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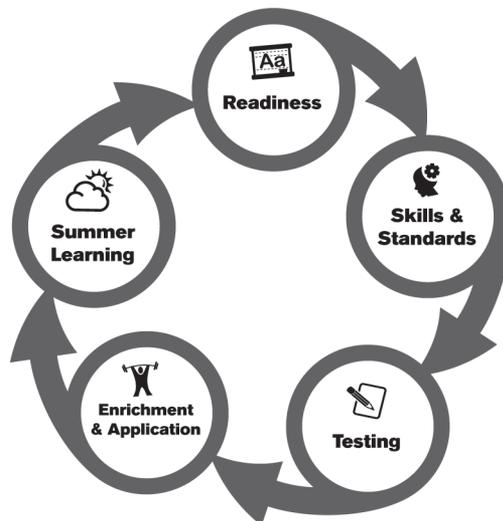


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**Check What You Know****Understanding the Number System and Operations**

Rewrite each expression using the Distributive Property.

a

1. $4 \times (6 + 2) =$ _____

2. $4 \times (2 + 6) =$ _____

3. $(3 \times 6) - (3 \times 3) =$ _____

b

$(2 \times 5) + (2 \times 4) =$ _____

$6 \times (5 - 1) =$ _____

$8 \times (3 - 1) =$ _____

Find the Greatest Common Factor of each set of numbers.

a

4. 15, 20 _____

5. 65, 39 _____

b

12, 36 _____

95, 76 _____

c

72, 60 _____

96, 112 _____

Find the Least Common Multiple of each set of numbers.

6. 12, 3 _____

7. 7, 10, 3 _____

15, 3, 2 _____

12, 6 _____

4, 7 _____

7, 3, 5 _____



Check What You Know

Understanding the Number System and Operations

Multiply or divide.

8. **a**

$$\begin{array}{r} 312 \\ \times 263 \\ \hline \end{array}$$

b

$$\begin{array}{r} 428 \\ \times 321 \\ \hline \end{array}$$

c

$$\begin{array}{r} 2185 \\ \times 216 \\ \hline \end{array}$$

d

$$\begin{array}{r} 3372 \\ \times 351 \\ \hline \end{array}$$

9. $73 \overline{)6278}$

$54 \overline{)8239}$

$27 \overline{)54702}$

$83 \overline{)96542}$

10.

$$\begin{array}{r} 2.86 \\ \times 0.3 \\ \hline \end{array}$$

$$\begin{array}{r} 0.82 \\ \times 0.43 \\ \hline \end{array}$$

$$\begin{array}{r} \$78.53 \\ \times \quad 16 \\ \hline \end{array}$$

$$\begin{array}{r} 3.21 \\ \times 8.72 \\ \hline \end{array}$$

11. $0.08 \overline{)64}$

$0.3 \overline{)726}$

$0.83 \overline{)2.1995}$

$14 \overline{)\$7.70}$

SHOW YOUR WORK

Solve each problem.

- 12.** One bag of peanuts costs \$1.52. How many bags can you buy with \$34.96?

You can buy _____ bags.

- 13.** A box containing 78.4 pounds of coffee will be divided into containers that hold 0.56 pounds each. How many containers can be filled?

_____ containers can be filled.

12.

13.

Lesson 1.1 Number Properties

There are certain rules or properties of math that are always true.

The **Commutative Properties** of addition and multiplication state that the order in which numbers are added or multiplied does not change the result.

$$a + b = b + a \quad \text{and} \quad a \times b = b \times a$$

$$2 + 3 = 5 \qquad 5 \times 2 = 10$$

$$3 + 2 = 5 \qquad 2 \times 5 = 10$$

The **Associative Properties** of addition and multiplication state that the way in which addends or factors are grouped does not change the result.

$$(a + b) + c = a + (b + c) \quad \text{and} \quad (a \times b) \times c = a \times (b \times c)$$

$$(2 + 3) + 4 = 2 + (3 + 4) \qquad (2 \times 4) \times 5 = 2 \times (4 \times 5)$$

$$5 + 4 = 2 + 7 \qquad 8 \times 5 = 2 \times 20$$

$$9 = 9 \qquad 40 = 40$$

The **Identity Property of Addition** states that the sum of an addend and 0 is the addend.
 $5 + 0 = 5$

The **Identity Property of Multiplication** states that the product of a factor and 1 is that factor.
 $4 \times 1 = 4$

The **Properties of Zero** state that the product of a factor and 0 is 0. $5 \times 0 = 0$

The properties of zero also state that the quotient of zero and any non-zero divisor is 0. $0 \div 5 = 0$

Name the property shown by each statement.

- | a | b |
|--|-----------------------------------|
| 1. $2 \times 8 = 8 \times 2$ _____ | $2 + (3 + 4) = (2 + 3) + 4$ _____ |
| 2. $35 \times 1 = 35$ _____ | $32 + 25 = 25 + 32$ _____ |
| 3. $4 \times (6 \times 2) = (4 \times 6) \times 2$ _____ | $0 \times 9 = 0$ _____ |
| 4. $45 + 0 = 45$ _____ | $18 \times 0 = 0 \times 18$ _____ |

Rewrite each expression using the property indicated.

- | | |
|--|--|
| 5. Associative; $(3 + 5) + 2 =$ _____ | Commutative; $5 \times 7 =$ _____ |
| 6. Identity; $0 + 4 =$ _____ | Associative; $3 \times (2 \times 5) =$ _____ |
| 7. Commutative; $7 + 9 =$ _____ | Associative; $(2 + 5) + 4 =$ _____ |
| 8. Identity; $7 \times 1 =$ _____ | Identity; $37 + 0 =$ _____ |
| 9. Properties of Zero; $0 \times 12 =$ _____ | Properties of Zero; $0 \div 6 =$ _____ |

Lesson 1.2 The Distributive Property

The **Distributive Property** combines the operations of addition and multiplication.

$$\begin{array}{rcl}
 a \times (b + c) & = & (a \times b) + (a \times c) \\
 3 \times (2 + 5) & = & (3 \times 2) + (3 \times 5) \\
 3 \times 7 & & 6 + 15 \\
 21 & & 21
 \end{array}$$

Indicate which operation should be done first.

- | a | b |
|--|-------------------------------------|
| 1. $(2 \times 5) + (2 \times 3)$ _____ | $7 \times (3 + 5)$ _____ |
| 2. $(6 + 9) \times 4$ _____ | $(3 \times 5) + (3 \times 7)$ _____ |

Rewrite each expression using the Distributive Property.

- | | |
|--|---------------------------------------|
| 3. $4 \times (6 + 2) =$ _____ | $(2 \times 5) + (2 \times 4) =$ _____ |
| 4. $(5 \times 1) + (5 \times 6) =$ _____ | $4 \times (2 + 6) =$ _____ |
| 5. $8 \times (4 + 3) =$ _____ | $(5 \times 0) + (5 \times 1) =$ _____ |

Write each missing number.

