LESSON 1-1  Practice

Estimating with Whole Numbers

Round each number to the greatest place value. The first one is done for you.

1. 67 70  
2. 575  
3. 1,852  

Estimate each sum or difference. The first one is done for you.

4. 42 + 19  
5. 63 – 28  
6. 104 + 178  

   60

Estimate each product. The first one is done for you.

7. 2 × 19  
8. 87 × 2  
9. 26 × 3  

   40

Rewrite each problem using compatible numbers. Then divide. The first one is done for you.

10. 62 ÷ 3  
11. 40 ÷ 7  
12. 29 ÷ 4  

   63 ÷ 3, 21

13. A fin whale weighs 44 tons. A gray whale weighs 32 tons. About how much more does a fin whale weigh than a gray whale?

14. The Suez Canal in Egypt is 108 miles long. The Erie Canal in New York is 363 miles long. About how long are the two canals together?
Practice

Exponents

Name the base and the exponent for each of the following. The first one is done for you.

1. $7^2$  
   base $7$  
   exponent $2$
2. $5^4$  
   base $5$  
   exponent $4$
3. $6^8$  
   base $6$  
   exponent $8$

Write using exponents. The first one is done for you.

4. $4 \times 4$  
   $4^2$
5. $2 \times 2 \times 2$  
   $2^3$
6. $10 \times 10$  
   $10^2$
7. $5 \times 5 \times 5 \times 5$  
   $5^4$
8. $3 \times 3 \times 3 \times 3$  
   $3^4$
9. $8 \times 8 \times 8 \times 8 \times 8$  
   $8^5$

Write as repeated multiplication. The first one is done for you.

10. $6^2$  
    $6 \times 6$
11. $5^3$
12. $2^5$

13. How many different ways can you use the digits 3 and 5 to write expressions in exponential form? What are the expressions?
Lesson 1-3

Practice

Order of Operations

Name the operation you should perform first. The first one is done for you.

1. $5 + 6 \times 2$
2. $18 + 3 - 1$

Multiplication

3. $3^2 + 6$
4. $(15 + 38) \times 6$

Order of Operations
1. Parentheses
2. Exponents
3. Multiplication
4. Division
5. Addition
6. Subtraction

Match each expression to its value. The first one is done for you.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5 + 8 - 2$</td>
<td>A. 9</td>
</tr>
<tr>
<td>$9 + (12 - 10)$</td>
<td>B. 12</td>
</tr>
<tr>
<td>$(20 - 15) \times 2$</td>
<td>C. 16</td>
</tr>
<tr>
<td>$10 + 5 + 7$</td>
<td>D. 11</td>
</tr>
<tr>
<td>$6 + 2 \times 3$</td>
<td>E. 13</td>
</tr>
<tr>
<td>$(2 \times 4) + 8$</td>
<td>F. 10</td>
</tr>
</tbody>
</table>

11. Sam bought two CDs for $13 each. Sales tax for both CDs was $3. Write an expression to show how much Sam paid in all.
LESSON 1-4
Properties and Mental Math

Choose the letter of the equation that shows the given property.
1. Associative Property
   A 2 + 3 = 3 + 2
   B 7 × 8 = 7 × (4 + 4)
   C 8 × (6 × 5) = (8 × 6) × 5

2. Distributive Property
   A 75 + 15 = 15 + 75
   B 9 × 8 = 8 × 9
   C 12 × (4 + 7) = (12 × 4) + (12 × 7)

3. Commutative Property
   A 3 × (7 + 8) = 3 × 15
   B (10 + 4) + 3 = 10 + (4 + 3)
   C 6 × 5 = 5 × 6

4. Associative Property
   A 4 + (3 + 9) = (4 + 3) + 9
   B (10 + 4) + 3 = 10 + (4 + 3)
   C 16 × 8 = 8 × 16

Rewrite each expression using the named property.
5. 8 + 12; Commutative Property
6. 2 × (4 + 5); Distributive Property

Find each sum or product.
7. 7 + 15 + 3 + 5
8. 7 × 2 × 5

Multiply using the Distributive Property.
9. 4 × 38
10. 6 × 53

11. Sue has $4, Tom has $11, Brian has $6, and Anita has $9. Use mental math to find how much money they have altogether.
LEsson 2-1 Practice
Variables and Expressions

Circle the letter of the correct answer.

