| **7.** 716. | **9.** 722. | **11.** 768. | **13.** 287. |

**17. Page 65**

| | | | |
|---|---|---|---|
| **3.** 610. | **4.** 544. | **5.** 1000. | **6.** 671. |

**18.** Page 65

**4.** 604. **5.** 868. **6.** 908. **7.** 704. **8.** 780. **9.** 924.

**19.** Page 66

**8.** 817. **9.** 617. **10.** 751. **11.** 1051. **12.** 1078. **13.** 1302.

**20.** Page 66

**4.** 234. **5.** 938. **6.** 1230. **7.** 1123. **8.** 1970. **9.** 1974.

**21.** Page 67

**5.** 7836. **6.** 7945. **7.** 7568. **8.** 8178. **9.** 7064.

**22.** Page 68

**2.** 7839. **3.** 8389. **4.** 7259. **5.** 9244. **6.** 7767.

**23.** Page 68

**10.** 4956. **11.** 5088. **12.** 6861. **13.** 5462. **14.** 7112.

**24.** Page 69

**6.** 4233 lb. **7.** $6371. **8.** $7440.

**25.** Page 69

**5.** 4802 ft. **6.** $7986.

**26.** Page 70

**3.** 4625 lb. **4.** 4800 lb. **5.** 8420. **6.** 5360.

**27.** Page 70

**3.** $2845. **5.** 7100. **7.** 6000. **9.** 9999.
**4.** 4264. **6.** 7483. **8.** 9000.

**28.** Page 72

**9.** 16. **10.** 29. **11.** 47. **12.** 14. **13.** 18. **14.** 51. **15.** 15.

**29.** Page 72

**4.** $65. **5.** $16. **6.** 15 in. **7.** 20. **8.** 48. **9.** 15. **10.** 27.

**30.** Page 73

6. 49. 7. 25. 8. 21. 9. 6. 10. 8. 11. 32. 12. 13.

**31.** Page 73

4. 16. 5. 24. 6. 53. 7. 16. 8. 13. 9. 34. 10. 28.

**32.** Page 75

7. 317. 8. 246. 9. 282. 10. 166. 11. 264.

**33.** Page 75

4. $425. 5. $350. 6. $175. 7. $75. 8. $385.

**34.** Page 76

7. 85. 9. 606. 11. $379. 13. 539. 15. 468.
8. 440. 10. 268. 12. 48. 14. 569. 16. $781.

**35.** Page 77

7. 375. 8. $233. 9. $693. 10. $491. 11. $204.

**36.** Page 78

3. 84. 5. 577 ft. 7. 176. 9. 117.
4. $175. 6. 18 in. 8. 145. 10. 505.

**37.** Page 78

4. 370 ft. 5. $21.

**38.** Page 79

9. 400. 10. 300. 11. 100. 12. 400. 13. 1000. 14. 2000.

**39.** Page 79

10. 5000. 12. 3000. 14. 7200.
11. 3000. 13. 4000. 15. 8400.

**40.** Page 80

4. 1225. 5. 1919. 6. 2085. 7. 1578. 8. 1467. 9. 989.

**41. Page 81**

**8.** 1484. **9.** 1589. **10.** 2396. **11.** 5988. **12.** 2883. **13.** 1638.

**42. Page 81**

**5.** 4254. **6.** 4021. **7.** 3963. **8.** 5930. **9.** 2091. **10.** 7777.

**43. Page 82**

**5.** $1275. **6.** 1144. **7.** 1024. **8.** 2172. **9.** 3087.

**44. Page 82**

**4.** 639. **5.** 365. **6.** 155.

**45. Page 83**

**14.** Sums: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20.

**15.** 6; 6. **16.** 8; 8. **17.** 12. **18.** 16. **19.** 14. **20.** 10.

**46. Page 84**

**8.** $2 \times 2 = 4$.
**9.** $3 \times 2 = 6$.
**10.** $4 \times 2 = 8$.
**11.** $6 \times 2 = 12$.
**12.** $7 \times 2 = 14$.
**13.** $8 \times 2 = 16$.
**14.** 4.
**15.** 14.
**16.** 18.

**47. Page 84**

**8.** $5 \times 2 = 10$.
**9.** $7 \times 2 = 14$.
**10.** $9 \times 2 = 18$.
**11.** $6 \times 2 = 12$.
**12.** $8 \times 2 = 16$.
**13.** $10 \times 2 = 20$.
**14.** $2 \times 2 = 4$.
**15.** $9 \times 2 = 18$.
**16.** $5 \times 2 = 10$.
**17.** 18.

**48. Page 85**

**9.** 7. **10.** 8; 2. **11.** 9; 2.

**49. Page 86**

**12.** $2 \div 2 = 1$.
**13.** $6 \div 2 = 3$.
**14.** $12 \div 2 = 6$.
**15.** $4 \div 2 = 2$.
**16.** $8 \div 2 = 4$.
**17.** $16 \div 2 = 8$.
**18.** 6.
**19.** 10.
**20.** 7.
**21.** 3.
**22.** 8.
**23.** 6.
**24.** 7.

### 50. Page 86

**5.** 7.
**6.** 10.
**7.** 6.
**8.** 4.
**9.** 5.
**10.** 9.
**11.** 9.
**12.** 8.
**13.** 5.

### 51. Page 87

**4.** 9.
**5.** 8.
**6.** 5.
**7.** $14 \div 2 = 7$.
**8.** $12 \div 2 = 6$.
**9.** $20 \div 2 = 10$.
**10.** $12 \div 2 = 6$.
**11.** $8 \div 2 = 4$.
**12.** $14 \div 2 = 7$.

### 52. Page 87

**6.** 8.
**7.** 13.
**8.** 17.
**9.** 20.

### 53. Page 88

**13.** Sums: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30.

**14.** 14.
**15.** 22.
**16.** 33.
**17.** 22.
**18.** 24.
**19.** 10.
**20.** 11.
**21.** 7.
**22.** 15.
**23.** 17.
**24.** 25.
**25.** 21.
**26.** 34.
**27.** 30.
**28.** 16.
**29.** 32.

### 54. Page 89

**5.** $2 \times 3 = 6$.
**6.** $3 \times 3 = 9$.
**7.** $4 \times 3 = 12$.
**8.** $5 \times 3 = 15$.
**9.** $7 \times 3 = 21$.
**10.** $4 \times 3 = 12$.
**11.** $5 \times 3 = 15$.
**12.** $10 \times 3 = 30$.
**13.** $8 \times 3 = 24$.
**14.** $6 \times 3 = 18$.
**15.** 21.
**16.** 27.
**17.** 12.
**18.** 6.
**19.** 9.

### 55. Page 89

**7.** $8 \times 3 = 24$.
**8.** $7 \times 3 = 21$.
**9.** $9 \times 3 = 27$.
**10.** $6 \times 3 = 18$.
**11.** $7 \times 3 = 21$.
**12.** $8 \times 3 = 24$.
**13.** $10 \times 3 = 30$.
**14.** $6 \times 3 = 18$.
**15.** 13.
**16.** 20.
**17.** 20.
**18.** 25.

### 56. Page 90

**17.** $27 \div 3 = 9$.
**18.** $21 \div 3 = 7$.
**19.** $18 \div 3 = 6$.
**20.** $15 \div 3 = 5$.
**21.** $24 \div 3 = 8$.
**22.** $12 \div 3 = 4$.
**23.** 9.
**24.** 7.
**25.** 10.

### 57. Page 91

**8.** $27 \div 3 = 9$.
**9.** $15 \div 3 = 5$.
**10.** $18 \div 3 = 6$.
**11.** $24 \div 3 = 8$.
**12.** 8.
**13.** 7.
**14.** 1; 7; 10.
**15.** 6.

### 58. Page 91

**4.** 9. **5.** 12. **6.** 18. **7.** 20. **8.** 6. **9.** 6. **10.** 10. **11.** 8.

### 59. Page 92

**13.** Sums: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40.

**14.** 15.
**15.** 17.
**16.** 31.
**17.** 27.
**18.** 32.
**19.** 14.
**20.** 17.
**21.** 42.
**22.** 7.
**23.** 14.
**24.** 16.
**25.** 19.
**26.** 22.
**27.** 28.
**28.** 30.
**29.** 35.

### 60. Page 93

**7.** $5 \times 4 = 20$.
**8.** $6 \times 4 = 24$.
**9.** $9 \times 4 = 36$.
**10.** $7 \times 4 = 28$.
**11.** $2 \times 4 = 8$.
**12.** $3 \times 4 = 12$.
**13.** $5 \times 4 = 20$.
**14.** $9 \times 4 = 36$.
**15.** 12.
**16.** 36.
**17.** 24.
**18.** 20.

### 61. Page 93

**9.** $2 \times 4 = 8$.
**10.** $3 \times 4 = 12$.
**11.** $4 \times 4 = 16$.
**12.** $8 \times 4 = 32$.
**13.** $10 \times 4 = 40$.
**14.** $1 \times 4 = 4$.
**15.** $4 \times 4 = 16$.
**16.** $6 \times 4 = 24$.
**17.** $8 \times 4 = 32$.
**18.** $10 \times 4 = 40$.
**19.** 21.
**20.** 39.
**21.** 29.
**22.** 38.
**23.** 19.

### 62. Page 94

**15.** $24 \div 4 = 6$.
**16.** $20 \div 4 = 5$.
**17.** $16 \div 4 = 4$.
**18.** $32 \div 4 = 8$.
**19.** $36 \div 4 = 9$.
**20.** 2.
**21.** 3.
**22.** 5.
**23.** 6.
**24.** 8.
**25.** 7.
**26.** 6.
**27.** 9.
**28.** 8.
**29.** 10.
**30.** 17.
**31.** 18.
**32.** 15.
**33.** 25.

### 63. Page 95

13. Sums: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50.

14. 10; 10.
15. 17.
16. 23.
17. 37.
18. 47.
19. 36.
20. 33.
21. 18.
22. 17.
23. 34.
24. 22.
25. 43.
26. 49.
27. 32.
28. 39.
29. 21.

### 64. Page 96

8. $2\times5=10$.
9. $3\times5=15$.
10. $8\times5=40$.
11. $9\times5=45$.
12. $1\times5=5$.
13. $3\times5=15$.
14. $7\times5=35$.
15. $6\times5=30$.
16. 15.
17. 20.
18. 30.
19. 35.

### 65. Page 96

9. $5\times5=25$.
10. $7\times5=35$.
11. $4\times5=20$.
12. $6\times5=30$.
13. $8\times5=40$.
14. $2\times5=10$.
15. $9\times5=45$.
16. $10\times5=50$.
17. $5\times5=25$.
18. $4\times5=20$.
19. 31.
20. 44.
21. 35.
22. 37.
23. 57.

### 66. Page 97

15. $35\div5=7$.
16. $45\div5=9$.
17. $20\div5=4$.
18. $20\div5=4$.
19. $45\div5=9$.
20. $30\div5=6$.
21. 3.
22. 8.
23. 7.
24. 5.
25. 9.
26. 16.
27. 9.
28. 9.

### 67. Page 98

13. Sums: 6, 12, 18, 24, 30, 36, 42, 48, 54, 60.

14. 12; 12.
15. 44.
16. 37.
17. 27.
18. 31.
19. 38.
20. 51.
21. 55.
22. 46.
23. 41.
24. $29.

### 68. Page 99

5. $3\times6=18$.
6. $5\times6=30$.
7. $7\times6=42$.
8. $9\times6=54$.
9. $2\times6=12$.
10. $4\times6=24$.
11. $7\times6=42$.
12. $8\times6=48$.
13. 24.
14. 48.
15. 42.
16. 12.