- | | |
|---|--|
| 6. $(5 \times 3) + (n \times 4) = 5 \times (3 + 4)$ _____ | $7 \times (n + 3) = (7 \times 2) + (7 \times 3)$ _____ |
| 7. $n \times (5 + 3) = (6 \times 5) + (6 \times 3)$ _____ | $(5 \times 7) + (n \times 4) = 5 \times (7 + 4)$ _____ |
| 8. $(4 \times 5) + (4 \times 2) = 4 \times (5 + n)$ _____ | $3 \times (n + 5) = (3 \times 4) + (3 \times 5)$ _____ |

Replace a with 2, b with 5, and c with 3. Then, find the value of each expression

- | | |
|---|---------------------------------------|
| 9. $a \times (b + c) =$ _____ | $(a \times b) + (a \times c) =$ _____ |
| 10. $(c \times a) + (c \times b) =$ _____ | $b \times (a + c) =$ _____ |

Lesson 1.2 The Distributive Property

The **Distributive Property** states: $a \times (b + c) = (a \times b) + (a \times c)$

The same property also means that: $a \times (b - c) = (a \times b) - (a \times c)$

This can help solve complex multiplication problems:

$$26 = 20 + 6 \quad 17 \times 26 = (17 \times 20) + (17 \times 6) = 340 + 102 = 442$$

$$18 = 20 - 2 \quad 47 \times 18 = (47 \times 20) - (47 \times 2) = 940 - 94 = 846$$

Using the Distributive Property, rewrite each expression in a way that will help solve it. Then, solve.

a**b**

1. $22 \times 102 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

$39 \times 25 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

2. $146 \times 33 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

$28 \times 16 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

3. $36 \times 35 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

$51 \times 106 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

4. $19 \times 256 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

$45 \times 17 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

5. $57 \times 38 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

$48 \times 45 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

6. $82 \times 80 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

$51 \times 82 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

7. $43 \times 142 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

$264 \times 67 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

8. $12 \times 39 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

$58 \times 35 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

Lesson 1.3 Multi-Digit Multiplication

Multiply 3,263 by 3.

$$\begin{array}{r} 3263 \\ \times 43 \\ \hline \end{array}$$

$$\begin{array}{r} 3263 \\ \times 3 \\ \hline 9789 \end{array}$$

Multiply 3,263 by 40.

$$\begin{array}{r} 3263 \\ \times 40 \\ \hline 130520 \end{array}$$

Add.

$$\begin{array}{r} 3263 \\ \times 43 \\ \hline 9789 \\ + 130520 \\ \hline 140,309 \end{array}$$

Multiply.

a

$$\begin{array}{r} 1. \quad 324 \\ \times 27 \\ \hline \end{array}$$

b

$$\begin{array}{r} 816 \\ \times 16 \\ \hline \end{array}$$

c

$$\begin{array}{r} 255 \\ \times 44 \\ \hline \end{array}$$

d

$$\begin{array}{r} 2165 \\ \times 23 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 5150 \\ \times 22 \\ \hline \end{array}$$

$$\begin{array}{r} 7182 \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} 6324 \\ \times 36 \\ \hline \end{array}$$

$$\begin{array}{r} 4522 \\ \times 63 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 886 \\ \times 374 \\ \hline \end{array}$$

$$\begin{array}{r} 763 \\ \times 618 \\ \hline \end{array}$$

$$\begin{array}{r} 654 \\ \times 523 \\ \hline \end{array}$$

$$\begin{array}{r} 985 \\ \times 447 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 2186 \\ \times 342 \\ \hline \end{array}$$

$$\begin{array}{r} 1898 \\ \times 475 \\ \hline \end{array}$$

$$\begin{array}{r} 3688 \\ \times 259 \\ \hline \end{array}$$

$$\begin{array}{r} 2864 \\ \times 723 \\ \hline \end{array}$$

Lesson 1.4 Multi-Digit Division

983 is between 840 (28×30) and 1120 (28×40), so the tens digit is 3.

$$\begin{array}{r} 3 \\ 28 \overline{)983} \\ - 840 \quad \text{subtract} \\ \hline 143 \end{array}$$

143 is between 140 (28×5) and 168 (28×6), so the ones digit is 5.

$$\begin{array}{r} 35 \text{ r}3 \\ 28 \overline{)983} \\ - 840 \quad \text{subtract} \\ \hline 143 \\ - 140 \quad \text{subtract} \\ \hline 3 \quad \text{remainder} \end{array}$$

Divide.

	a	b	c	d	e
1.	$18 \overline{)94}$	$27 \overline{)68}$	$22 \overline{)88}$	$19 \overline{)78}$	$25 \overline{)64}$

2.	$43 \overline{)88}$	$12 \overline{)84}$	$32 \overline{)865}$	$24 \overline{)768}$	$31 \overline{)913}$
----	---------------------	---------------------	----------------------	----------------------	----------------------

3.	$27 \overline{)815}$	$54 \overline{)725}$	$45 \overline{)880}$	$23 \overline{)615}$	$18 \overline{)324}$
----	----------------------	----------------------	----------------------	----------------------	----------------------

Lesson 1.4 Multi-Digit Division

37,262 is between
32,800 (82×400) and
41,000 (82×500), so
the hundreds digit is 4.

$$\begin{array}{r} 4 \\ 82 \overline{)37262} \\ - 32800 \quad \text{subtract} \\ \hline 4462 \end{array}$$

4,462 is between
4,100 (82×50) and
4,920 (82×60), so the
tens digit is 5.

$$\begin{array}{r} 45 \\ 82 \overline{)37262} \\ - 32800 \\ \hline 4462 \\ - 4100 \quad \text{subtract} \\ \hline 362 \end{array}$$

362 is between
328 (82×4) and
410 (82×5), so the
ones digit is 4.

$$\begin{array}{r} 454 \text{ r}34 \\ 82 \overline{)37262} \\ - 32800 \\ \hline 4462 \\ - 4100 \\ \hline 362 \\ - 328 \quad \text{subtract} \\ \hline 34 \quad \text{remainder} \end{array}$$

Divide.

a

$$1. \quad 56 \overline{)6185}$$

b

$$32 \overline{)9984}$$

c

$$27 \overline{)9984}$$

d

$$13 \overline{)2329}$$

e

$$22 \overline{)2420}$$

$$2. \quad 45 \overline{)6950}$$

$$88 \overline{)9944}$$

$$21 \overline{)5672}$$

$$78 \overline{)40794}$$

$$65 \overline{)14625}$$

$$3. \quad 36 \overline{)52813}$$

$$63 \overline{)45675}$$

$$42 \overline{)34816}$$

$$23 \overline{)20378}$$

$$18 \overline{)10242}$$

Lesson 1.5 Reciprocal Operations

Multiplication and division are reciprocal, or opposite, operations. You can use reciprocal operations to check your answers when you work math problems.

$$15 \times 4 = 60 \qquad 60 \div 15 = 4$$

$$8 \times 7 = 56 \qquad 56 \div 8 = 7$$

Multiply or divide. Use the reciprocal operation to check your answers.

a

1.

$$\begin{array}{r} 392 \\ \times 22 \\ \hline \end{array}$$

b

$$\begin{array}{r} 239 \\ \times 60 \\ \hline \end{array}$$

c

$$\begin{array}{r} 931 \\ \times 77 \\ \hline \end{array}$$

d

$$\begin{array}{r} 496 \\ \times 28 \\ \hline \end{array}$$

2.

$$\begin{array}{r} 193 \\ \times 55 \\ \hline \end{array}$$

$$\begin{array}{r} 529 \\ \times 31 \\ \hline \end{array}$$

$$\begin{array}{r} 695 \\ \times 75 \\ \hline \end{array}$$

$$\begin{array}{r} 972 \\ \times 93 \\ \hline \end{array}$$

3.

$$21 \overline{)2898}$$

$$22 \overline{)7898}$$

$$71 \overline{)5893}$$

$$32 \overline{)4832}$$

4.

$$11 \overline{)3498}$$

$$33 \overline{)5214}$$

$$42 \overline{)4914}$$

$$12 \overline{)8328}$$

Lesson 1.6 Problem Solving**SHOW YOUR WORK**

Estimate the answers to the following problems. Check your answer by using the opposite operation.