1. Which of the following is an algebraic expression?
   A  10 • (3 − 2)
   B  15 ÷ 5
   C  9 − n

2. What is the variable in the expression (16 + a) • 5 − 4?
   A  16
   B  a
   C  n

3. Which of these expressions is a way to rewrite the algebraic expression n + 3?
   A  n
   B  n • 3
   C  \( \frac{3}{n} \)

Evaluate each expression to find the missing values in the tables.

4. | n  | n + 3 |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

6. If \( x = 3 \), what is the value of the expression \( 6 + x \)?

5. | n  | n • 2^2 |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

7. If \( x = 2 \), what is the value of the expression \( 9 − x \)?
Practice

Translating Between Words and Math

Circle the letter of the correct answer.

1. Which of the following is the solution to an addition problem?
   A sum
   B plus
   C add

2. Which of the following is the solution to a subtraction problem?
   A minus
   B difference
   C less

3. Which word phrase represents the following expression: $5 \cdot 3$?
   A the product of 5 and 3
   B 5 less than 3
   C the quotient of 5 and 3

4. Which word phrase represents the following expression: $14 + n$?
   A the difference of 14 and $n$
   B take away $n$ from 14
   C the quotient of 14 and $n$

Match algebraic expressions A–E to Exercises 5–9 below.

A. $8x$  B. $8 - x$  C. $x + 8$  D. $x - 8$  E. $x \div 8$

5. 8 take away $x$ ________

6. $x$ divided by 8 ________

7. the product of 8 and $x$ ________

8. $x$ decreased by 8 ________

9. 8 more than $x$ ________

10. Lily bought 14 beads and lost some of them. This is modeled by the expression $14 - x$. What does $x$ represent?

11. The pet store put the same number of hamsters in 6 cages. This is modeled by the expression $6n$. What does $n$ represent?
Is the given value of the variable a solution?

1. \( x + 1 = 5 \) for \( x = 4 \) Yes
2. \( 13 - w = 10 \) for \( w = 2 \)
3. \( 2 \cdot v = 12 \) for \( v = 10 \)
4. \( 14 + p = 2 \) for \( p = 7 \)
5. \( 8 + w = 11 \) for \( w = 3 \)
6. \( 4t = 20 \) for \( t = 5 \)

Circle the letter of the equation that each given solution makes true.

7. \( x = 5 \)
   - A. \( 2 + x = 7 \)
   - B. \( 9 - x = 3 \)
   - C. \( 3 \cdot x = 18 \)

8. \( g = 7 \)
   - A. \( 9g = 6 \)
   - B. \( 8 - g = 1 \)
   - C. \( 11 + g = 17 \)

9. \( y = 2 \)
   - A. \( 7 - y = 1 \)
   - B. \( 3 \cdot y = 6 \)
   - C. \( 10 + y = 20 \)

10. \( m = 9 \)
    - A. \( m - 4 = 13 \)
    - B. \( 7 \cdot m = 36 \)
    - C. \( 18 + m = 2 \)

11. \( z = 4 \)
    - A. \( 5z = 20 \)
    - B. \( 12 + z = 4 \)
    - C. \( z - 3 = 7 \)

12. \( a = 8 \)
    - A. \( 2a = 10 \)
    - B. \( a + 12 = 20 \)
    - C. \( a + 4 = 4 \)

13. Rhonda has $13. She has one $5 bill, three $1 bills, and one other bill. Is the other bill a $1 bill or a $5 bill? Explain.
**Practice**

**Addition Equations**

Match each equation in Column 1 to its solution in Column 2. Write the letter for the solution. The first one is done for you.