### 69. Page 99

**5.** 15. **6.** 23. **7.** 48. **8.** 55. **9.** 62. **10.** 45. **11.** 36. **12.** 27. **13.** 45. **14.** 53. **15.** 54.

### 70. Page 100

**15.** $36 \div 6 = 6$. **16.** $48 \div 6 = 8$. **17.** $54 \div 6 = 9$. **18.** $18 \div 6 = 3$. **19.** $42 \div 6 = 7$. **20.** $24 \div 6 = 4$. **21.** 5. **22.** 2. **23.** 10. **24.** 10. **25.** 14. **26.** 37. **27.** 8.

### 71. Page 101

**7.** Sums: 7, 14, 21, 28, 35, 42, 49, 56, 63, 70.

**8.** 14; 14. **9.** 21; 21. **10.** 30. **11.** 48. **12.** 56. **13.** 64. **14.** 25. **15.** 37. **16.** \$42. **17.** \$28. **18.** 77¢.

### 72. Page 102

**4.** $7 \times 7 = 49$. **5.** $5 \times 7 = 35$. **6.** $3 \times 7 = 21$. **7.** $10 \times 7 = 70$. **8.** $6 \times 7 = 42$. **9.** $2 \times 7 = 14$. **10.** $4 \times 7 = 28$. **11.** $8 \times 7 = 56$. **12.** 63. **13.** 49. **14.** 35. **15.** 56. **16.** 91.

### 73. Page 102

**10.** 56. **11.** 26. **12.** 33. **13.** 17. **14.** 13. **15.** 44. **16.** 55. **17.** 71. **18.** 27. **19.** 42.

### 74. Page 103

**16.** $14 \div 7 = 2$. **17.** $56 \div 7 = 8$. **18.** $42 \div 7 = 6$. **19.** $35 \div 7 = 5$. **20.** $49 \div 7 = 7$. **21.** $21 \div 7 = 3$. **22.** 4. **23.** 9. **24.** 10. **25.** 11. **26.** 13. **27.** 19. **28.** 27. **29.** 21. **30.** 21.

### 75. Page 104

**7.** 52. **8.** 33. **9.** 60. **10.** 27. **11.** 23. **12.** 35. **13.** 48. **14.** 73. **15.** 64¢. **16.** 72¢. **17.** 72¢. **18.** 56¢.

### 76. Page 105

**4.** $4 \times 8 = 32$. **5.** $7 \times 8 = 56$. **6.** $9 \times 8 = 72$. **7.** $5 \times 8 = 40$. **8.** $6 \times 8 = 48$. **9.** $3 \times 8 = 24$. **10.** 16. **11.** 64. **12.** 40. **13.** 96.

**77. Page 105**

**11.** 29. **12.** 65. **13.** 56. **14.** 42.

**78. Page 106**

**17.** $32 \div 8 = 4$. **19.** $72 \div 8 = 9$. **21.** 5. **23.** 9. **25.** 7.
**18.** $56 \div 8 = 7$. **20.** $24 \div 8 = 3$. **22.** 8. **24.** 8.

**79. Page 107**

**7.** 88. **9.** 39. **11.** 24. **13.** 80. **15.** 63¢.
**8.** 57. **10.** 31. **12.** 32. **14.** 90. **16.** 47¢.

**80. Page 108**

**5.** 27. **8.** $2 \times 9 = 18$. **11.** $3 \times 9 = 27$.
**6.** 45. **9.** $8 \times 9 = 72$. **12.** $5 \times 9 = 45$.
**7.** 36. **10.** $4 \times 9 = 36$. **13.** $7 \times 9 = 63$.

**81. Page 108**

**11.** 54. **12.** 72. **13.** 38. **14.** 59. **15.** 80. **16.** 42.

**82. Page 109**

**13.** $54 \div 9 = 6$. **16.** 7. **19.** 9.
**14.** $45 \div 9 = 5$. **17.** 10. **20.** 14.
**15.** $72 \div 9 = 8$. **18.** 8. **21.** 16.
**22.** 6.

**83. Page 110**

**4.** $2 \times 10 = 20$. $5 \times 10 = 50$. $8 \times 10 = 80$. **5.** 82¢.
$3 \times 10 = 30$. $6 \times 10 = 60$. $9 \times 10 = 90$. **6.** 50¢.
$4 \times 10 = 40$. $7 \times 10 = 70$. $10 \times 10 = 100$.

**84. Page 110**

**13.** $100 \div 10 = 10$. $70 \div 10 = 7$. $40 \div 10 = 4$.
$90 \div 10 = 9$. $60 \div 10 = 6$. $30 \div 10 = 3$.
$80 \div 10 = 8$. $50 \div 10 = 5$. $20 \div 10 = 2$.

**89. Page 113**

9. 46. 11. 84. 13. 128. 15. 186.
10. 84. 12. 100. 14. 205. 16. 144 children.

**90. Page 114**

8. 69. 9. 99¢. 10. 126 lb.

**91. Page 115**

9. 140. 11. 288. 13. 188. 15. 282.
10. 192. 12. 415. 14. 159.

**92. Page 116**

8. 525. 10. 744. 12. 882. 14. $810.
9. 516. 11. 885. 13. 981. 15. 675 lb.

**93. Page 117**

11. 472. 13. 2712. 15. 4584.
12. 1026. 14. 2545. 16. 6083.

**94. Page 117**

5. 1188. 7. 4656. 9. 9600.
6. 1540. 8. 5929. 10. 9801.
11. $2175.

**95. Page 118**

6. $144. 7. $96. 8. $288. 9. $72. 10. $288.

**96. Page 119**

8. 2442. 10. 6666. 12. 7700. 14. 5621. 16. 2519.
9. 3795. 11. 5511. 13. 7931. 15. 2189. 17. 3916.

**97. Page 120**

4. $1500. 6. $1740. 8. $8700.
5. $864. 7. $5100. 9. $1620.
10. $2100.

**98. Page 121**

8. 8. 9. 7. 10. 6.

### 99. Page 122

**11.** 222. **13.** 121. **15.** 122. **17.** 110. **19.** 210. **21.** 320.
**12.** 100. **14.** 102. **16.** 102. **18.** 101. **20.** 100. **22.** 110.

### 100. Page 123

**11.** 11, with 1 remainder.
**12.** 11, with 3 remainder.
**13.** 20, with 3 remainder.
**14.** 10, with 1 remainder.
**15.** 110, with 3 remainder.
**16.** 111, with 1 remainder.
**17.** 7, with 2 remainder.

### 101. Page 124

**8.** 101. **9.** 110. **10.** 20. **11.** 20. **12.** 21. **13.** 21. **14.** 50.
**15.** 40, with 4 remainder.
**16.** 70.
**17.** 62.
**18.** 92.
**19.** 32, with 1 remainder.
**20.** 95, with 2 remainder.
**21.** 75, with 2 remainder.
**22.** 85, with 2 remainder.
**23.** 95, with 3 remainder.
**24.** 58, with 1 remainder.
**25.** 99, with 2 remainder.

### 102. Page 125

**8.** 63, with 1 remainder.
**9.** 112, with 1 remainder.
**10.** 111.
**11.** 80, with 2 remainder.
**12.** 25, with 2 remainder.
**13.** 47, with 3 remainder.
**14.** 31, with 4 remainder.
**15.** 48, with 6 remainder.
**16.** 54, with 1 remainder.
**17.** 30, with 5 remainder.

### 103. Page 125

**3.** 165, with 1 remainder.
**4.** 163, with 1 remainder.
**5.** 277, with 1 remainder.
**6.** 140, with 1 remainder.
**7.** 188, with 1 remainder.
**8.** 31, with 2 remainder.
**9.** 148, with 2 remainder.
**10.** 65, with 4 remainder.
**11.** 37, with 4 remainder.
**12.** 61, with 1 remainder.
**13.** 72.
**14.** 105.
**15.** 37.
**16.** 140, with 1 remainder.
**17.** 617.

### 104. Page 126

6. 131, with 1 remainder.
7. 210, with 1 remainder.
8. 267, with 1 remainder.
9. 336.
10. 379.
11. 37.
12. 58.
13. 85, with 1 remainder.
14. 107.
15. 133, with 3 remainder.
16. 21.
17. 56.
18. 74.
19. 94, with 1 remainder.
20. 104.
21. 29, with 4 remainder.
22. 41, with 6 remainder.
23. 53, with 2 remainder.
24. 66, with 7 remainder.
25. 79.

### 105. Page 126

4. 41.
5. 114.
6. 140, with 1 remainder.
7. 189, with 2 remainder.
8. 207, with 1 remainder.
9. 127.
10. 147.
11. 154, with 2 remainder.
12. 51.
13. 103, with 2 remainder.
14. 116, with 5 remainder.
15. 27, with 1 remainder.
16. 80.
17. 78.
18. 70.
19. 67.

### 106. Page 127

8. 419.
9. $2520.
10. 1085 ft.
11. 1528.
12. 2325.
13. 1700.

### 107. Page 127

5. 283.
6. 206.
7. 491.
8. 774.
9. 981.
10. 978.
11. 498.
12. 825.
13. 654.
14. 1776.
15. 2331.
16. 8991.

### 108. Page 128

4. 87¢.
5. 60¢.
6. 65¢.
7. 87¢.
8. 90¢.
9. 90¢.

**109.** Page 129

| | | | | |
|---|---|---|---|---|
| 8. 1000. | 11. 511. | 14. 990. | 17. 223. | 20. 124. |
| 9. 700. | 12. 570. | 15. 556. | 18. 186. | 21. 3858. |
| 10. 610. | 13. 940. | 16. 279. | 19. 162. | 22. 2961. |
| | | | | 23. 812. |

**110.** Page 129

| | | | | |
|---|---|---|---|---|
| 5. 2536. | 8. 1623. | 11. 552. | 14. 904. | 17. 3945. |
| 6. 2024. | 9. 715. | 12. 1509. | 15. 781. | 18. 1821. |
| 7. 1518. | 10. 621. | 13. 1356. | 16. 972. | 19. 2468. |
| | | | | 20. 1793. |

**111.** Page 130

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 8. 63. | 10. 93. | 12. 73. | 14. 617. | 16. 812. | 18. 1162. |
| 9. 85. | 11. 91. | 13. 96. | 15. 411. | 17. 1204. | 19. 1221. |

**112.** Page 130

6. 130. 7. 144. 8. 43.

**113.** Page 131

8. 100. 9. 75¢. 10. $36. 11. $155. 12. 388 ft.

**114.** Page 132

| | | | |
|---|---|---|---|
| 6. 54¢. | 8. 81¢. | 10. 96¢. | 12. 91¢. |
| 7. 92¢. | 9. 87¢. | 11. 23¢. | 13. 45¢. |

**115.** Page 133

| | | | | |
|---|---|---|---|---|
| 10. 50¢. | 15. 65¢. | 20. 83¢. | 25. 25¢. | 30. 14¢. |
| 11. 70¢. | 16. 52¢. | 21. 87¢. | 26. 20¢. | 31. 33¢. |
| 12. 80¢. | 17. 28¢. | 22. 92¢. | 27. 5¢. | 32. 31¢. |
| 13. 25¢. | 18. 34¢. | 23. 94¢. | 28. 15¢. | 33. 42¢. |
| 14. 45¢. | 19. 81¢. | 24. 91¢. | 29. 22¢. | 34. 44¢. |

**116.** Page 134

| | | | |
|---|---|---|---|
| 11. 70¢. | 13. 96¢. | 15. 30¢. | 17. 76¢. |
| 12. 48¢. | 14. 94¢. | 16. 18¢. | 18. 71¢. |

### 117. Page 135

**9.** 214. **11.** 266. **13.** 259. **15.** 93. **17.** 42. **19.** 82.
**10.** 182. **12.** 337. **14.** 358. **16.** 129. **18.** 54. **20.** 122.