1. There are 527 sixth-grade students who will take a field trip. There are 9 buses. About how many students will be riding in each bus?

Round 527 to _____.

About _____ students will ride each bus.

2. At West Side Middle School, there are 42 classrooms with 28 desks in each. About how many desks are there?

Round 42 to _____ and round 28 to _____.

There are about _____ desks.

3. There are 563 books to be shelved in the library. Each shelf holds 7 books. About how many shelves will be used?

Round 563 to _____.

About _____ shelves will be used.

4. Mrs. Juergen's class is building a model city from craft sticks. Each house requires 267 sticks. The class will build 93 houses. About how many sticks will be needed?

Round 267 to _____ and round 93 to _____.

About _____ sticks will be needed.

5. Thirty-eight students are going on a field trip. Parents will drive. Each car can hold 4 students along with the driver. How many cars will be needed?

Round 38 to _____.

About _____ cars will be needed.

6. Jorge's family is taking a car trip to see his grandmother. The family plans to spend 3 days on the road. The distance is 687 miles. About how far must they drive each day?

Round 687 to _____.

They must drive about _____ miles each day.

1.

2.

3.

4.

5.

6.

Lesson 1.7 Greatest Common Factor

A **factor** is a divisor of a number. (For example, 3 and 4 are both factors of 12.) A **common factor** is a divisor that is shared by two or more numbers (1, 2, 4, and 8). The **greatest common factor** is the largest common factor shared by the numbers (8).

To find the greatest common factor of 32 and 40, list all of the factors of each.

$$32 \left\langle \begin{array}{l} 1 \times 32 \\ 2 \times 16 \\ 4 \times 8 \end{array} \right\rangle 1, 2, 4, 8, 16, \text{ and } 32$$

$$40 \left\langle \begin{array}{l} 1 \times 40 \\ 2 \times 20 \\ 4 \times 10 \\ 5 \times 8 \end{array} \right\rangle 1, 2, 4, 5, 8, 10, 20, \text{ and } 40$$

The greatest common factor is 8.

List the factors of each number below. Then, list the common factors and the greatest common factor.

	Factors	Common Factors	Greatest Common Factor
1.	8 _____ 12 _____	_____	_____
2.	6 _____ 18 _____	_____	_____
3.	24 _____ 15 _____	_____	_____
4.	4 _____ 6 _____	_____	_____
5.	5 _____ 12 _____	_____	_____
6.	16 _____ 12 _____	_____	_____

Lesson 1.7 Greatest Common Factor

Find the greatest common factor for each set of numbers.

- | | a | | b |
|-------------------|----------|----------------|----------|
| 1. 7 and 3 | _____ | 15 and 18 | _____ |
| 2. 14 and 42 | _____ | 27 and 18 | _____ |
| 3. 36 and 24 | _____ | 45 and 20 | _____ |
| 4. 72 and 54 | _____ | 42 and 49 | _____ |
| 5. 86 and 94 | _____ | 66 and 11 | _____ |
| 6. 52 and 26 | _____ | 12 and 40 | _____ |
| 7. 9, 12, and 21 | _____ | 16, 32, and 64 | _____ |
| 8. 15, 25, and 40 | _____ | 27, 36, and 72 | _____ |

Lesson 1.8 Least Common Multiple

Find the least common multiple by listing multiples of each number until finding the first one that is shared.

$8 - 8, 16, 24$ }
 $12 - 12, 24$ } The Least Common Multiple is 24.

Find the least common multiple for each set of numbers.

- | | a | | b |
|--------------------------|----------|----------------|----------|
| 1. 51 and 18 | _____ | 104 and 76 | _____ |
| 2. 54 and 64 | _____ | 20 and 26 | _____ |
| 3. 78 and 110 | _____ | 42 and 63 | _____ |
| 4. 23 and 92 | _____ | 75 and 15 | _____ |
| 5. 28 and 32 | _____ | 12 and 16 | _____ |
| 6. 9, 45, and 81 | _____ | 21, 45, and 6 | _____ |
| 7. 17, 24, and 53 | _____ | 86, 68, and 20 | _____ |

Lesson 1.8 Least Common Multiple

Find the least common multiple for each set of numbers.

- | | a | | b |
|-------------------------|----------|----------------|----------|
| 1. 10 and 13 | _____ | 23 and 35 | _____ |
| 2. 45 and 59 | _____ | 41 and 55 | _____ |
| 3. 68 and 71 | _____ | 63 and 76 | _____ |
| 4. 28 and 35 | _____ | 40 and 50 | _____ |
| 5. 33 and 44 | _____ | 27 and 45 | _____ |
| 6. 6, 76, and 18 | _____ | 4, 24, and 21 | _____ |
| 7. 5, 25, and 65 | _____ | 7, 99, and 49 | _____ |
| 8. 3, 27, and 45 | _____ | 8, 72, and 216 | _____ |

Lesson 1.9 Multiplying Decimals

The number of digits to the right of the decimal point in the product is the sum of the number of digits to the right of the decimal point of the factors.

$$\begin{array}{r} 0.4 \\ \times 0.2 \\ \hline 0.08 \end{array}$$

$$\begin{array}{r} 0.28 \\ \times 0.6 \\ \hline 0.168 \end{array}$$

$$\begin{array}{r} 3.2432 \\ \times 0.13 \\ \hline 97296 \\ + 32432 \\ \hline 0.421616 \end{array}$$

If needed, add zeros as place holders.

Multiply.

- | | a | b | c | d | e |
|-----------|---|---|--|--|--|
| 1. | $\begin{array}{r} 0.7 \\ \times 8 \\ \hline \end{array}$ | $\begin{array}{r} 0.08 \\ \times 0.5 \\ \hline \end{array}$ | $\begin{array}{r} 0.325 \\ \times 0.3 \\ \hline \end{array}$ | $\begin{array}{r} 1.68 \\ \times 8 \\ \hline \end{array}$ | $\begin{array}{r} 25 \\ \times 0.7 \\ \hline \end{array}$ |
| 2. | $\begin{array}{r} 0.03 \\ \times 3.06 \\ \hline \end{array}$ | $\begin{array}{r} 0.162 \\ \times 0.3 \\ \hline \end{array}$ | $\begin{array}{r} 8.03 \\ \times 3.5 \\ \hline \end{array}$ | $\begin{array}{r} 0.297 \\ \times 7.1 \\ \hline \end{array}$ | $\begin{array}{r} 76.4 \\ \times 3.6 \\ \hline \end{array}$ |
| 3. | $\begin{array}{r} 53.64 \\ \times 0.37 \\ \hline \end{array}$ | $\begin{array}{r} 328.1 \\ \times 0.63 \\ \hline \end{array}$ | $\begin{array}{r} 9.806 \\ \times 31 \\ \hline \end{array}$ | $\begin{array}{r} 600.3 \\ \times 0.034 \\ \hline \end{array}$ | $\begin{array}{r} 895 \\ \times 0.63 \\ \hline \end{array}$ |
| 4. | $\begin{array}{r} 27.1 \\ \times 3.54 \\ \hline \end{array}$ | $\begin{array}{r} 3.263 \\ \times 18 \\ \hline \end{array}$ | $\begin{array}{r} 1.253 \\ \times 12 \\ \hline \end{array}$ | $\begin{array}{r} 58.9 \\ \times 0.038 \\ \hline \end{array}$ | $\begin{array}{r} 0.82 \\ \times 0.82 \\ \hline \end{array}$ |
| 5. | $\begin{array}{r} 0.283 \\ \times 0.6 \\ \hline \end{array}$ | $\begin{array}{r} 0.178 \\ \times 53 \\ \hline \end{array}$ | $\begin{array}{r} 0.83 \\ \times 0.23 \\ \hline \end{array}$ | $\begin{array}{r} 3.6 \\ \times 0.025 \\ \hline \end{array}$ | $\begin{array}{r} 48.2 \\ \times 0.26 \\ \hline \end{array}$ |