**Column 1**

1. $5 + x = 8$  
   B   
2. $12 + x = 12$  
   ______  
3. $x + 11 = 15$  
   ______  
4. $x + 9 = 20$  
   ______  
5. $8 + x = 13$  
   ______  
6. $6 + x = 14$  
   ______  
7. $2 + x = 11$  
   ______  
8. $3 + x = 10$  
   ______  

**Column 2**

A. $x = 5$  
B. $x = 3$  
C. $x = 11$  
D. $x = 9$  
E. $x = 7$  
F. $x = 4$  
G. $x = 8$  
H. $x = 0$

**Solve each equation. Check your answers.**

9. $p + 8 = 14$  
10. $q + 10 = 13$  

11. $7 + s = 15$  
12. $4 + w = 11$  

13. Phyllis has 6 yards of silk. She needs 8 yards to make curtains. This is modeled by $6 + x = 8$, where $x$ is the amount of silk she needs. How much more silk does she need to make the curtains?

14. Emma paid $26 in all for a hammer and a screwdriver. The hammer cost $10. Write an addition equation using the variable $n$ to show how much the screwdriver cost.
Practice
Adding and Subtracting with Unlike Denominators

Write the least common denominator for each pair of fractions.
The first one is done for you.

1. \( \frac{1}{2}, \frac{2}{4} \)
2. \( \frac{1}{8}, \frac{2}{3} \)
3. \( \frac{1}{6}, \frac{1}{4} \)

Add or subtract. Write each answer in simplest form.
The first one is done for you.

4. \( \frac{1}{3}, \frac{1}{5} \)
5. \( \frac{1}{5}, \frac{3}{4} \)
6. \( \frac{1}{5}, \frac{7}{10} \)

7. \( \frac{1}{2} + \frac{2}{3} \)
8. \( \frac{1}{2} - \frac{1}{4} \)
9. \( \frac{3}{4} - \frac{2}{3} \)

10. \( \frac{2}{5} - \frac{1}{10} \)
11. \( \frac{1}{6} + \frac{1}{3} \)
12. \( \frac{1}{5} + \frac{7}{10} \)

13. \( \frac{5}{8} - \frac{1}{4} \)
14. \( \frac{1}{5} + \frac{1}{4} \)
15. \( \frac{1}{2} - \frac{3}{8} \)

16. Alice practices the piano \( \frac{3}{4} \) hour every day. Today, she practiced
for \( \frac{1}{2} \) hour longer than usual. How long did Alice practice the piano today?

17. One lap around the school’s track is \( \frac{1}{4} \) mile. Tyler ran two times
around the track. Then he ran \( \frac{5}{6} \) mile home. How far did Tyler run in all?
Practice

Adding and Subtracting Mixed Numbers

Estimate each sum or difference to the nearest whole number. The first one is done for you.

1. \( \frac{2}{5} + \frac{1}{4} = \frac{2 + 1}{3} \)
2. \( \frac{3}{6} + \frac{4}{5} \)
3. \( \frac{4}{2} - \frac{1}{8} \)

Find each sum or difference. Write the answer in simplest form. The first one is done for you.

4. \( \frac{1}{2} + \frac{3}{4} \)
5. \( \frac{2}{3} - \frac{5}{6} \)
6. \( \frac{1}{7} - \frac{1}{8} \)

7. \( \frac{1}{2} + \frac{3}{4} = \frac{2}{4} + \frac{3}{4} \)
8. \( \frac{10}{3} - \frac{8}{10} \)
9. \( \frac{3}{4} + \frac{2}{6} \)

10. \( \frac{3}{2} - \frac{1}{3} \)
11. \( \frac{10}{2} - \frac{9}{4} \)
12. \( \frac{4}{2} + \frac{1}{5} \)

13. \( \frac{1}{2} + \frac{2}{3} \)
14. \( \frac{12}{1} - \frac{10}{8} \)
15. \( \frac{7}{1} + \frac{1}{6} \)

16. \( \frac{2}{12} + \frac{1}{8} \)
17. \( \frac{4}{6} - \frac{1}{9} \)
18. \( \frac{3}{7} + \frac{3}{3} \)

19. Jack babysat for \( \frac{4}{4} \) hours on Friday night. He babysat for \( \frac{2}{3} \) hours on Saturday night. How many hours did he babysit in all?