### 118. Page 136

**7.** 99. **8.** 21. **9.** $450. **10.** 15 ft. **11.** 264 ft. **12.** 72 ft.

### 119. Page 137

**8.** 261 ft. **12.** 227 yd. **16.** 90.
**9.** 326 ft. **13.** 297 yd. **17.** 93, 3 remainder.
**10.** 220 in. **14.** 30. **18.** 30.
**11.** 264 in. **15.** 31, 1 remainder. **19.** 31, 1 remainder.

### 120. Page 138

**7.** 333 sq. ft. **9.** 243 sq. ft. **11.** 209 sq. ft.
**8.** 232 sq. ft. **10.** 133 sq. ft. **12.** 432 sq. yd.

### 121. Page 139

**4.** 342. **6.** 203. **8.** 704. **10.** 300. **12.** 288. **14.** 1584.
**5.** 368. **7.** 272. **9.** 528. **11.** 432. **13.** 720. **15.** 121.
**16.** 132.

### 122. Page 140

**3.** $705. **4.** $570. **5.** $250. **6.** $375. **7.** $575. **8.** $263.

### 123. Page 140

**6.** $6795. **8.** $8100. **10.** $623.
**7.** $9493. **9.** $693. **11.** $450.

### 124. Page 141

**4.** $2.01. **6.** $7.85. **8.** $8.42. **10.** $26.95.
**5.** $3.15. **7.** $510.06. **9.** $107.01. **11.** $5.55.
**12.** $16.87.

**125.** Page 142

5. $403.10. 7. $466.60. 9. $1265.25. 11. $5904.50.
6. $612.41. 8. $1081.75. 10. $878.75.

**126.** Page 142

4. $625.25. 6. $1462. 8. $6479.20. 10. $31.02.
5. $451.50. 7. $4351.80. 9. $25.15. 11. $82.05.
12. $38.40.

**127.** Page 143

4. 4 qt. 6. 2 qt. 8. 4 qt. 10. 1 gal. 1 qt. 12. 4 gal.
5. 8 qt. 7. 3 qt. 9. 1 gal. 11. 1 gal. 3 qt. 13. 4 gal. 2 qt.

**128.** Page 144

8. 64 qt. 10. 184 qt. 12. 896 qt. 14. 4 days.
9. 128 qt. 11. 128 qt. 13. 4000 qt.

**129.** Page 145

5. 1 bu. 7. 2 bu. 9. 3 bu. 11. 4 bu. 13. 1 bu.
6. 10 bu. 8. 8 bu. 10. 30 bu. 12. 40 bu. 14. 1 bu.

**130.** Page 145

4. $10.67. 5. $13.88. 6. $12.14. 7. $12.99. 8. $22.

**131.** Page 146

6. 88. 7. 121. 8. 148. 9. 108. 10. 66. 11. 51. 12. 80¢; $160.

**132.** Page 146

7. 132. 9. 30. 11. 182. 13. 32¢; $1.60.
8. 103. 10. 167. 12. 201.

**133.** Page 147

4. 120. 8. 360. 12. 15. 16. 173. 19. 9.
5. 240. 9. 540. 13. 720. 17. 1. 20. 13.
6. 300. 10. 30. 14. 84. 18. 2. 21. 20; 120; 135.
7. 420. 11. 20. 15. 86.

**134.** Page 148

8. \$7.11. 10. \$8.57. 12. \$8.05. 14. \$1073.07.
9. \$7.83. 11. \$4.74. 13. \$83.30.

**135.** Page 148

3. \$6.57. 5. \$8.08. 7. \$5.36.
4. \$16.75. 6. \$6.51. 8. \$35.06.

**136.** Page 149

6. $\frac{1}{3}$. 7. $\frac{3}{4}$. 8. $\frac{2}{4}$. 9. $\frac{2}{3}$. 10. 27.

**137.** Page 150

8. 360. 9. 321. 10. 198. 11. \$720. 12. \$1167.

**138.** Page 150

8. 140. 9. 212. 10. 153. 11. \$370. 12. \$734.

**139.** Page 151

6. 31. 8. 62. 10. 162 ft. 12. \$310. 14. \$941.
7. 42. 9. 71. 11. 181 ft. 13. \$420. 15. \$1221.

**140.** Page 151

5. 5. 6. 50. 7. 71 ft. 8. \$95. 9. \$1250. 10. 24.

**141.** Page 152

7. 145. 8. 137. 9. 185. 10. \$1500. 11. \$1360.

**142.** Page 152

11. 12. 12. 120. 13. 220 ft. 14. \$420. 15. \$540.

**143.** Page 153

4. 208. 6. 291. 8. 57 ft. 10. 4.
5. 260. 7. 39 ft. 9. 82 ft. 11. 6.

**144.** Page 153

4. \$421. 5. \$631. 6. \$740. 7. \$942. 8. \$1665.

### 145. Page 154

6. $\frac{2}{7}$. 8. $\frac{4}{7}$. 10. $\frac{6}{7}$. 12. 1. 14. $\frac{5}{7}$. 16. $\frac{6}{7}$. 18. 9; 11.
7. $\frac{3}{7}$. 9. $\frac{5}{7}$. 11. 1. 13. 1. 15. $\frac{4}{7}$. 17. $\frac{6}{7}$.

### 146. Page 154

5. $\frac{1}{4}$. 7. $\frac{3}{4}$. 9. 1. 11. $\frac{5}{8}$. 13. $\frac{3}{8}$.
6. $\frac{1}{2}$. 8. 1. 10. $\frac{7}{8}$. 12. $\frac{7}{8}$.

### 147. Page 155

4. 3. 7. 13. 10. 320. 13. \$3.05. 16. \$8.20.
5. 6. 8. 19. 11. 472. 14. \$4.10. 17. \$9.30.
6. 12. 9. 24. 12. 621. 15. \$6.20. 18. \$12.40.

### 148. Page 155

4. $\frac{7}{8}$. 6. $\frac{1}{2}$. 8. $\frac{1}{4}$. 10. $\frac{3}{8}$. 12. $\frac{1}{8}$.
5. $\frac{3}{4}$. 7. $\frac{1}{4}$. 9. $\frac{1}{2}$. 11. $\frac{5}{8}$.

### 149. Page 156

5. 43. 6. 48.

### 150. Page 156

4. 8¢. 7. 182. 10. 184. 13. 342. 15. 552.
5. 9¢. 8. 114. 11. 246. 14. 492. 16. 738.
6. 4; 12. 9. 164. 12. 546.

### 151. Page 157

11. 105. 12. 210. 13. 91. 14. 273. 15. 74. 16. 370.

### 152. Page 157

3. 15. 4. 10. 5. 5. 6. 15. 7. 20. 8. 25. 9. 28. 10. 35.

### 153. Page 158

14. $2 = \frac{1}{3}$ of 6; $3 = \frac{1}{3}$ of 9. 16. $2 = \frac{1}{4}$ of 8; $3 = \frac{1}{4}$ of 12.
15. $4 = \frac{2}{3}$ of 6; $6 = \frac{2}{3}$ of 9. 17. $6 = \frac{3}{4}$ of 8; $9 = \frac{3}{4}$ of 12.

**154. Page 158**

7. \$460; \$1380. 8. 1; 49. 9. \$1215.

**155. Page 159**

3. $54\frac{4}{5}$. 4. $72\frac{1}{3}$. 5. $97\frac{3}{8}$. 6. $150\frac{3}{8}$. 7. $256\frac{3}{8}$.

**156. Page 159**

3. $30\frac{3}{4}$. 5. $86\frac{1}{4}$. 7. $169\frac{1}{4}$. 9. $181\frac{3}{4}$. 11. $644\frac{3}{4}$.
4. $37\frac{1}{3}$. 6. $185\frac{2}{3}$. 8. $42\frac{1}{6}$. 10. $22\frac{1}{7}$. 12. $821\frac{5}{8}$.

**157. Page 160**

4. $6\frac{1}{2}$. 5. 8. 6. 60. 7. 26. 8. 26. 9. 53.

**158. Page 160**

7. 11. 8. $11\frac{1}{2}$. 9. $57\frac{1}{4}$. 10. 40. 11. $68\frac{3}{4}$. 12. 91.

**159. Page 161**

5. $11\frac{3}{4}$. 7. $78\frac{3}{4}$. 9. $42\frac{3}{4}$. 11. $17\frac{3}{4}$.
6. $42\frac{3}{4}$. 8. $42\frac{3}{4}$. 10. $53\frac{3}{4}$. 12. $30\frac{3}{4}$.

**160. Page 161**

4. $13\frac{3}{8}$. 6. $41\frac{3}{8}$. 8. $83\frac{3}{8}$. 10. $8\frac{3}{8}$.
5. $14\frac{3}{8}$. 7. $81\frac{3}{8}$. 9. $100\frac{3}{8}$. 11. $9\frac{3}{8}$.
12. $11\frac{3}{8}$.

**161. Page 162**

4. $12\frac{1}{4}$. 6. $21\frac{1}{4}$. 8. $8\frac{1}{4}$. 10. $8\frac{1}{4}$. 12. $9\frac{1}{4}$. 14. $15\frac{1}{4}$.
5. $13\frac{1}{4}$. 7. $42\frac{1}{4}$. 9. $5\frac{1}{4}$. 11. $12\frac{1}{4}$. 13. $18\frac{1}{4}$. 15. $18\frac{1}{4}$.

**162. Page 162**

4. $13\frac{1}{8}$. 6. $20\frac{1}{8}$. 8. $13\frac{1}{8}$. 10. $21\frac{1}{8}$. 12. $7\frac{1}{8}$. 14. $3\frac{1}{8}$. 16. $2\frac{1}{8}$.
5. $14\frac{1}{8}$. 7. $26\frac{1}{8}$. 9. $16\frac{1}{8}$. 11. $21\frac{1}{8}$. 13. $4\frac{1}{8}$. 15. $7\frac{1}{8}$. 17. $2\frac{1}{8}$.
18. $6\frac{1}{8}$.

**163. Page 163**

4. $59\frac{3}{4}$. 5. $47\frac{3}{8}$. 6. $58\frac{3}{8}$. 7. $57\frac{3}{8}$. 8. $70\frac{3}{8}$. 9. $70\frac{3}{8}$.

**164.** Page 163

4. $22\frac{1}{4}$. 5. $12\frac{1}{8}$. 6. $40\frac{1}{8}$. 7. $6\frac{1}{8}$. 8. $11\frac{1}{4}$. 9. $5\frac{1}{4}$.

**165.** Page 164

4. $5\frac{3}{8}$. 5. $5\frac{3}{4}$. 6. $9\frac{1}{4}$. 7. $5\frac{3}{8}$. 8. $7\frac{3}{8}$. 9. $3\frac{1}{4}$.

**166.** Page 164

4. $4\frac{1}{2}$ lb. 5. $2\frac{1}{4}$. 6. $12\frac{3}{8}$. 7. $5\frac{1}{8}$. 8. $2\frac{1}{8}$. 9. $3\frac{1}{8}$.

**167.** Page 165

6. 57¢. 7. 80¢. 8. 73¢. 9. \$1. 10. \$1. 11. \$1. 12. \$3.72.

**168.** Page 165

5. \$53. 6. \$6.25. 7. \$7.55. 8. \$9.13. 9. \$7.77. 10. \$10.62.

**169.** Page 166

7. 20¢. 9. 30¢. 11. 40¢. 13. 50¢. 15. 60¢.
8. 28¢. 10. 35¢. 12. 43¢. 14. 52¢. 16. 64¢.

**170.** Page 166

5. \$6.44. 7. \$11.12. 9. \$11.64.
6. \$8.62. 8. \$8.33. 10. \$9.72.

**171.** Page 167

4. 17. 5. 158. 6. 173. 7. 155.