Lesson 1.10 Dividing by Two Digits

Multiply the divisor and dividend by 10, by 100, or by 1,000 so the divisor is a whole number.

$$\begin{array}{r} 3.5 \overline{)14.0} \\ \text{Multiply} \\ \text{by 10.} \end{array} = \begin{array}{r} 35 \overline{)140} \\ \underline{-140} \\ 0 \end{array}$$

$$\begin{array}{r} 0.42 \overline{)16.80} \\ \text{Multiply} \\ \text{by 100.} \end{array} = \begin{array}{r} 42 \overline{)1680} \\ \underline{-1680} \\ 0 \end{array}$$

$$\begin{array}{r} 0.27 \overline{)8100} \\ \text{Multiply} \\ \text{by 1,000.} \end{array} = \begin{array}{r} 27 \overline{)8100} \\ \underline{-8100} \\ 0 \end{array}$$

Divide.

a

1. $2.3 \overline{)5.06}$

b

3. $3.4 \overline{)289}$

c

5. $5.2 \overline{)2.08}$

d

7. $7.2 \overline{)10.8}$

2. $0.45 \overline{)18}$

0. $2.2 \overline{)1.166}$

0. $6.3 \overline{)25.2}$

0. $9.8 \overline{)63.7}$

3. $0.032 \overline{)96}$

0. $0.15 \overline{)0.45}$

0. $0.68 \overline{)0.017}$

0. $0.12 \overline{)0.0144}$

4. $2.4 \overline{)0.96}$

0. $6.2 \overline{)24.8}$

0. $0.16 \overline{)0.08}$

0. $8.5 \overline{)5.1}$

Lesson 1.11 Problem Solving**SHOW YOUR WORK**

Solve each problem.

1. A package weighs 2.6 pounds. How much do 8 of the same-sized packages weigh?

The packages weigh _____ pounds.

2. It takes Maxine 0.3 hours to make a potholder. How many potholders can she make in 4.5 hours?

She can make _____ potholders.

3. A box of grass seed weighs 0.62 pounds. How much does a box containing 0.75 times as much grass seed weigh?

The box weighs _____ pounds.

4. A collection of nickels is worth \$18.60. How many nickels are in the collection?

There are _____ nickels in the collection.

5. Mrs. Anderson bought party favors for the 24 students in her class. Each favor costs \$2.27. How much did all the party favors cost?

The favors cost _____.

6. Each prize for a carnival booth costs \$0.32. How many prizes can you buy with \$96?

You can buy _____ prizes.

7. Brittany has a pack of 24 pencils. Each pencil weighs 0.9 grams. How much does the pack of pencils weigh?

The pack of pencils weighs _____ grams.

1.

2.

3.

4.

5.

6.

7.

Lesson 1.11 Problem Solving**SHOW YOUR WORK**

Solve each problem.

1. Workers are using a piece of iron that is 0.324 millimeters thick and a piece of copper that is 0.671 millimeters thick. How much thicker is the copper?

The copper is _____ millimeters thicker.

2. Lenora bought a book for \$12.36 and some school supplies for \$7.29 and \$5.47. How much did she spend?

She spent _____.

3. Joe's bill at the grocery store came to \$6.08. He paid with a ten-dollar bill and a dime. How much change did he get?

He received _____ in change.

4. One bottle holds 67.34 ounces and another bottle holds 48.5 ounces. Combined, how much do they hold?

The bottles hold _____ ounces combined.

5. A basic stereo system costs \$189.67. An upgraded model costs \$212.09. How much more does the upgraded model cost?

The upgraded model costs _____ more.

6. Lin ran 0.683 kilometers on Wednesday and 0.75 kilometers on Thursday. How far did he run on the two days combined?

He ran _____ kilometers over both days.

7. A certain cabinet door is actually made of three thin boards that are pressed together. The boards are 0.371 inches, 0.13 inches, and 0.204 inches thick. How thick is the cabinet door?

The door is _____ inches thick.

1.

2.

3.

4.

5.

6.

7.

**Check What You Learned****Understanding the Number System and Operations**

Rewrite each expression using the Distributive Property.

a**b**

1. $3 \times (5 - 2) =$ _____

$(5 \times 2) + (8 \times 2) =$ _____

2. $7 \times (7 - 4) =$ _____

$(7 \times 6) - (7 \times 3) =$ _____

3. $3 \times (8 + 2) =$ _____

$5 \times (9 - 4) =$ _____

Find the Greatest Common Factor of each set of numbers.

a**b****c**

4. 40, 4 _____

30, 12 _____

4, 10 _____

5. 20, 24 _____

3, 10 _____

24, 2 _____

Find the Least Common Multiple of each set of numbers.

6. 30, 15 _____

15, 5 _____

20, 4 _____

7. 5, 12, 10 _____

3, 8 _____

40, 3, 24 _____

**Check What You Learned****Understanding the Number System and Operations**

Multiply or divide.

a

8.
$$\begin{array}{r} 213 \\ \times 362 \\ \hline \end{array}$$

b

$$\begin{array}{r} 248 \\ \times 231 \\ \hline \end{array}$$

c

$$\begin{array}{r} 2851 \\ \times 261 \\ \hline \end{array}$$

d

$$\begin{array}{r} 3732 \\ \times 531 \\ \hline \end{array}$$

9. $76 \overline{)6308}$

$45 \overline{)8329}$

$26 \overline{)45702}$

$86 \overline{)99588}$

10.
$$\begin{array}{r} 365.3 \\ \times 5.2 \\ \hline \end{array}$$

$$\begin{array}{r} 0.76 \\ \times 0.53 \\ \hline \end{array}$$

$$\begin{array}{r} \$67.45 \\ \times 23 \\ \hline \end{array}$$

$$\begin{array}{r} 4.26 \\ \times 7.62 \\ \hline \end{array}$$

11. $0.6 \overline{)78}$

$0.09 \overline{)738}$

$0.07 \overline{)50.4}$

$18 \overline{)\$13.50}$

Solve each problem.

- 12.** A bag of wood chips weighs 12.4 pounds. How much does a bag containing 0.42 times as many wood chips weigh?