20. An oak tree is \( \frac{5}{6} \) feet tall, and an elm tree \( \frac{7}{2} \) feet tall. How much taller is the elm tree?
**Practice**

**Multiplying Fractions**

Multiply. Write each answer in simplest form. The first one is done for you.

1. \( \frac{1}{2} \cdot \frac{1}{7} \)
   \[
   \frac{1 \cdot 1}{2 \cdot 7} = \frac{1}{14}
   \]

2. \( \frac{1}{4} \cdot \frac{1}{4} \)

3. \( \frac{1}{5} \cdot \frac{1}{3} \)

4. \( \frac{2}{3} \cdot \frac{1}{3} \)

5. \( \frac{2}{3} \cdot \frac{2}{7} \)

6. \( \frac{1}{4} \cdot \frac{1}{5} \)

7. \( \frac{1}{3} \cdot \frac{2}{5} \)

8. \( \frac{1}{4} \cdot \frac{2}{3} \)

9. \( \frac{1}{3} \cdot \frac{1}{3} \)

Evaluate the expression \( x \cdot \frac{1}{2} \) for each value of \( x \). Write the answer in simplest form. The first one is done for you.

10. \( x = \frac{1}{2} \)

11. \( x = \frac{1}{3} \)

12. \( x = \frac{1}{4} \)

13. \( x = \frac{1}{5} \)

14. \( x = \frac{2}{3} \)

15. \( x = \frac{3}{4} \)

16. In Mr. Brown’s class, \( \frac{1}{3} \) of the students are girls. About \( \frac{1}{4} \) of the girls want to join the chorus. What fraction of all the students in Mr. Brown’s class want to join the chorus?

17. A recipe for trail mix calls for \( \frac{3}{4} \) pound of peanuts. Luiza wants to make just half of the recipe. How many pounds of peanuts should she use?

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**LESSON 5-8**

**Practice**

**Multiplying Mixed Numbers**

Multiply. Write each answer in simplest form. The first one is done for you.

1. \( \frac{1}{2} \times \frac{1}{3} \)
2. \( 1 \frac{1}{5} \times \frac{4}{5} \)
3. \( 1 \frac{1}{4} \times \frac{2}{3} \)

\[ \frac{1}{2} \times \frac{1}{3} = \frac{1}{6} \]
\[ 1 \frac{1}{5} \times \frac{4}{5} = \frac{24}{25} \]
\[ 1 \frac{1}{4} \times \frac{2}{3} = \frac{1}{2} \]

4. \( \frac{1}{8} \times \frac{2}{5} \)
5. \( \frac{2}{5} \times 1 \frac{1}{2} \)
6. \( 1 \frac{3}{5} \times \frac{1}{3} \)

\[ \frac{1}{8} \times \frac{2}{5} = \frac{1}{20} \]
\[ \frac{2}{5} \times 1 \frac{1}{2} = \frac{8}{5} \]
\[ 1 \frac{3}{5} \times \frac{1}{3} = \frac{2}{5} \]

Find each product. Write the answer in simplest form. The first one is done for you.