**172.** Page 168

4. 15. 6. 9. 8. 6 pt., 16 pt., 5 pt.
5. 30. 7. 18. 9. 16 qt., 4 qt., 10 qt.

**173.** Page 168

4. $17\frac{3}{4}$ lb. 5. \$9; \$90. 6. \$1035; \$2880; \$3510.

**174.** Page 169

6. \$11.30. 8. \$13.59. 10. \$11.42.
7. \$11.03. 9. \$11.43. 11. \$20.00.

**175. Page 169**

4. \$4.25. 5. \$3.58. 6. \$6.28. 7. \$3.04. 8. \$2.63. 9. \$5.02.

**176. Page 170**

5. \$410.25. 7. \$1000.00. 9. \$1721.83. 11. \$962.34.
6. \$444.30. 8. \$439.29. 10. \$1629.39. 12. \$885.14.

**177. Page 170**

7. \$74.74. 9. \$287.89. 11. \$180.04. 13. \$206.01.
8. \$301.06. 10. \$170.14. 12. \$68.04. 14. \$331.27.

**178. Page 171**

10. 504. 12. 2009. 14. 6678. 16. 6556. 18. 3564.
11. 1410. 13. 7368. 15. 9504. 17. 9096. 19. 5868.

**179. Page 171**

13. 145. 16. 321. 19. 122. 22. 98. 25. $981\frac{1}{4}$.
14. 211. 17. 438. 20. 121. 23. $1705\frac{1}{2}$. 26. $855\frac{5}{8}$.
15. 214. 18. 156. 21. 71. 24. $1053\frac{1}{4}$. 27. $922\frac{1}{8}$.

**180. Page 172**

9. 100 ft. 11. 11. 13. \$136. 15. \$11.40.
10. 28. 12. 12. 14. \$11. 16. \$29.50.
17. \$44.93.

**1. Page 173**

18. 20,000. 20. 13,000. 22. 99,000.
19. 70,000. 21. 87,000. 23. 100,000.

**2. Page 174**

14. 65,756. 15. 72,672. 16. 98,765. 17. 99,701.

**3. Page 174**

10. 1002. 11. 11,001. 12. 70,070. 13. 55,055. 14. 99,990.

**4. Page 175**

10. 300,000. 12. 400,000. 14. 500,000. 16. 600,000.
11. 700,000. 13. 200,000. 15. 800,000. 17. 900,000.
18. $300; 300,000.

**5. Page 175**

10. 275,000. 13. 260,000. 16. 509,000. 18. 876,000.
11. 296,000. 14. 307,000. 17. 750,000. 19. 999,000.
12. 463,000. 15. 365,000.

**6. Page 176**

6. 242,000. 8. 498,080. 10. 888,088.
7. 376,006. 9. 700,007. 11. 123,456.

**7. Page 176**

7. 500. 9. 651. 11. 400. 13. 1920.
8. 550. 10. 705. 12. 904. 14. 1920.

**8. Page 177**

4. 664. 5. 672. 6. 722. 7. 884. 8. 770. 9. 817.

**9. Page 177**

8. 643. 10. 6643. 12. 8983.
9. 2643. 11. 9668. 13. 10,000.

**10. Page 178**

3. $1225. 5. $168.70. 7. $6535.
4. $1532. 6. $170. 8. $10,000.

**11. Page 178**

3. $20. 5. $199.99. 7. $8441.
4. $20. 6. $8549. 8. $6563.

**12. Page 179**

4. 250. 5. 2750. 6. 9750. 7. 10,000. 8. $100. 9. $100.

### 13. Page 179

3. 182.
4. 2682.
5. $186.82.
6. 78,682.
7. 99,765.
8. 99,999.

### 14. Page 180

4. 299.
5. 255.
6. 221.
7. $22.21.
8. $222.22.
9. 80,269.

### 15. Page 180

4. 11,673.
5. 14,650.
6. 12,650.
7. 18,096.
8. 16,392.
9. 35,765.
10. 12,120.
11. 16,216.
12. 13,731.
13. 25,077.

### 16. Page 181

4. $22.50.
5. $17.75.
6. $82.78.
7. $189.14.
8. $396.87.

### 17. Page 181

10. $121.05.
11. $58.60.
12. $187.27.
13. $111.85.
14. $29.14.

### 18. Page 182

10. $290.25.
11. $92.65.
12. $148.70.
13. $724.25.
14. $673.52.

### 19. Page 182

10. $1450.
11. 22,323.
12. 31,408.
13. 14,917.
14. 21,890.
15. 325,889.

### 20. Page 183

3. $84.75.
4. $219.08.
5. $226.41.
6. $800.08.
7. $578.13.
8. $133.58.
9. $555.55.
10. $777.77.
11. $258.43.
12. $999.99.
13. 3520 ft.

**21. Page 183**

6. 15,865. 7. 41,915. 8. 52,786. 9. 24,309. 10. 9999.

**22. Page 184**

11. $38.88.
12. 7859 ft.
13. 441.
14. 107,879.
15. $193.91.
16. $100.

**23. Page 185**

12. 750. 15. 500. 18. 1250. 21. 3400. 24. 12,750.
13. 620. 16. 200. 19. 4750. 22. 4000. 25. 43,800.
14. 970. 17. 400. 20. 6420. 23. 7000. 26. 50,000.

**24. Page 185**

10. $1755. 13. $5277.30. 16. $12,450. 18. $35,600.
11. $2257.50. 14. $2174.50. 17. $35,467. 19. $28,750.50.
12. $4864.50. 15. $3120.50.

**25. Page 186**

6. 810. 7. 3360. 8. 20,700. 9. $128.40. 10. $1950.

**26. Page 187**

5. 15,000. 7. $1750. 9. $82.50. 11. 1680 lb.
6. 7800. 8. $2560. 10. $625. 12. 4500 lb.

**27. Page 187**

7. 22,500. 9. 290,000. 11. $43,400.
8. 10,000. 10. 567,500. 12. $78,400.

**29. Page 188**

4. 385. 10. 1375. 16. 13,750. 22. 24,200.
5. 528. 11. 2563. 17. 34,925. 23. 33,000.
6. 792. 12. 5291. 18. 75,152. 24. 88,055.
7. 1056. 13. 10,582. 19. $46,156. 25. 66,660.
8. 825. 14. 3828. 20. $89,452. 26. $250.25.
9. 880. 15. 7513. 21. $53,625. 27. $393.25.

### 31. Page 189

4. 504.
5. 1032.
6. 1116.
7. 900.
8. 396.
9. 1188.
10. 1500.
11. 7704.
12. 3924.
13. 4908.
14. 6060.
15. 8400.
16. $3300.
17. $9900.
18. $8040.
19. $15,120.
20. $28,560.
21. $48,960.
22. 12,000.
23. 14,400.
24. 36,036.
25. 60,600.
26. $258.
27. $153.

### 32. Page 190

6. 6831.
7. 5511.
8. 6000.
9. 26,788.
10. 19,096.
11. 42,976.
12. 20,700.
13. 30,300.
14. 13,696.
15. 39,996.
16. 25,077.
17. 98,901.

### 33. Page 191

7. $77.50.
8. $80.30.
9. $163.20.
10. $220.50.
11. $500.
12. $1077.18.
13. $101.20.
14. $206.70.
15. $213.12.
16. $365.43.
17. $825.
18. $1959.52.
19. $435.
20. $225.18.
21. $420.
22. $989.01.
23. $3896.
24. $9899.01.

### 34. Page 192

5. 92,610.
6. 162,022.
7. 88,752.
8. 199,791.
9. 111,000.
10. 102,000.
11. 110,088.
12. 826,983.
13. 1,000,000.
14. 555,500.
15. 302,412.
16. 894,306.
17. $468.75.
18. $506.25.
19. $680.

### 35. Page 193

4. 43,127.
5. 36,663.
6. 158,974.
7. 159,075.
8. 386,830.
9. 908,091.
10. 195,048.
11. 383,394.
12. 209,374.
13. 303,485.
14. 706,928.
15. 564,682.
16. 214,110.
17. 598,850.
18. 988,372.
19. 807,216.
20. 818,856.
21. 917,181.
22. $16,875.
23. $11,875.

### 36. Page 194

| | | | |
|---|---|---|---|
| 5. $20,951. | 9. $59,865. | 13. $526.38. | 17. $436.32. |
| 6. $23,088. | 10. $199.50. | 14. $294.88. | 18. $102. |
| 7. $50,007. | 11. $173.53. | 15. $198.12. | 19. $290.52. |
| 8. $34,029. | 12. $574.07. | 16. $508.32. | |

### 37. Page 194

| | | | |
|---|---|---|---|
| 9. $668.25. | 12. $5069.33. | 15. $54,364.70. | 18. $3001.86. |
| 10. $2099.34. | 13. $3111. | 16. $39,253.76. | 19. $6182.48. |
| 11. $3660. | 14. $6137.40. | 17. $1552.87. | 20. $4089.40. |

### 38. Page 195

5. $1925. 6. $1615. 7. $16,500. 8. $85,750. 9. $1050.

### 39. Page 195

| | | |
|---|---|---|
| 5. $8.70. | 7. $3240. | 9. $63,200. |
| 6. $4.55. | 8. $69,125. | 10. $102.30. |

### 40. Page 196

| | | | |
|---|---|---|---|
| 5. $336. | 8. $4104. | 11. $46.35. | 14. 26,768. |
| 6. $552. | 9. $11.76. | 12. $44.52. | 15. 48,375. |
| 7. $2200. | 10. $20.46. | 13. 9900. | 16. 526,250. |

### 41. Page 196

| | | | |
|---|---|---|---|
| 6. $750. | 8. $2000. | 10. $231. | 12. $200,000. |
| 7. $1001. | 9. $211. | 11. $195.75. | 13. $234,375. |
| | | | 14. $168,750. |

### 42. Page 197

| | | | |
|---|---|---|---|
| 7. 75. | 11. 486. | 15. $250. | 19. 408. |
| 8. 68. | 12. 522. | 16. $370. | 20. 609. |
| 9. 94. | 13. 349. | 17. $640. | 21. 707. |
| 10. 37. | 14. 628. | 18. $920. | 22. 800. |

### 43. Page 197

**5.** 7. **7.** 41. **9.** 132. **11.** 44. **13.** 23.
**6.** 7. **8.** 75. **10.** 74. **12.** 56.

### 44. Page 198

**4.** 30. **11.** $1364\frac{1}{6}$. **18.** $13{,}030\frac{4}{5}$. **25.** $317\frac{7}{10}$.
**5.** $30\frac{1}{4}$. **12.** $922\frac{2}{7}$. **19.** $12{,}102\frac{5}{8}$. **26.** 243.
**6.** $30\frac{3}{4}$. **13.** $897\frac{5}{8}$. **20.** 127. **27.** 132.
**7.** $1735\frac{1}{2}$. **14.** $293\frac{4}{5}$. **21.** 236. **28.** 142.
**8.** $1420\frac{2}{3}$. **15.** $10{,}710\frac{1}{2}$. **22.** $147\frac{7}{10}$. **29.** 44.
**9.** $1458\frac{1}{4}$. **16.** $12{,}140\frac{2}{3}$. **23.** $186\frac{9}{10}$. **30.** $44\frac{1}{2}=44\frac{2}{4}\frac{0}{0}$.
**10.** $1455\frac{1}{5}$. **17.** $6280\frac{1}{4}$. **24.** $723\frac{3}{10}$. **31.** 39.
**32.** $39\frac{1}{7}=39\frac{1}{7}\frac{0}{0}$. **33.** 43.