The bag weighs _____ pounds.

- 13.** One comic book costs \$2.23. How many comic books can you buy for \$71.36?

You can buy _____ comic books.

12.

13.



Check What You Know

Multiplying and Dividing Fractions

Multiply or divide. Write answers in simplest form.

a
1. $\frac{7}{8} \times \frac{3}{4}$

b
 $9 \times \frac{3}{8}$

c
 $\frac{5}{8} \times 5$

2. $3\frac{1}{8} \times 4$

$8 \times 2\frac{3}{5}$

$4\frac{1}{2} \times 9$

3. $5\frac{3}{4} \times 2\frac{1}{3}$

$2\frac{1}{4} \times 3\frac{1}{5}$

$3\frac{2}{3} \times 1\frac{1}{8}$

4. $8 \div \frac{2}{3}$

$\frac{4}{5} \div 3$

$10 \div \frac{3}{8}$

5. $\frac{4}{5} \div \frac{7}{8}$

$\frac{2}{3} \div \frac{5}{6}$

$\frac{3}{8} \div \frac{7}{8}$

6. $2\frac{3}{4} \div 3\frac{1}{8}$

$7 \div 3\frac{1}{4}$

$7\frac{3}{8} \div 9$



Check What You Know

SHOW YOUR WORK

Multiplying and Dividing Fractions

Solve each problem. Write answers in simplest form.

- 7.** John and George together raked $\frac{7}{8}$ of the yard. John raked $\frac{3}{4}$ of that amount. What part of the yard did John rake?

John raked _____ of the yard.

- 8.** Felipe has track practice for $\frac{5}{8}$ of an hour after school each day. How many hours does he have track practice in 5 days?

Felipe has track practice for _____ hours.

- 9.** Paul can walk $2\frac{1}{2}$ miles in 1 hour. How far can he walk in $1\frac{3}{4}$ hours?

Paul can walk _____ miles.

- 10.** Brad has a stack of 7 books on his desk. Each book is $1\frac{7}{8}$ inches thick. How tall is the stack?

The stack is _____ inches tall.

- 11.** A bag of candy weighs $3\frac{2}{3}$ ounces. How much would $4\frac{1}{2}$ bags of candy weigh?

The bags would weigh _____ ounces.

- 12.** It takes 8 hours to paint a room. How long will it take to paint $\frac{2}{3}$ of the room?

It will take _____ hours to paint $\frac{2}{3}$ of the room.

- 13.** Jim will divide $6\frac{3}{4}$ pounds of candy equally among 9 friends. How much candy will each friend get?

Each friend will get _____ of a pound.

7.

8.

9.

10.

11.

12.

13.

Lesson 2.1 Multiplying Fractions and Mixed Numbers

Multiply fractions.

$$\frac{3}{8} \times \frac{2}{3} = \frac{3 \times 2}{8 \times 3}$$

Multiply numerators together.
Multiply denominators together.

$$= \frac{6}{24} = \frac{1}{4} \text{ Simplify.}$$

Multiply mixed numbers.

$$2\frac{3}{4} \times 3\frac{1}{3} = \frac{11}{4} \times \frac{10}{3}$$

Rename each mixed number as an improper fraction.

$$\frac{11}{4} \times \frac{10}{3} = \frac{110}{12} = \frac{55}{6}$$

$$= 9\frac{1}{6}$$

Multiply.
Simplify.

Multiply. Write answers in simplest form.

a

1. $\frac{2}{5} \times \frac{2}{3} =$

b

$\frac{3}{4} \times \frac{5}{6} =$

c

$\frac{7}{8} \times \frac{5}{7} =$

d

$\frac{2}{5} \times \frac{3}{4} =$

2. $\frac{7}{12} \times \frac{3}{4} =$

$\frac{2}{3} \times \frac{8}{9} =$

$\frac{4}{5} \times \frac{3}{8} =$

$\frac{3}{7} \times \frac{3}{5} =$

3. $\frac{1}{6} \times \frac{2}{3} =$

$\frac{11}{12} \times \frac{2}{3} =$

$\frac{2}{5} \times \frac{2}{5} =$

$\frac{3}{4} \times \frac{3}{7} =$

4. $1\frac{1}{3} \times 2\frac{1}{8} =$

$2\frac{1}{2} \times 1\frac{3}{4} =$

$2\frac{5}{8} \times 2\frac{3}{5} =$

$1\frac{1}{2} \times 2\frac{2}{3} =$

5. $3\frac{1}{5} \times 5\frac{2}{3} =$

$4\frac{1}{2} \times 4\frac{1}{2} =$

$2\frac{1}{3} \times 3\frac{1}{4} =$

$2\frac{4}{5} \times 3\frac{1}{8} =$

6. $2\frac{2}{3} \times 5\frac{1}{4} =$

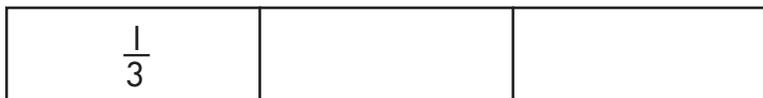
$2\frac{1}{3} \times 2\frac{1}{3} =$

$3\frac{1}{4} \times 1\frac{1}{8} =$

$2\frac{7}{8} \times 1\frac{1}{3} =$

**Lesson 2.2****Using Visual Models to Divide Fractions**

Fraction bars can be used to help divide fractions.



When dividing $\frac{1}{3}$ by $\frac{1}{6}$, you are finding out how many sixths are equal to $\frac{1}{3}$.

When you line up the fraction bars and divide them into the appropriate pieces, you can see that $\frac{2}{6}$ is equal to $\frac{1}{3}$.

Therefore,

$$\frac{1}{3} \div \frac{1}{6} = 2$$



Use the fraction bars to solve the problems. Write answers in simplest form.

1. $\frac{1}{2} \div \frac{1}{4} =$ _____

2. $\frac{2}{3} \div \frac{1}{6} =$ _____

3. $\frac{3}{5} \div \frac{1}{15} =$ _____

Lesson 2.2 Using Visual Models to Divide Fractions

Use the fraction bars to solve the problems. Write answers in simplest form.

1. $\frac{1}{8} \div \frac{1}{2} =$ _____

2. $\frac{1}{10} \div \frac{2}{5} =$ _____

3. $\frac{1}{12} \div \frac{1}{4} =$ _____

4. $\frac{2}{9} \div \frac{1}{3} =$ _____

Lesson 2.3 Dividing Fractions

To divide, multiply by the reciprocal of the divisor.

$$\frac{4}{5} \div \frac{8}{9} = \frac{4}{5} \times \frac{9}{8} = \frac{36}{40} = \frac{9}{10}$$

Divide. Write answers in simplest form.

a

1. $\frac{1}{2} \div \frac{3}{5}$

b

$\frac{3}{8} \div \frac{2}{3}$

c

$\frac{5}{8} \div \frac{3}{4}$

d

$\frac{2}{5} \div \frac{3}{8}$

2. $\frac{1}{2} \div \frac{7}{8}$

$\frac{4}{5} \div \frac{3}{4}$

$\frac{5}{6} \div \frac{3}{8}$

$\frac{2}{3} \div \frac{4}{5}$

3. $\frac{7}{8} \div \frac{1}{3}$

$\frac{7}{9} \div \frac{2}{3}$

$\frac{1}{3} \div \frac{2}{3}$

$\frac{5}{6} \div \frac{1}{3}$

4. $\frac{3}{5} \div \frac{2}{3}$

$\frac{4}{9} \div \frac{3}{7}$

$\frac{1}{2} \div \frac{5}{8}$

$\frac{2}{3} \div \frac{7}{9}$

Lesson 2.3 Dividing Fractions

Divide. Write answers in simplest form.