7. \( \frac{4}{5} \times \frac{1}{6} \)
8. \( \frac{3}{5} \times 1 \frac{1}{4} \)
9. \( \frac{1}{3} \times \frac{1}{3} \)

\[ \frac{4}{5} \times \frac{1}{6} = \frac{28}{30} = \frac{14}{15} \]
\[ \frac{3}{5} \times 1 \frac{1}{4} = \frac{9}{5} \]
\[ \frac{1}{3} \times \frac{1}{3} = \frac{1}{9} \]

10. \( 2 \times 1 \frac{1}{2} \)
11. \( 4 \times 2 \frac{1}{4} \)
12. \( 5 \times 1 \frac{1}{5} \)

13. Lin Li makes \( 2 \frac{1}{2} \) dollars per hour baby-sitting her little brother. How much money will she make if she baby-sits for 5 hours?

14. Andrea is baking 2 batches of cookies. The recipe calls for \( 4 \frac{1}{2} \) cups of flour for each batch. How many cups of flour will she use?


LESSON 5-9

Practice

Dividing Fractions and Mixed Numbers

Find the reciprocal. The first one is done for you.

1. \( \frac{1}{2} \)
   \[ \frac{2}{1} = 2 \]

2. \( \frac{2}{3} \)
   [Switch the numerator and denominator.]

3. \( \frac{1}{5} \)

4. \( \frac{1}{3} \)

5. \( \frac{3}{5} \)

6. \( \frac{1}{4} \)
   [Change \( \frac{1}{4} \) to an improper fraction.]

7. \( \frac{2}{5} \)

8. \( \frac{3}{7} \)

9. \( \frac{1}{2} \)

Divide. Write each answer in simplest form. The first one is done for you.

10. \( \frac{2}{3} \div 2 \)
    \[ \frac{2 \cdot 1}{3 \cdot 2} = \frac{2}{6} = \frac{1}{3} \]

11. \( \frac{1}{2} \div \frac{3}{4} \)
    \[ \frac{1}{2} \cdot \frac{4}{3} = \frac{1}{2} \cdot \frac{4}{3} \]

12. \( \frac{5}{6} \div \frac{1}{4} \)
    \[ \frac{5}{6} \cdot \frac{4}{1} = \frac{20}{6} = \frac{10}{3} \]

13. \( \frac{3}{5} \div \frac{1}{5} \)
    \[ \frac{3}{5} \cdot \frac{5}{1} = \frac{3}{1} = 3 \]

14. \( \frac{7}{9} \div 3 \)
    \[ \frac{7}{9} \cdot \frac{1}{3} = \frac{7}{27} \]

15. \( 1\frac{1}{2} \div \frac{1}{2} \)
    \[ \frac{3}{2} \cdot \frac{2}{1} = \frac{3}{1} = 3 \]

16. Stella has 6 pounds of chocolate. She needs \( \frac{2}{3} \) pound of the chocolate to make one cake. How many cakes can she make?

17. Todd has \( \frac{8}{9} \) pound of clay. He needs \( \frac{1}{3} \) pound to make each action figure. How many action figures can he make?
LESSON 5-10  Practice
Solving Fraction Equations: Multiplication and Division

Solve each equation. Write the answer in simplest form. The first one is done for you.

1. \( \frac{1}{2} x = 2 \)  
   \( \frac{1}{2} \times 2 = 2 \cdot 2 \)  
   \( x = 4 \)

2. \( 2t = \frac{2}{3} \)  
   Multiply both sides by \( \frac{1}{2} \)
   \( \frac{2}{3} \times \frac{1}{2} = \frac{1}{3} \)

3. \( \frac{1}{3} a = 3 \)

4. \( \frac{r}{2} = 4 \)

5. \( \frac{b}{3} = 6 \)

6. \( 2y = \frac{1}{5} \)

7. \( \frac{1}{4} d = 2 \)

8. \( \frac{b}{5} = 6 \)

9. \( \frac{q}{10} = \frac{1}{5} \)

Circle the correct answer.