### 45. Page 199

**4.** 14. **7.** 21. **10.** 54. **13.** 121. **16.** 231. **19.** $31.
**5.** 16. **8.** 32. **11.** 61. **14.** 131. **17.** 351. **20.** 67; 71.
**6.** 18. **9.** 43. **12.** 81. **15.** 91. **18.** 637.

### 46. Page 200

**14.** 9. **16.** 7. **18.** 33. **20.** 44. **22.** 73. **24.** 88.
**15.** 8. **17.** 31. **19.** 33. **21.** 77. **23.** 91. **25.** 99.

### 47. Page 201

**5.** 22. **7.** 33. **9.** 33. **11.** 40. **13.** 52.
**6.** 26. **8.** 22. **10.** 34. **12.** 41. **14.** 21.

### 48. Page 201

**4.** 22. **6.** 41. **8.** 83. **10.** 33. **12.** 81.
**5.** 32. **7.** 51. **9.** 81. **11.** 66.

### 49. Page 202

**6.** 22. **8.** 42. **10.** 41. **12.** 101. **14.** 110.
**7.** 31. **9.** 32. **11.** 40. **13.** 102.

### 50. Page 202

4. $109\frac{2}{5}\frac{8}{5}$.
5. $218\frac{1}{1}\frac{2}{7} = 218\frac{2}{3}\frac{4}{4}$.
6. $126\frac{1}{4}\frac{4}{7}$.
7. $128\frac{8}{8}\frac{3}{5}$.
8. $130\frac{4}{8}\frac{7}{7}$.
9. $129\frac{2}{2}\frac{3}{9}$.
10. $118\frac{9}{1}\frac{9}{9} = 118\frac{2}{8}\frac{7}{7}$.
11. $105\frac{1}{8}\frac{7}{5}$.
12. $117\frac{3}{7}\frac{8}{3}$.

### 51. Page 203

12. 20.
13. $20\frac{7}{3}\frac{}{0}\frac{}{0}$.
14. $20\frac{1}{3}\frac{0}{0}\frac{7}{0}$.
15. $200\frac{1}{3}\frac{0}{0}\frac{7}{0}$.
16. $230\frac{1}{3}\frac{0}{0}\frac{7}{0}$.
17. 20.
18. $20\frac{8}{2}\frac{}{0}\frac{}{0}$.
19. $20\frac{1}{2}\frac{0}{0}\frac{8}{0}$.
20. $17\frac{107}{6000}$.
21. $21\frac{111}{7000}$.

### 52. Page 204

5. 135.
6. 223.
7. 124.
8. 123.
9. 428.
10. 127.
11. 279.
12. 312.
13. 206.
14. 320.
15. 604.
16. 370.
17. 264.
18. $2689\frac{7}{3}\frac{2}{2}\frac{}{1}$.
19. $860\frac{3}{3}\frac{0}{0}\frac{1}{2}$.
20. $549\frac{1}{2}\frac{5}{2}\frac{5}{5}$.
21. $1440\frac{7}{4}\frac{}{5}\frac{}{8}$.
22. $2169\frac{9}{1}\frac{7}{0}\frac{}{2}$.
23. 1333.
24. 1111.

### 53. Page 205

4. $13.50.
5. $18.90.
6. 3000.

### 54. Page 206

6. $37.15.
7. $46.60.
8. $56.00.
9. $70.00.
10. $41.46.
11. $28.78.
12. $3675.
13. $1564.
14. $3552.
15. $6278.
16. $5073.
17. $9801.

### 55. Page 206

4. 54,756.
5. 237,169.
6. 291,600.
7. 451,584.
8. 734,472.
9. $1108.66.
10. $1362.89.
11. $786.19.
12. $2017.61.
13. $2000.01.

### 57. Page 208

6. 9.
7. 14.
8. 6.
9. 12.
10. 8.
11. 12.

### 58. Page 209

4. $\frac{2}{2}$.
5. $\frac{4}{4}$.
6. $\frac{8}{8}$.
7. $\frac{2}{4}$.
8. $\frac{2}{8}$.
9. $\frac{4}{8}$.
10. $\frac{6}{8}$.
11. $\frac{4}{8}$.

### 59. Page 209

3. $\frac{3}{5}$. 5. $\frac{3}{6}$. 7. $\frac{4}{6}$. 9. $\frac{1}{3}$. 11. 7. 13. 2. 15. 7.
4. $\frac{6}{6}$. 6. $\frac{2}{6}$. 8. $\frac{6}{6}$. 10. $\frac{2}{3}$. 12. 13. 14. 5. 16. 12.

### 60. Page 210

5. $\frac{4}{8}$. 9. $\frac{8}{8}$. 13. $\frac{9}{12}$. 17. $\frac{5}{10}$. 21. $\frac{8}{10}$. 25. $\frac{6}{6}$.
6. $\frac{2}{8}$. 10. $\frac{10}{8}$. 14. $\frac{4}{12}$. 18. $\frac{2}{10}$. 22. $\frac{14}{10}$. 26. $\frac{6}{6}$.
7. $\frac{6}{8}$. 11. $\frac{6}{12}$. 15. $\frac{2}{12}$. 19. $\frac{4}{10}$. 23. $\frac{2}{6}$. 27. $\frac{8}{8}$.
8. $\frac{8}{8}$. 12. $\frac{3}{12}$. 16. $\frac{10}{12}$. 20. $\frac{6}{10}$. 24. $\frac{4}{6}$. 28. $\frac{10}{8}$.

### 61. Page 212

5. $\frac{1}{2}$. 7. $\frac{2}{3}$. 9. $\frac{1}{2}$. 11. $\frac{1}{2}$. 13. $\frac{1}{2}$. 15. $\frac{1}{4}$. 17. $\frac{1}{4}$. 19. $\frac{2}{3}$.
6. $\frac{2}{3}$. 8. $\frac{2}{5}$. 10. $\frac{1}{4}$. 12. $\frac{1}{3}$. 14. $\frac{1}{3}$. 16. $\frac{1}{2}$. 18. $\frac{3}{4}$.

### 62. Page 212

3. $\frac{8}{4}$. 4. $\frac{28}{4}$. 5. $\frac{36}{4}$. 6. $\frac{48}{4}$. 7. $\frac{80}{4}$. 8. $\frac{12}{4}$.

### 63. Page 213

4. 2. 6. 4. 8. $2\frac{1}{4}$. 10. $1\frac{1}{8}$. 12. $3\frac{3}{4}$. 14. $\$2\frac{1}{4}$.
5. 3. 7. 10. 9. $1\frac{3}{5}$. 11. $1\frac{4}{5}$. 13. $2\frac{1}{8}$.

### 64. Page 213

4. $1\frac{1}{2}$. 6. $1\frac{3}{4}$. 8. $1\frac{1}{4}$. 10. $1\frac{2}{8}$. 12. $1\frac{2}{3}$. 14. $1\frac{2}{5}$. 16. $\$4\frac{1}{4}$.
5. $1\frac{1}{4}$. 7. $1\frac{1}{2}$. 9. $1\frac{1}{5}$. 11. $1\frac{3}{5}$. 13. $1\frac{1}{5}$. 15. $1\frac{3}{5}$.

### 65. Page 214

4. $1\frac{1}{4}$. 6. $1\frac{5}{8}$. 8. $\frac{5}{8}$. 10. $\frac{9}{8}$, or $1\frac{1}{8}$.
5. $\frac{5}{8}$. 7. $\frac{7}{8}$. 9. $\frac{7}{8}$. 11. $\frac{8}{8}$, or $1\frac{1}{8}$.

### 66. Page 214

4. 6. 7. 9. 10. $9\frac{1}{2}$. 13. 16. 16. $10\frac{1}{2}$. 19. $9\frac{3}{4}$.
5. 8. 8. $9\frac{1}{2}$. 11. $5\frac{3}{4}$. 14. 13. 17. $11\frac{3}{4}$. 20. $7\frac{3}{4}$.
6. 8. 9. $15\frac{1}{4}$. 12. 12. 15. 12. 18. $13\frac{1}{4}$. 21. $7\frac{5}{8}$.

### 67. Page 215

5. $1\frac{3}{8}$. 8. $1\frac{1}{5}$. 11. $1\frac{1}{2}$. 14. $1\frac{1}{8}$. 17. $\frac{7}{8}$. 20. $\frac{1}{2}$
6. $1\frac{1}{4}$. 9. $1\frac{2}{5}$. 12. $1\frac{1}{2}$. 15. $1\frac{1}{3}$. 18. $1\frac{1}{8}$. 21. $\frac{7}{8}$.
7. $1\frac{1}{3}$. 10. $1\frac{1}{8}$. 13. $1\frac{7}{10}$. 16. $1\frac{2}{3}$. 19. $\frac{1}{2}$. 22. $1\frac{7}{8}$.

### 68. Page 215

6. $7\frac{1}{2}$. 8. $12\frac{1}{4}$. 10. $8\frac{5}{8}$. 12. $8\frac{1}{8}$. 14. $10\frac{7}{10}$.
7. $11\frac{1}{4}$. 9. $6\frac{3}{8}$. 11. $13\frac{3}{8}$. 13. $9\frac{1}{2}$. 15. $21\frac{1}{4}$ in.

### 69. Page 217

5. $1\frac{3}{8}$. 7. $1\frac{1}{8}$. 9. $1\frac{1}{12}$. 11. $\frac{7}{10}$. 13. $1\frac{11}{12}$. 15. $5\frac{11}{12}$.
6. $\frac{5}{6}$. 8. $\frac{7}{12}$. 10. $1\frac{5}{12}$. 12. $1\frac{3}{10}$. 14. $2\frac{11}{12}$. 16. $1\frac{3}{5}$.
17. \$1$\frac{1}{2}$.

### 70. Page 217

5. $17\frac{1}{4}$. 7. $12\frac{3}{4}$. 9. $11\frac{5}{6}$. 11. $16\frac{3}{4}$.
6. $17\frac{7}{8}$. 8. $16\frac{3}{5}$. 10. $19\frac{1}{4}$.

### 71. Page 218

4. $\frac{7}{8}$. 6. $1\frac{5}{12}$. 8. 2. 10. $8\frac{7}{12}$. 12. 11.
5. $1\frac{1}{12}$. 7. $1\frac{5}{12}$. 9. $1\frac{3}{5}$. 11. 7.

### 72. Page 218

4. $6\frac{3}{8}$. 6. $8\frac{1}{8}$. 8. $53\frac{1}{12}$. 10. $34\frac{3}{5}$.
5. $5\frac{7}{8}$. 7. $10\frac{1}{2}$. 9. $32\frac{2}{3}$. 11. $49\frac{3}{4}$.

### 73. Page 219

4. $\frac{3}{8}$. 6. $1\frac{3}{8}$. 8. $1\frac{1}{8}$. 10. $3\frac{1}{8}$. 12. $6\frac{1}{8}$.
5. $\frac{3}{8}$. 7. $4\frac{5}{8}$. 9. $5\frac{3}{8}$. 11. $6\frac{3}{8}$.

### 74. Page 219

4. $9\frac{5}{6}$. 6. $20\frac{2}{3}$. 8. $12\frac{3}{8}$. 10. $9\frac{5}{8}$. 12. $4\frac{1}{2}$.
5. $13\frac{5}{12}$. 7. $5\frac{5}{8}$. 9. $7\frac{7}{12}$. 11. $14\frac{5}{8}$.

### 75. Page 220

4. $4\frac{3}{4}$. 5. $32\frac{1}{6}$. 6. $47\frac{5}{6}$. 7. $21\frac{5}{12}$. 8. $34\frac{4}{5}$. 9. $7\frac{7}{10}$.

### 76. Page 220

4. $5\frac{1}{2}$. 5. $18\frac{5}{12}$. 6. $21\frac{7}{10}$. 7. $25\frac{9}{10}$. 8. $5\frac{7}{12}$. 9. $14\frac{7}{12}$. 10. 5.