a
1. $\frac{3}{5} \div \frac{2}{7} =$

b
 $\frac{3}{4} \div \frac{1}{2} =$

c
 $\frac{5}{8} \div \frac{3}{5} =$

d
 $\frac{5}{6} \div \frac{1}{10} =$

2. $\frac{1}{5} \div \frac{1}{4} =$

$\frac{1}{2} \div \frac{2}{3} =$

$\frac{6}{7} \div \frac{1}{8} =$

$\frac{1}{4} \div \frac{1}{2} =$

3. $\frac{7}{10} \div \frac{1}{4} =$

$\frac{1}{2} \div \frac{6}{11} =$

$\frac{3}{5} \div \frac{1}{3} =$

$\frac{1}{4} \div \frac{3}{8} =$

4. $\frac{10}{12} \div \frac{2}{7} =$

$\frac{1}{15} \div \frac{4}{5} =$

$\frac{12}{15} \div \frac{1}{4} =$

$\frac{4}{5} \div \frac{9}{10} =$

5. $\frac{9}{10} \div \frac{2}{6} =$

$\frac{7}{15} \div \frac{8}{10} =$

$\frac{2}{12} \div \frac{3}{4} =$

$\frac{7}{15} \div \frac{7}{9} =$

Lesson 2.3 Dividing Fractions

Divide. Write answers in simplest form.

a

1. $\frac{4}{9} \div \frac{1}{3} =$

b

$12 \div \frac{1}{5} =$

c

$2 \div \frac{2}{3} =$

d

$\frac{1}{5} \div \frac{1}{3} =$

2. $\frac{1}{7} \div \frac{3}{5} =$

$\frac{2}{3} \div \frac{3}{4} =$

$5 \div \frac{2}{3} =$

$\frac{2}{3} \div \frac{1}{9} =$

3. $\frac{7}{8} \div 4 =$

$\frac{2}{15} \div \frac{15}{17} =$

$\frac{3}{8} \div \frac{2}{3} =$

$\frac{3}{11} \div \frac{17}{23} =$

4. $\frac{4}{11} \div \frac{2}{3} =$

$\frac{1}{11} \div \frac{5}{7} =$

$\frac{9}{20} \div \frac{9}{17} =$

$\frac{3}{7} \div \frac{9}{20} =$

5. $\frac{2}{3} \div \frac{10}{11} =$

$\frac{1}{13} \div \frac{3}{13} =$

$\frac{6}{11} \div \frac{5}{7} =$

$\frac{1}{4} \div \frac{6}{17} =$

Lesson 2.4 Dividing Mixed Numbers

$3\frac{2}{5} \div 4$

Rename $3\frac{2}{5}$ as $\frac{17}{5}$.

$4\frac{1}{3} \div 2\frac{3}{4}$

$\frac{17}{5} \div \frac{4}{1}$

Rename 4 as $\frac{4}{1}$.

$\frac{13}{3} \div \frac{11}{4}$

Rename.

$\frac{9}{20} \times \frac{1}{4} = \frac{17}{20}$

Multiply by the reciprocal.

$\frac{13}{3} \times \frac{4}{11} = \frac{52}{33} = 1\frac{19}{33}$

Multiply by the reciprocal.

Divide. Write answers in simplest form.

a

1. $2\frac{1}{2} \div 3\frac{1}{3}$

b

$1\frac{1}{8} \div 2\frac{1}{4}$

c

$8 \div 3\frac{1}{2}$

d

$2\frac{1}{3} \div 5$

2. $4\frac{1}{2} \div 1\frac{1}{6}$

$4\frac{5}{6} \div 2\frac{2}{5}$

$4\frac{1}{3} \div 6$

$1\frac{1}{2} \div 3\frac{1}{8}$

3. $6 \div 2\frac{1}{2}$

$1\frac{1}{2} \div 3$

$5 \div 3\frac{3}{4}$

$2\frac{1}{8} \div 3$

4. $3\frac{3}{5} \div 4$

$3\frac{1}{3} \div 2\frac{3}{8}$

$1 \div 4\frac{1}{3}$

$9 \div 1\frac{2}{3}$

Lesson 2.4 Dividing Mixed Numbers

Divide. Write answers in simplest form.

a

1. $1\frac{3}{4} \div \frac{2}{3} =$

b

$9 \div 1\frac{2}{3} =$

c

$\frac{4}{9} \div 1\frac{3}{5} =$

d

$4\frac{1}{4} \div 6 =$

2. $1\frac{5}{6} \div \frac{1}{3} =$

$2\frac{2}{3} \div \frac{1}{4} =$

$\frac{4}{7} \div 1\frac{3}{4} =$

$2\frac{5}{8} \div 1\frac{2}{5} =$

3. $3\frac{1}{4} \div 4 =$

$3\frac{1}{4} \div 4\frac{5}{8} =$

$3\frac{2}{7} \div 4\frac{1}{3} =$

$4\frac{4}{5} \div 4\frac{1}{2} =$

4. $3\frac{1}{5} \div 4\frac{3}{7} =$

$2\frac{8}{9} \div 3\frac{4}{5} =$

$2\frac{1}{6} \div 4\frac{1}{9} =$

$3\frac{1}{2} \div 3\frac{1}{4} =$

5. $5\frac{2}{5} \div 3\frac{1}{3} =$

$7 \div 2\frac{3}{8} =$

$4\frac{2}{7} \div 3\frac{1}{3} =$

$2\frac{2}{3} \div 3\frac{6}{11} =$

Lesson 2.5 Problem Solving**SHOW YOUR WORK**

Solve each problem. Write answers in simplest form.

1. Sam and José mowed $\frac{2}{3}$ of the yard. José mowed $\frac{3}{4}$ of that amount. What part of the yard did José mow?

José mowed _____ of the yard.

2. Maria practices the piano $\frac{5}{6}$ of an hour every day. How many hours does she practice in 4 days?

Maria practices _____ hours.

3. It takes 6 hours to clean the Smith's house. How long does it take to clean $\frac{5}{8}$ of the house?

It takes _____ hours.

4. A container holding $6\frac{2}{3}$ pints of juice will be divided equally among 5 people. How much juice will each person get?

Each person will get _____ pints.

5. A 7-hour class will be divided into equal sessions of $1\frac{2}{5}$ hours. How many sessions will be needed?

_____ sessions will be needed.

6. Jamie divided $6\frac{2}{5}$ ounces of candy into equal amounts. He put the candy into containers that hold $2\frac{2}{3}$ ounces each. How many containers will be filled?

_____ containers will be filled.

7. Dawson baked one pie in $\frac{7}{12}$ of an hour. How long will it take Dawson to bake 9 pies?

Dawson will bake 9 pies in _____ hours.

1.

2.

3.

4.

5.

6.

7.

Lesson 2.5 Problem Solving**SHOW YOUR WORK**

Solve each problem. Write answers in simplest form.