10. Tate earned $9 for working \( \frac{3}{4} \) of an hour. Which equation can be used to find Tate's hourly rate?
   - A \( 9h = \frac{3}{4} \)
   - B \( 9 + \frac{3}{4} = h \)
   - C \( \frac{3}{4} h = 9 \)

11. Which step should you use to solve the equation \( 5x = 2 \)?
   - A add 5 to both sides
   - B multiply both sides by \( \frac{1}{5} \)
   - C divide both sides by 2

12. A number \( n \) is divided by 2, and the quotient is \( \frac{1}{3} \). Write an equation to model this problem. \( \text{Hint: Follow the wording} \) \( "n \text{ divided by 2 is } \frac{1}{3}." \)

13. A number \( n \) is multiplied by \( \frac{1}{4} \), and the product is 5. Write and solve an equation to model this problem.
LESSON 6-2 Practice

Mean, Median, Mode, and Range

Find the mean of each data set. The first one is done for you.

1.

<table>
<thead>
<tr>
<th>Length of Worms (in.)</th>
<th>3</th>
<th>5</th>
<th>4</th>
<th>2</th>
<th>6</th>
</tr>
</thead>
</table>

\[ \text{mean} = \frac{3 + 5 + 4 + 2 + 6}{5} = \frac{\text{lengths}}{\text{number}} \text{ of worms} = 4 \text{ in.} \]

2.

| Ages of Brothers (yr) | 12 | 16 | 15 | 14 | 8 |

Find the mean, median, mode, and range of each data set. The first one is done for you.

3.

| Heights of Trees (m) | 7 | 11 | 9 | 7 | 6 |

\[ \text{mean} = \frac{40}{5} = 8 \text{ m} \]

The ordered set is 6, 7, 7, 9, 11
The median is the middle value 7 m.
The lowest value is 6.
The highest value is 11.
Range = 11 - 6 = 5 m
The value 7 appears the most frequently. The mode is 7 m.

4.

| Sizes of Bottled Juice (L) | 6 | 12 | 12 | 16 | 24 |

5.

| Football Team Wins (games per season) | 10 | 8 | 10 | 8 | 14 |

6. Tammy is 14 years old. She has a younger sister and an older brother. Her sister is 12 years old. The mean of all their ages is 14. How old is Tammy's brother?
LESSON 7-1

Practice

Ratios and Rates

Use the table to write each ratio. The first one is done for you.

1. angel fish to tiger barbs _____ 4:5 _____

2. red-tail sharks to clown loaches

3. catfish to angel fish

4. clown loaches to tiger barbs

5. catfish to red-tail sharks

6. Write three equivalent ratios to compare the number of gray triangles in the picture with the total number of triangles.

   Use the table to write each ratio. The first one is done for you.

   7. gray male kittens to gray female kittens

   2:5

   8. white female kittens to white male kittens.

<table>
<thead>
<tr>
<th>Caroline’s Pet Fish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiger Barbs</td>
</tr>
<tr>
<td>Catfish</td>
</tr>
<tr>
<td>Angel fish</td>
</tr>
<tr>
<td>Red-tail sharks</td>
</tr>
<tr>
<td>Clown loaches</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Caroline’s Kittens</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>
Find the missing value in each proportion.

1. \( \frac{1}{2} = \frac{n}{6} \)

Solution:
Find cross products:
\( 6 \cdot 1 = 2 \cdot n \)
\( 6 = 2n \)
\( 3 = n \)

4. \( \frac{2}{3} = \frac{6}{n} \)

5. \( \frac{n}{5} = \frac{12}{15} \)

6. \( \frac{2}{n} = \frac{1}{6} \)

7. \( \frac{10}{2} = \frac{n}{4} \)

8. \( \frac{1}{4} = \frac{2}{n} \)

9. \( \frac{16}{8} = \frac{n}{4} \)

Write a proportion for each model. The first one is done for you with a possible answer.

10. \[
\begin{array}{c}
\text{\( \frac{4}{6} = \frac{2}{3} \)}
\end{array}
\]

11.