### 77. Page 221

4. $10\frac{7}{10}$. 5. $23\frac{9}{10}$. 6. $17\frac{9}{10}$. 7. $53\frac{9}{16}$. 8. $33\frac{7}{16}$. 9. $8\frac{13}{16}$. 10. $14\frac{11}{16}$. 11. $13\frac{13}{16}$. 12. $21\frac{13}{16}$.

### 78. Page 221

4. $74\frac{5}{6}$. 5. $34\frac{7}{10}$. 6. $2057\frac{5}{8}$. 7. $560\frac{7}{10}$. 8. $1537\frac{7}{12}$. 9. 11.

### 79. Page 222

4. $\frac{4}{5}$. 5. $\frac{3}{5}$. 6. $1\frac{1}{3}$. 7. $1\frac{1}{2}$. 8. $2\frac{1}{4}$. 9. $2\frac{2}{5}$. 10. $1\frac{7}{8}$. 11. $4\frac{3}{8}$. 12. $4\frac{1}{2}$. 13. $2\frac{1}{2}$. 14. $3\frac{3}{4}$. 15. $10\frac{1}{2}$.

### 80. Page 222

4. 4. 5. 4. 6. 8. 7. $8\frac{1}{3}$. 8. $7\frac{1}{2}$. 9. 14. 10. $7\frac{1}{2}$. 11. 21.

### 81. Page 223

4. 4. 5. 6. 6. 6. 7. 2. 8. 15. 9. $12\frac{1}{2}$. 10. 6. 11. 15. 12. 28. 13. $3\frac{1}{8}$. 14. $11\frac{1}{4}$. 15. $21\frac{7}{8}$. 16. $\$26\frac{1}{4}$.

### 82. Page 223

4. 7. 5. 50. 6. 100. 7. 100. 8. 200. 9. 100. 10. 100. 11. 100. 12. 264. 13. 670. 14. 46. 15. $50\frac{2}{3}$. 16. 44. 17. $151\frac{1}{5}$. 18. $236\frac{4}{5}$. 19. \$600.

### 83. Page 224

| | | | | |
|---|---|---|---|---|
| **9.** 12. | **12.** 12. | **15.** 6. | **18.** 6. | **21.** 51. |
| **10.** 18. | **13.** 6. | **16.** 12. | **19.** 6; 4. | **22.** 69. |
| **11.** 24. | **14.** 18. | **17.** 6. | **20.** 54. | **23.** 18. |

### 84. Page 225

| | | | | |
|---|---|---|---|---|
| **4.** 96. | **6.** 868. | **8.** 465. | **10.** 740. | **12.** 3123. |
| **5.** 465. | **7.** 102. | **9.** 492. | **11.** 1782. | |

### 85. Page 225

| | | | | |
|---|---|---|---|---|
| **4.** 320. | **6.** 785. | **8.** 1610. | **10.** 1602. | **12.** 6312. |
| **5.** 360. | **7.** 663. | **9.** 1757. | **11.** 741. | |

### 86. Page 226

**8.** $\frac{1}{3}$. **9.** $\frac{2}{3}$. **10.** $\frac{2}{3}$. **11.** $\frac{1}{3}$.

### 87. Page 226

**5.** $\frac{1}{8}$; $\frac{1}{8}$; $\frac{1}{8}$; $\frac{1}{2}$. **6.** $\frac{1}{8}$.

### 88. Page 227

| | | | | |
|---|---|---|---|---|
| **8.** $\frac{1}{4}$. | **12.** $\frac{7}{12}$. | **16.** $\frac{2}{5}$. | **20.** $\frac{1}{8}$. | **24.** $\frac{1}{8}$. |
| **9.** $\frac{1}{4}$. | **13.** $\frac{3}{5}$. | **17.** $\frac{1}{10}$. | **21.** $\frac{1}{12}$. | **25.** $\frac{3}{8}$. |
| **10.** $\frac{5}{8}$. | **14.** $\frac{1}{3}$. | **18.** $\frac{1}{5}$. | **22.** $\frac{1}{4}$. | **26.** $\frac{3}{8}$. |
| **11.** $\frac{2}{3}$. | **15.** $\frac{1}{2}$. | **19.** $\frac{1}{8}$. | **23.** $\frac{1}{8}$. | **27.** $\frac{1}{7}$. |

### 89. Page 228

| | | | | |
|---|---|---|---|---|
| **4.** 126. | **6.** 180. | **8.** 374. | **10.** 3000. | **12.** 5586. |
| **5.** 136. | **7.** 378. | **9.** 2000. | **11.** 6400. | |

### 91. Page 229

| | | | |
|---|---|---|---|
| **16.** \$6. | **18.** \$12. | **20.** \$15. | **22.** \$9. |
| **17.** \$4. | **19.** \$48. | **21.** \$9. | **23.** \$8. |

### 92. Page 230

5. 3 in. 8. 2 ft. 11. $3¢$. 14. $2. 16. $\frac{2}{25}$.
6. $\frac{3}{7}$. 9. $\frac{1}{5}$. 12. $\frac{3}{16}$. 15. $\frac{1}{9}$. 17. $\frac{3}{16}$ in.
7. $\frac{3}{8}$. 10. $\frac{2}{15}$. 13. $\frac{3}{20}$.

### 93. Page 230

5. $2¢$. 8. $3¢$. 11. 3. 14. 2. 16. $\frac{2}{33}$.
6. $\frac{2}{15}$. 9. $\frac{3}{32}$. 12. $\frac{3}{34}$. 15. $\frac{2}{25}$. 17. $\frac{6}{36}$ yd.
7. $\frac{2}{25}$. 10. $\frac{3}{35}$. 13. $\frac{3}{50}$.

### 94. Page 231

6. 2. 7. 3. 8. 4. 9. 6. 10. 8. 11. 16. 12. 10. 13. 15.

### 95. Page 231

6. 5. 9. 8. 12. 15. 15. 8.
7. 5. 10. 8. 13. 15. 16. 16.
8. 5. 11. 8. 14. 15. 17. 10.

### 96. Page 232

4. $\frac{2}{3}$. 8. $\frac{3}{4}$. 12. $\frac{5}{8}$. 16. $\frac{7}{8}$.
5. $\frac{2}{3}$. 9. $\frac{3}{4}$. 13. $\frac{5}{8}$. 17. $\frac{7}{8}$.
6. $\frac{2}{3}$. 10. $\frac{3}{4}$. 14. $\frac{5}{8}$. 18. $\frac{9}{11}$.
7. $\frac{2}{3}$. 11. $\frac{3}{4}$. 15. $\frac{5}{8}$. 19. 3.
20. $\frac{2}{3}$; $\frac{2}{3}$.

### 97. Page 232

3. 2. 7. 4. 11. 2. 15. $1\frac{1}{2}$. 19. $\frac{5}{6}$. 23. $\frac{3}{4}$.
4. $\frac{2}{3}$. 8. $1\frac{1}{3}$. 12. 6. 16. $2\frac{1}{2}$. 20. $1\frac{1}{6}$. 24. $1\frac{1}{3}$.
5. $\frac{1}{2}$. 9. $\frac{4}{5}$. 13. $\frac{2}{3}$. 17. $3\frac{1}{2}$. 21. $1\frac{1}{2}$. 25. $2\frac{1}{2}$.
6. $1\frac{1}{2}$. 10. $1\frac{3}{4}$. 14. 2. 18. $\frac{1}{2}$. 22. $\frac{2}{3}$. 26. $1\frac{3}{5}$.

### 98. Page 233

8. 5280. 10. $16\frac{1}{2}$. 12. 2640. 14. 240.
9. $16\frac{1}{2}$. 11. 10,560. 13. 1320. 15. 880.

### 99. Page 234

**8.** 4320.
**9.** 2400.
**10.** 3840.
**11.** 4.
**13.** 4.
**14.** $9\frac{3}{8}$.

### 100. Page 235

**6.** 480 cu. in.
**7.** 72 cu. ft.
**8.** 504 cu. in.
**9.** 336 cu. ft.
**10.** 1728 cu. in.
**11.** 4284 cu. in.
**12.** 15,232 cu. in.
**13.** 4032 cu. ft.

### 101. Page 236

**4.** 42.
**5.** 128.
**6.** 192.

### 102. Page 237

**5.** 72 hr.
**6.** 72 hr.
**7.** 168 hr.
**8.** 2 hr.
**9.** 60 hr.
**10.** 56 da.
**11.** 182 da.
**12.** 2 da.
**13.** 6 da.

### 103. Page 238

**5.** 4 qt.
**6.** 92 qt.
**7.** 18 qt.
**8.** 21 qt.
**9.** 12 qt.
**10.** 7 qt. 1 pt.
**11.** 1 qt.
**12.** 4 qt.
**13.** 2 gal.
**14.** 16 gal.
**15.** 2 gal. 1 qt.
**16.** 2 gal.
**17.** 2 gal. 1 qt.
**18.** 3 gal. 1 qt.
**19.** 4 gal. 1 qt.
**20.** 5 gal. 1 qt.

### 104. Page 238

**5.** 4 pk.
**6.** 32 pk.
**7.** 80 pk.
**8.** 100 pk.
**9.** 2 pk.
**10.** 4 pk.
**11.** 5 pk.
**12.** 10 pk.
**13.** 2 bu.
**14.** 8 bu.
**15.** 20 bu.
**16.** 2 bu. 1 pk.

### 105. Page 239

**4.** $38.50.
**5.** $362.50.
**6.** 9¢.
**7.** $187.50; $262.50.
**8.** $42.25; $58.50.

### 106. Page 239

**7.** 96.
**8.** 128.
**9.** 400.
**10.** 24.
**11.** 36.
**12.** $2.25; $2.40; $2.10.

### 107. Page 240

4. 180.

### 108. Page 240

4. 66. 5. 16°. 6. 144; 66; 42.

### 109. Page 241

3. 56 oz. 5. 124 oz. 7. 114 in. 9. 14 qt. 11. 39 qt.
4. 86 oz. 6. 44 in. 8. 190 in. 10. 29 qt. 12. 50 qt.

### 110. Page 241

4. 6 lb.
5. 1 lb. 2 oz.
6. 1 lb. 8 oz.
7. 2 lb.
8. 2 lb. 4 oz.
9. 1 ft. 1 in.
10. 1 ft. 3 in.
11. 2 ft.
12. 2 ft. 3 in.
13. 3 ft.
14. 1 gal.
15. $1\frac{1}{4}$ gal.
16. $2\frac{1}{2}$ gal.
17. 4 gal.
18. $8\frac{3}{4}$ gal.

### 111. Page 242

4. 14 ft. 5 in.
5. 17 ft. 1 in.
6. 11 lb. 1 oz.
7. 14 lb. 2 oz.
8. 6 pk. 4 qt.
9. 6 pk. 4 qt.
10. 7 da. 10 hr.
11. 12 da. 13 hr.

### 112. Page 242

4. 71 lb. 2 oz.
5. 82 ft. 4 in.
6. 45 wk. 4 da.
7. 84 lb. 1 oz.
8. 136 ft. 5 in.
9. 80 bu. 1 pk.

### 113. Page 243

2. 10 hr. 40 min.
3. 15 hr. 45 min.
4. 21 hr. 43 min.
5. 20 ft. 1 in.
6. 51 lb. 8 oz.
7. 101 lb. 5 oz.

### 114. Page 243

4. 12 yr. 5 mo. 5. 6 yr. 3 mo. 16 da. 6. 8 yr. 4 mo. 12 da.

### 115. Page 244

4. 6 lb. 15 oz.
5. 15 ft. 7 in.
6. 22 ft. 5 in.
7. 7 ft. 8 in.
8. 25 ft. 10 in.
9. 37 ft. 4 in.