1. How many pieces of string that are $\frac{2}{7}$ of an inch long can be cut from a piece of string that is $\frac{7}{8}$ of an inch long?

_____ pieces of string can be cut.

2. Five pounds of walnuts will be divided equally into containers which will hold $\frac{5}{8}$ of a pound each. How many containers will be filled?

_____ containers will be filled.

3. A ribbon is $\frac{7}{9}$ of a yard long. It will be divided equally among 3 people. What is the length of ribbon that each person will get?

Each person will get _____ of a yard.

4. Raul can ride his bike $7\frac{1}{2}$ miles in one hour. How far can he ride in $2\frac{1}{3}$ hours?

Raul can ride _____ miles.

5. If 8 boards are stacked on top of each other and each board is $2\frac{1}{4}$ inches thick, how high is the stack?

The stack is _____ inches high.

6. A bag of potatoes weighs $2\frac{1}{2}$ pounds. How much would $3\frac{1}{3}$ bags weigh?

The bags would weigh _____ pounds.

7. Jason put 6 pieces of chain together to make a fence. Each piece of chain was $3\frac{2}{5}$ feet long. How long was the chain?

The chain was _____ feet long.

1.

2.

3.

4.

5.

6.

7.

**Check What You Learned****Multiplying and Dividing Fractions**

Multiply. Write answers in simplest form.

1. **a**
 $\frac{2}{3} \times \frac{3}{4}$

b
 $\frac{1}{2} \times \frac{3}{8}$

c
 $\frac{7}{8} \times \frac{3}{5}$

d
 $\frac{2}{7} \times \frac{5}{8}$

2. $\frac{2}{3} \times 5$

$4 \times \frac{7}{8}$

$\frac{3}{5} \times 12$

$8 \times \frac{4}{7}$

3. $3\frac{1}{8} \times 4$

$5 \times 7\frac{1}{2}$

$3\frac{2}{3} \times 6$

$10 \times 1\frac{2}{3}$

4. $2\frac{1}{2} \times 3\frac{1}{3}$

$1\frac{1}{5} \times 3\frac{3}{4}$

$2\frac{1}{2} \times 2\frac{1}{2}$

$4\frac{1}{3} \times 2\frac{3}{5}$

Write the reciprocal.

5. $\frac{3}{8}$ _____

5 _____

$\frac{12}{5}$ _____

$\frac{4}{7}$ _____

Divide. Write answers in simplest form.

6. $5 \div \frac{2}{3}$

$\frac{4}{5} \div 5$

$7 \div \frac{3}{8}$

$\frac{7}{8} \div 2$

7. $\frac{2}{3} \div \frac{4}{5}$

$\frac{7}{8} \div \frac{2}{3}$

$\frac{4}{7} \div \frac{3}{8}$

$\frac{5}{12} \div \frac{3}{4}$

8. $3\frac{1}{8} \div 2\frac{1}{2}$

$4\frac{2}{3} \div 3\frac{1}{2}$

$2\frac{3}{4} \div 2\frac{3}{4}$

$1\frac{1}{2} \div 3\frac{1}{8}$

**Check What You Learned****SHOW YOUR WORK****Multiplying and Dividing Fractions**

Solve each problem. Write answers in simplest form.

- 9.** Alice and Samantha watered $\frac{5}{6}$ of the yard together. Samantha watered $\frac{1}{3}$ of that amount. What part of the yard did Samantha water?

Samantha watered _____ of the yard.

- 10.** Ramona sets aside $\frac{3}{4}$ of an hour for homework after school each day. How many hours does she do homework in 5 days?

Ramona does _____ hours of homework in 5 days.

- 11.** Anita can skate $3\frac{1}{3}$ miles in 1 hour. How far can she skate in $2\frac{1}{2}$ hours?

Anita can skate _____ miles.

- 12.** A stack of 5 bricks is on the driveway. Each brick is $2\frac{1}{3}$ inches thick. How high is the stack of bricks?

The stack of bricks is _____ inches high.

- 13.** At the grocery, the bags of oranges weigh $4\frac{1}{3}$ pounds. How much would $2\frac{1}{2}$ bags of oranges weigh?

The bags would weigh _____ pounds.

- 14.** It takes a baseball team 2 hours to complete a game. How long will it take to complete $\frac{2}{3}$ of the game?

It will take _____ hours.

- 15.** A bag holding $7\frac{1}{5}$ pounds of mixed nuts will be divided equally among 9 people. How many pounds of nuts will each person get?

Each person will get _____ of a pound of nuts.

9.**10.****11.****12.****13.****14.****15.**

**Check What You Know****Ratios, Rates, and Percents**

Solve each proportion.

- | | | |
|--|--|--|
| a | b | c |
| 1. $\frac{7}{5} = \frac{28}{\square}$ _____ | $\frac{4}{6} = \frac{\square}{21}$ _____ | $\frac{6}{\square} = \frac{15}{20}$ _____ |
| 2. $\frac{\square}{9} = \frac{14}{18}$ _____ | $\frac{15}{18} = \frac{10}{\square}$ _____ | $\frac{\square}{30} = \frac{13}{10}$ _____ |
| 3. $\frac{10}{8} = \frac{\square}{24}$ _____ | $\frac{11}{12} = \frac{44}{\square}$ _____ | $\frac{\square}{2} = \frac{9}{6}$ _____ |
| 4. $\frac{12}{\square} = \frac{4}{5}$ _____ | $\frac{10}{14} = \frac{\square}{35}$ _____ | $\frac{10}{\square} = \frac{25}{15}$ _____ |

Write the equivalent decimal and fraction for each percent.

- | | a | b | | c | d |
|---------|----------|----------|---------|----------|----------|
| Percent | Decimal | Fraction | Percent | Decimal | Fraction |
| 5. 15% | _____ | _____ | 22% | _____ | _____ |
| 6. 120% | _____ | _____ | 54% | _____ | _____ |
| 7. 36% | _____ | _____ | 205% | _____ | _____ |

For each fraction or decimal, write the equivalent percent.

- | | | |
|---------------------------|-----------------------|-----------------------|
| a | b | c |
| 8. $\frac{3}{25} =$ _____ | $0.01 =$ _____ | $\frac{2}{5} =$ _____ |
| 9. $4.06 =$ _____ | $\frac{1}{8} =$ _____ | $0.6 =$ _____ |

Complete each sentence.

- | | |
|---------------------------------------|----------------------|
| a | b |
| 10. 90% of 120 is _____. | 18 is 40% of _____. |
| 11. 3.6 is 5% of _____. | 27 is _____% of 108. |
| 12. $37\frac{1}{2}\%$ of 64 is _____. | 35 is 25% of _____. |
| 13. 39 is _____% of 52. | 28 is _____% of 20. |
| 14. 110% of 55 is _____. | 82 is _____% of 40. |



Check What You Know

SHOW YOUR WORK

Ratios, Rates, and Percents

Solve each problem.

- 15.** Corn costs \$2 for 6 ears. Carmen bought 24 ears of corn. How much did she spend?

Carmen spent _____.

- 16.** Tomatoes are 5 for \$2. Keith spent \$8 on tomatoes. How many tomatoes did he get?

Keith got _____ tomatoes.

- 17.** Peaches are 8 for \$2. Jill bought 12 peaches. How much did she spend?

Jill spent _____.