### 116. Page 245

4. 5 yd. 1 ft.
5. 7 gal. 1 qt.
6. 6 hr. 40 min.
7. 1 yr. 7 mo.
8. 6 wk. 4 da.
9. 7 hr. 30 min.

### 117. Page 245

4. 28 ft. 7 in.
5. 2 bu. 3 pk.
6. 4 yr. 3 mo. 15 da.
7. 172 ft. 6 in.
8. 5 yd. 2 ft.
9. 1 yr. 5 mo. 21 da.

### 118. Page 246

4. 2 hr. 40 min.
5. 1 T. 1850 lb.
6. 2 yr. 9 mo. 15 da.
7. 2 yr. 3 mo. 18 da.

### 119. Page 246

4. 1 lb. 14 oz.
5. 1 hr. 45 min.
6. 1 hr. 45 min. 10 sec.
7. 1 hr. 44 min. 50 sec.
8. 4 yr. 10 da.
9. 3 yr. 8 mo. 20 da.
10. 1 yr. 9 mo. 16 da.
11. 3 yr. 5 mo. 21 da.

### 120. Page 247

4. 94 ft. 4 in.
5. 43 lb. 2 oz.
6. 95 yd.
7. 93 lb. 12 oz.
8. 42 yd. 18 in.
9. 93 min. 48 sec.
10. 212 ft.
11. 211 lb.
12. 164 hr. 9 min.

### 121. Page 248

4. 115 mi. 625 ft.
5. 562 gal. 2 qt.
6. 212 min.
7. 306 bu.
8. 577 da.
9. 37 hr.

### 122. Page 248

4. 4 ft.
5. 9 ft.
6. 116 ft. 8 in.
7. 190 ft. 6 in.
8. 183 ft. 4 in.
9. 66 ft.
10. 30 lb. 15 oz.
11. 75 yd. 2 ft. 1 in.

### 123. Page 249

**4.** 2 ft. 1 in.
**5.** 3 ft. 1 in.
**6.** 7 ft. 3 in.
**7.** 9 ft. 2 in.
**8.** 5 ft. 1 in.
**9.** 8 lb. 4 oz.
**10.** 8 lb. 3 oz.
**11.** 9 lb. 2 oz.
**12.** 7 lb. 2 oz.
**13.** 8 lb. 2 oz.
**14.** 2 ft. 1 in.

### 124. Page 249

**4.** 1 lb. 2 oz.
**5.** 3 lb. 8 oz.
**6.** 4 lb. 4 oz.
**7.** 3 bu. 1 pk.
**8.** 4 bu. 1 pk.
**9.** 5 yd. 1 ft.
**10.** 6 yd. 1 ft.
**11.** 2 ft. 2 in.
**12.** 4 ft. 9 in.
**13.** 8 ft. 4 in.

### 125. Page 250

**4.** 5 in.
**5.** 4 in.
**6.** 11 in.
**7.** 8 in.
**8.** 8 in.
**9.** 10 oz.
**10.** 10 oz.
**11.** 1 ft.
**12.** 2 pk.
**13.** 3 qt.
**14.** 5 in.
**15.** 8 in.

### 126. Page 250

**4.** 15 lb. 2 oz. **5.** 2 oz. **6.** 1 in. **7.** 2 oz. **8.** 2 in.

### 127. Page 252

**5.** 32 in.
**6.** $37\frac{1}{2}$ in.
**7.** 3 ft. 10 in.
**8.** 9 ft. 2 in.
**9.** 172 in.
**10.** $204\frac{1}{2}$ in.

### 128. Page 252

**4.** 52 ft. 6 in. **5.** 22 ft. 4 in. **6.** 26 ft. 1 in.

### 129. Page 253

**5.** 20,000. **6.** 3200. **7.** 4800. **8.** 935. **9.** $1333\frac{1}{3}$ sq. yd.

### 130. Page 254

**8.** 60.
**9.** \$4.80.
**10.** 14 in. by 19 in.; 266.
**11.** 30 in. by 45 in.; 1350.
**12.** 75¢.
**13.** \$600.

**131. Page 255**

**4.** 882 cu. in. **6.** 3536 cu. in.
**5.** 3105 cu. in. **7.** 1305 cu. ft.

**132. Page 255**

**4.** 15,120 cu. ft. **5.** 46,872 cu. in. **6.** 95,589 cu. in.

**133. Page 256**

**5.** 1152 cu. in. **7.** 2850 cu. ft. **9.** 216 cu. ft.
**6.** 2160 cu. ft. **8.** 198 cu. ft. **10.** 2310 cu. ft.
**11.** 14,250 cu. ft. **12.** 8 yd. by 5 yd. by 3 yd.; 120.

**134. Page 258**

**5.** $7.35. **6.** $13.54.

**135. Page 259**

**4.** $1.65. **5.** $4.34.

**136. Page 260**

**4.** $15.50. **5.** $24.58.

**137. Page 261**

**6.** $10.90. **7.** $6.82. **8.** $14.22.

**138. Page 262**

**6.** $5.43. **7.** $12.75. **8.** $58.31.

**139. Page 263**

**4.** $66. **6.** $32; $88. **8.** $14.25; $17.10.
**5.** $405. **7.** $18.75; $30. **9.** $1.25.

**140. Page 264**

**5.** 11. **6.** 17. **7.** 15 in. **8.** 6 ft. **9.** 12 ft. **10.** 2 ft.

### 141. Page 265

5. 107,525. 7. $76\frac{4}{5}$. 9. 1728. 11. $93\frac{1}{11}$.
6. 604,800. 8. $882. 10. 9.

### 142. Page 266

4. $441. 5. 222 lb. 6. $326.25. 7. $2.43. 8. $2.85. 9. 42¢.

### 143. Page 267

4. 7500 lb. 5. 2 qt.; $11\frac{1}{2}$ qt. 6. 144 bu. 7. 26,250.

### 144. Page 268

5. 18 sq. ft.; 90 sq. ft. 7. 6.05 P.M. 9. 2040.
6. 1¢; $7.00. 8. $\frac{1}{2}$ cd.

### 145. Page 269

5. $75. 7. $148.62\frac{1}{2}$. 9. 59,062$\frac{1}{2}$ lb.
6. $92.65. 8. $15. 10. 3 hr.

### 146. Page 270

4. $31.05. 6. $315; $517.50. 8. $27.20.
5. $216.45. 7. $143; $221.

### 147. Page 270

4. 39. 6. 66¢. 8. $648; $972; $1053.
5. $7.44. 7. $110.50.

### 148. Page 271

9. 305. 14. 351. 19. $20\frac{1}{5}$. 24. $19\frac{3}{4}$.
10. 320. 15. 322. 20. $13\frac{3}{10}$. 25. $17.99.
11. 305. 16. 336. 21. $14\frac{1}{15}$. 26. $20.87.
12. 315. 17. $22\frac{5}{8}$. 22. $21\frac{1}{8}$. 27. $21.25.
13. 329. 18. $19\frac{5}{6}$. 23. $16\frac{7}{12}$. 28. $27.59.

### 149. Page 272

**9.** \$53.20. **13.** \$52.37. **17.** $18\frac{4}{15}$. **21.** $38\frac{6}{8}$. **25.** $20\frac{9}{20}$.
**10.** \$5.21. **14.** $4\frac{3}{8}$. **18.** $27\frac{7}{10}$. **22.** $44\frac{11}{12}$. **26.** $22\frac{7}{8}$.
**11.** \$15.87. **15.** $9\frac{1}{8}$. **19.** $44\frac{17}{20}$. **23.** $17\frac{23}{24}$. **27.** $47\frac{5}{12}$.
**12.** \$19.85. **16.** $15\frac{7}{8}$. **20.** $17\frac{23}{24}$. **24.** $15\frac{1}{8}$. **28.** \$44.36.
**29.** \$30.24. **30.** \$80.40.

### 150. Page 273

**17.** 1280; 1600; 1920; 2240.
**18.** \$4.80; \$5.40; \$7.20; \$8.00.
**19.** \$43.20; \$50.40; \$48.00; \$46.80.
**20.** \$146.40; \$164.70; \$155.55; \$173.85.
**21.** \$241.20; \$265.32; \$247.23; \$259.29.
**22.** \$674.80; \$819.40; \$879.65; \$927.85.

**23.** \$33. **28.** \$2732.34. **33.** \$3124.68. **38.** \$4530.36.
**24.** \$117.76. **29.** \$57.30. **34.** \$2825.20. **39.** \$641.80.
**25.** \$257.58. **30.** \$115.83. **35.** \$99. **40.** \$6125.60.
**26.** \$522. **31.** \$628.48. **36.** \$208.80.
**27.** \$1504.30. **32.** \$1480.96. **37.** \$672.75.

### 151. Page 274

**19.** 120; 60; 40; 30; 24. **21.** 35¢; 7¢; 25¢; 5¢.
**20.** 120; 110; 60; 55; 12. **22.** \$3.20; \$1.60; 80¢; 32¢; 16¢.
**23.** \$7.80; \$3.90; \$5.20; \$1.73⅓; \$1.20.

**24.** 18. **28.** 27. **32.** $67\frac{1}{2}$. **36.** 34. **40.** 75. **44.** $16\frac{12}{25}$.
**25.** 16. **29.** 32. **33.** 66. **37.** 99. **41.** 39. **45.** $33\frac{11}{125}$.
**26.** 14. **30.** 28. **34.** 66. **38.** 40. **42.** 13. **46.** $12\frac{80}{121}$.
**27.** 62. **31.** 124. **35.** 88. **39.** 21. **43.** $13\frac{4}{75}$. **47.** $17\frac{113}{115}$.
**48.** $50\frac{1}{3}$. **49.** $12\frac{11}{333}$. **50.** $24\frac{16}{33}$.

### 152. Page 275

**5.** \$100. **8.** \$680. **11.** \$1600. **14.** \$3360.
**6.** \$100. **9.** \$2000. **12.** \$4200. **15.** \$6300.
**7.** \$900. **10.** \$700. **13.** \$1000. **16.** \$7007.

### 153. Page 275

8. 70.
9. $28\frac{5}{8}$.
10. $32\frac{1}{8}$.
11. $41\frac{1}{8}$.
12. 70.
13. 100.
14. $7\frac{7}{8}$.
15. $17\frac{4}{7}$.
16. $22\frac{3}{8}$.
17. 130; $162\frac{1}{2}$; 325.
18. $7\frac{1}{2}$; 6; 2; 10.
19. 30; 6.

### 154. Page 276

5. $\frac{1}{4}$.
6. $\frac{1}{4}$.
7. $\frac{2}{5}$.
8. $\frac{3}{5}$.
9. $\frac{3}{5}$.
10. $\frac{3}{7}$.
11. $\frac{1}{8}$.
12. $\frac{3}{8}$.
13. $\frac{1}{2}$.
14. $\frac{1}{5}$.
15. $\frac{1}{3}$.
16. $\frac{5}{8}$.
17. $\frac{2}{5}$; $\frac{1}{4}$.
18. $\frac{1}{5}$; $\frac{1}{5}$.

### 155. Page 276

5. 45.
6. 54.
7. 66.
8. $120.
9. 276 ft.
10. 50.
11. 54.
12. 116.
13. $468.
14. $474.
15. $24.
16. $59.50.
17. $115.
18. $663.
19. $616.

### 156. Page 278

1. 229; 2352; 2583; 2779; 26,128; $261.19.
2. 201; 2109; 2452; 2637; 24,866; $249.55.
3. 181; 1912; 2327; 2479; 23,004; $233.61.
4. 160; 1745; 2208; 2338; 21,507; $217.06.
5. 146; 1569; 2095; 2170; 20,186; $199.86.
6. 342; 3588; 4101; 4408; 41,035; $410.18.
7. 273; 2894; 3674; 3859; 36,091; $362.91.
8. 222; 2428; 3287; 3407; 32,086; $308.89.
9. 182; 2077; 2818; 2889; 28,226; $260.92.
10. 121; 1442; 1927; 1957; 19,528; $179.44.
11. 347; 3678; 4547; 4807; 45,052; $449.41.
12. 281; 3077; 4057; 4246; 39,894; $387.32.
13. 229; 2586; 3508; 3598; 34,826; $328.99.
14. 137; 1604; 2161; 2218; 21,739; $199.69.
15. 161; 1882; 2536; 2615; 25,627; $237.78.
16. 544; 5825; 7147; 7525; 71,096; $698.21.
17. 484; 5282; 6708; 7025; 66,791; $649.10.
18. 434; 4776; 6210; 6474; 61,718; $600.69.

19. 342; 3822; 5026; 5227; 49,733; $477.98.
20. 307; 3451; 4631; 4785; 45,813; $437.64.
21. 571; 6174; 7609; 8006; 75,861; $739.17.
22. 508; 5560; 7083; 7422; 70,679; $687.19.
23. 595; 6452; 7984; 8403; 79,749; $777.26.
24. 410; 4498; 5835; 6077; 57,830; $562.60.
25. 366; 4100; 5401; 5624; 53,621; $516.07.
26. 13; 108; 28; 33; 109; $3.57.
27. 6; 108; 64; 98; 864; $1.88.
28. 9; 27; 39; 11; 289; $6.19.
29. 5; 62; 22; 49; 709; $7.87.
30. 40; 383; 211; 272; 2470; $22.00.
31. 29; 311; 216; 277; 2474; $25.27.
32. 28; 236; 200; 192; 1998; $26.28.
33. 23; 230; 187; 260; 2007; $27.74.
34. 2; 36; 33; 38; 113; $6.84.
35. 5; 33; 48; 13; 388; $2.89.
36. 4; 21; 26; 79; 298; $7.65.
37. 2; 23; 76; 79; 727; $0.99.
38. 60; 543; 439; 500; 4305; $49.11.
39. 63; 614; 526; 584; 5182; $51.98.
40. 50; 506; 498; 551; 5073; $48.41.

### 157. Page 279

1. 415,872; 1,577,088; 1,107,072; 2,130,048; 2,996,352; 16,866,432.
2. 207,936; 788,544; 553,536; 1,065,024; 1,498,176; 8,433,216.
3. 138,624; 525,696; 369,024; 710,016; 998,784; 5,622,144.
4. 103,968; 394,272; 276,768; 532,512; 749,088; 4,216,608.
5. 69,312; 262,848; 184,512; 355,008; 499,392; 2,811,072.
6. 34,656; 131,424; 92,256; 177,504; 249,696; 1,405,536.
7. 17,328; 65,712; 46,128; 88,752; 124,848; 702,768.
8. 103,968; 394,272; 276,768; 532,512; 749,088; 4,216,608.

9. 69,312; 262,848; 184,512; 355,008; 499,392; 2,811,072.
10. 51,984; 197,136; 138,384; 266,256; 374,544; 2,108,304.
11. 34,656; 131,424; 92,256; 177,504; 249,696; 1,405,536.
12. 17,328; 65,712; 46,128; 88,752; 124,848; 702,768.
13. 8664; 32,856; 23,064; 44,376; 62,424; 351,384.
14. 34,656; 131,424; 92,256; 177,504; 249,696; 1,405,536.
15. 25,992; 98,568; 69,192; 133,128; 187,272; 1,054,152.
16. 17,328; 65,712; 46,128; 88,752; 124,848; 702,768.
17. 8664; 32,856; 23,064; 44,376; 62,424; 351,384.
18. 4332; 16,428; 11,532; 22,188; 31,212; 175,692.
19. 17,328; 65,712; 46,128; 88,752; 124,848; 702,768.
20. 11,552; 43,808; 30,752; 59,168; 83,232; 468,512.
21. 5776; 21,904; 15,376; 29,584; 41,616; 234,256.
22. 2888; 10,952; 7688; 14,792; 20,808; 117,128.
23. 8664; 32,856; 23,064; 44,376; 62,424; 351,384.
24. 4332; 16,428; 11,532; 22,188; 31,212; 175,692.
25. 2166; 8214; 5766; 11,094; 15,606; 87,846.
26. 2888; 10,952; 7688; 14,792; 20,808; 117,128.
27. 1444; 5476; 3844; 7396; 10,404; 58,564.
28. 7,901,568; 58,352,256; 34,319,232; 91,592,064; 152,813,952; 2,040,838,272.
29. 1,975,392; 14,588,064; 8,579,808; 22,898,016; 38,203,488; 510,209,568.
30. 1,316,928; 9,725,376; 5,719,872; 15,265,344; 25,468,992; 340,139,712.
31. 2,633,856; 19,450,752; 11,439,744; 30,530,688; 50,937,984; 680,279,424.
32. 1,316,928; 9,725,376; 5,719,872; 15,265,344; 25,468,992; 340,139,712.
33. 48; 48; 48; 48; 48; 48.
34. 24; 24; 24; 24; 24; 24.
35. 12; 12; 12; 12; 12; 12.
36. 8; 8; 8; 8; 8; 8.
37. 6; 6; 6; 6; 6; 6.
38. 4; 4; 4; 4; 4; 4.
39. 4; 4; 4; 4; 4; 4.
40. 24; 24; 24; 24; 24; 24.

**41.** 6; 6; 6; 6; 6; 6.
**42.** 2; 2; 2; 2; 2; 2.
**43.** 3; 3; 3; 3; 3; 3.
**44.** 2; 2; 2; 2; 2; 2.
**45.** 12; 12; 12; 12; 12; 12.
**46.** 6; 6; 6; 6; 6; 6.
**47.** 4; 4; 4; 4; 4; 4.
**48.** 3; 3; 3; 3; 3; 3.
**49.** 4; 4; 4; 4; 4; 4.
**50.** 2; 2; 2; 2; 2; 2.
**51.** 8; 8; 8; 8; 8; 8.
**52.** 12; 12; 12; 12; 12; 12.
**53.** 6; 6; 6; 6; 6; 6.
**54.** 3; 3; 3; 3; 3; 3.
**55.** 2; 2; 2; 2; 2; 2.
**56.** 2; 2; 2; 2; 2; 2.

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**9.** 6. **12.** 30. **15.** 12. **18.** 120. **21.** 54. **24.** 126.
**10.** 9. **13.** 8. **16.** 16. **19.** 108. **22.** 224. **25.** 143.
**11.** 8. **14.** 9. **17.** 16. **20.** 72. **23.** 105. **26.** 187.

**27.** 2, 3, 5, 6, 10, 15.
**28.** 2, 3, 4, 6, 8, 12, 16, 24.
**29.** 2, 4, 7, 8, 14, 28.
**30.** 5, 13.
**31.** 2, 3, 4, 6, 8, 12, 18, 24, 36.
**32.** 3, 9, 27.
**33.** 2, 3, 4, 6, 8, 12, 16, 24, 32, 48.
**34.** 2, 4, 8, 13, 26, 52.
**35.** 5, 25.
**36.** 2, 3, 4, 6, 8, 9, 12, 16, 18, 24, 36, 48, 72.
**37.** 2, 3, 4, 6, 12, 13, 26, 39, 52, 78.
**38.** 2, 5, 10, 25, 50, 125.

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**4.** $\frac{3}{10}$. **6.** $\frac{9}{10}$. **8.** $\frac{7}{100}$. **10.** $\frac{11}{100}$. **12.** $\frac{47}{100}$.
**5.** $\frac{7}{10}$. **7.** $\frac{3}{100}$. **9.** $\frac{8}{100}$. **11.** $\frac{21}{100}$. **13.** $\frac{91}{100}$.

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**7.** $\frac{3}{4}$. **8.** $\frac{1}{10}$. **9.** $\frac{1}{5}$. **10.** $\frac{2}{5}$. **11.** $\frac{1}{20}$.

### 161. Page 285

**4.** .3 **7.** .6. **10.** .47. **13.** 1.3. **16.** .125.
**5.** .4. **8.** .7. **11.** .51. **14.** 3.4. **17.** .075.
**6.** .5. **9.** .9. **12.** .75. **15.** 7.9. **18.** .007.

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| | | | | |
|---|---|---|---|---|
| **17.** .2. | **21.** 7.3. | **25.** 6.03. | **29.** 8.49. | **33.** 2.005. |
| **18.** .8. | **22.** 9.8. | **26.** 7.09. | **30.** 7.53. | **34.** 3.011. |
| **19.** 6.4. | **23.** 5.2. | **27.** 9.15. | **31.** 11.11. | **35.** 7.777. |
| **20.** 4.7. | **24.** 8.5. | **28.** 8.36. | **32.** 10.01. | **36.** 9.009. |

### 163. Page 286

**8.** .77. **9.** .005; .009. **10.** .084; .001. **11.** 103.103.

### 164. Page 287

**5.** 8.071. **6.** 12.91. **7.** 29.32. **8.** 12.254. **9.** 20.

### 165. Page 287

**4.** 327.77. **5.** 30. **6.** 18.153. **7.** 10.949. **8.** 99.999.

### 166. Page 288

**4.** 47.88. **5.** 49.59. **6.** 50. **7.** 59.999. **8.** 50.303.

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| | | | |
|---|---|---|---|
| **4.** $1.53. | **13.** 1.65. | **22.** 5.01. | **31.** 25.59. |
| **5.** 1.53 ft. | **14.** 1.61. | **23.** 1.84. | **32.** 23.582. |
| **6.** 2.26. | **15.** 2.85. | **24.** 2.34. | **33.** 27.208. |
| **7.** 1.68. | **16.** 2.94. | **25.** 1.02. | **34.** 44.191. |
| **8.** 2.94. | **17.** 5.03. | **26.** 0.74. | **35.** 70.72. |
| **9.** 1.41; 1.41; 1.01. | **18.** 5.01. | **27.** 43.9. | **36.** 7.072. |
| **10.** 7.7 mi. | **19.** 1.05. | **28.** 44.88. | **37.** 707.2. |
| **11.** 1.2. | **20.** 2.38. | **29.** 45.875. | **38.** 353.5. |
| **12.** .8. | **21.** 3.06. | **30.** 23.6. | **39.** 35.35. |
| | | | **40.** 3.535. |

### 168. Page 290

| | | | |
|---|---|---|---|
| **4.** $5.00. | **9.** $6.40. | **14.** 19.74. | **19.** 56.63. |
| **5.** $3.60. | **10.** $7.50. | **15.** 77.58. | **20.** 149.8. |
| **6.** $4.88. | **11.** $9.00. | **16.** 32.72. | **21.** 247.2. |
| **7.** $18.00. | **12.** $28.80. | **17.** 7.47. | **22.** 899.1. |
| **8.** $40.25. | **13.** $10.00. | **18.** 31.44. | |

### 169. Page 291

**4.** 1.47.
**5.** 1.08.
**6.** 1.57.
**7.** 3.12.
**8.** .232.
**9.** 23.1.
**10.** 2.5; .25.
**11.** 2.37 ft.
**12.** 12.37 in.
**13.** 8.97 mi.
**14.** 1.12.
**15.** 2.24.
**16.** 2.24.
**17.** 2.24.
**18.** 2.24.
**19.** 1.11.
**20.** 1.21.
**21.** .473.
**22.** .234.
**23.** .202.
**24.** .411.
**25.** .127.
**26.** 20.2.
**27.** 3.3.
**28.** .372.
**29.** .338.
**30.** .222.
**31.** .212.
**32.** .212.
**33.** .111.
**34.** .220.

8 1 6
3 5 7
4 9 2