- 18.** Corn costs \$2 for 6 ears. Isabel spent \$3 on corn. How many ears did she get?

Isabel got _____ ears.

- 19.** At East Side Middle School, $\frac{3}{4}$ of the students ride the bus to school. What percent of the students ride the bus?

_____ of the students ride the bus.

- 20.** Morgan got $\frac{17}{20}$ of the questions on a science test correct. What percent of the questions did she get correct?

Morgan got _____ of the questions correct.

- 21.** The band at East Side Middle School lost 20 percent of its 230 members from last year. How many band members left?

_____ band members left.

- 22.** A sweater is on sale for 40 percent off its original price of \$29.95. What is the amount of savings?

The savings is _____.

15.

16.

17.

18.

19.

20.

21.

22.

Lesson 3.1 Understanding Ratios

A **ratio** compares 2 numbers. When written out, several phrases can show how the ratio should be written.

4 to 2

4:2

 $\frac{4}{2}$ or $\frac{2}{1}$

6 out of 8

6:8

 $\frac{6}{8}$ or $\frac{3}{4}$

Express each ratio as a fraction in simplest form.

a**b**

- | | |
|--|-------------------------------------|
| 1. 15 feet out of 36 feet _____ | 5 pounds to 35 pounds _____ |
| 2. 48 rainy days out of 60 days _____ | 28 snow days out of 49 days _____ |
| 3. 10 pints to 20 pints _____ | 40 cups to 55 cups _____ |
| 4. 10 miles out of 12 miles _____ | 28 red bikes out of 40 bikes _____ |
| 5. 18 beetles out of 72 insects _____ | 63 gallons to 84 gallons _____ |
| 6. 49 dimes out of 77 coins _____ | 12 cakes out of 36 cakes _____ |
| 7. 15 students out of 30 students _____ | 3 floors out of 18 floors _____ |
| 8. 36 meters out of 100 meters _____ | 14 hats out of 20 accessories _____ |
| 9. 80 scores out of 90 scores _____ | 2 sports out of 19 sports _____ |
| 10. 42 cars out of 124 cars _____ | 7 messages out of 84 messages _____ |

Lesson 3.1 Understanding Ratios

Ratios can be written based on the number of objects in a set.

There are 2 bottles of soda and 5 bottles of water in the refrigerator.
Write the ratio of sodas to waters. $\frac{2}{5}$

Express each ratio as a fraction in simplest form.

a

1. There are 2 cubes and 15 spheres in a geometry box. Write the ratio of spheres to cubes.

2. There are 5 horses and 15 elephants in a circus. Write the ratio of elephants to horses.

3. There are 11 blue marbles and 7 red marbles in a box. Write the ratio of red marbles to blue marbles.

4. There are 5 blue marbles and 16 red marbles in a box. Write the ratio of blue marbles to red marbles.

5. There are 14 cars and 7 vans in a parking lot. Write the ratio of cars to vans.

6. There are 6 pennies and 10 dimes in a jar. Write the ratio of pennies to dimes.

b

There are 5 cars and 4 vans in a parking lot. Write the ratio of vans to cars.

There are 16 horses and 14 elephants in a circus. Write the ratio of horses to elephants.

There are 12 apples and 15 oranges in a fruit basket. Write the ratio of apples to oranges.

There are 12 dogs and 7 cats in a park. Write the ratio of cats to dogs.

There are 7 blue marbles and 8 red marbles in a bag. Write the ratio of red marbles to blue marbles.

There are 24 butterflies and 16 snails on the ground. Write the ratio of butterflies to snails.

Lesson 3.2 Solving Ratios

A proportion can be used in problem solving.

The ratio of apples to oranges is 4 to 5. There are 20 oranges in the basket. How many apples are there?

$$\frac{4}{5} = \frac{n}{20} \quad \text{Set up a proportion, using } n \text{ for the missing number.}$$

$$4 \times 20 = 5 \times n \quad \text{Cross-multiply.}$$

$$\frac{80}{5} = n \quad \text{Solve for } n.$$

$$16 = n \quad \text{There are 16 apples.}$$

Solve.

a

b

c

1. $\frac{1}{3} = \frac{n}{24}$ _____

$\frac{4}{9} = \frac{n}{36}$ _____

$\frac{5}{45} = \frac{n}{9}$ _____

2. $\frac{3}{5} = \frac{n}{15}$ _____

$\frac{10}{70} = \frac{n}{7}$ _____

$\frac{25}{40} = \frac{n}{16}$ _____

3. $\frac{7}{12} = \frac{n}{36}$ _____

$\frac{13}{26} = \frac{n}{4}$ _____

$\frac{7}{1} = \frac{n}{3}$ _____

4. $\frac{8}{5} = \frac{n}{40}$ _____

$\frac{2}{6} = \frac{n}{33}$ _____

$\frac{5}{13} = \frac{n}{39}$ _____

5. $\frac{5}{6} = \frac{n}{18}$ _____

$\frac{9}{8} = \frac{n}{32}$ _____

$\frac{2}{3} = \frac{n}{15}$ _____

Lesson 3.2 Solving Ratios

The missing number can appear any place in a proportion.

Solve the same way.

$$\frac{2}{3} = \frac{6}{n}$$

$$3 \times 6 = 2 \times n$$

$$\frac{18}{2} = n$$

$$9 = n$$

$$\frac{3}{5} = \frac{n}{10}$$

$$3 \times 10 = 5 \times n$$

$$\frac{30}{5} = n$$

$$6 = n$$

$$\frac{3}{n} = \frac{6}{8}$$

$$3 \times 8 = 6 \times n$$

$$\frac{24}{6} = n$$

$$4 = n$$

$$\frac{n}{4} = \frac{3}{6}$$

$$4 \times 3 = 6 \times n$$

$$\frac{12}{6} = n$$

$$2 = n$$

Solve.

a

1. $\frac{n}{3} = \frac{3}{9}$ _____

$\frac{5}{3} = \frac{15}{n}$ _____

$\frac{2}{n} = \frac{1}{4}$ _____

2. $\frac{15}{30} = \frac{2}{n}$ _____

$\frac{4}{6} = \frac{n}{24}$ _____

$\frac{n}{7} = \frac{15}{21}$ _____

3. $\frac{6}{n} = \frac{15}{20}$ _____

$\frac{n}{12} = \frac{9}{18}$ _____

$\frac{9}{2} = \frac{27}{n}$ _____

4. $\frac{7}{9} = \frac{n}{63}$ _____

$\frac{15}{n} = \frac{12}{4}$ _____

$\frac{40}{100} = \frac{n}{25}$ _____

5. $\frac{35}{n} = \frac{4}{8}$ _____

$\frac{16}{4} = \frac{36}{n}$ _____

$\frac{n}{12} = \frac{25}{30}$ _____

**Lesson 3.3****Solving Ratio Problems**

Tables can be used to help find missing values in real-life ratio problems.

A car can drive 60 miles on two gallons of gas. Create a table to find out how many miles the car can travel on 10 gallons of gas.

Gas	2 gallons	4 gallons	6 gallons	8 gallons	10 gallons
Miles	60 miles	120 miles	180 miles	240 miles	300 miles

Complete the tables to solve the ratio problems. Circle your answer in the table.

1. You can buy 4 cans of green beans at the market for \$2.25. How much will it cost to buy 12 cans of beans?

Cans	4 cans	8 cans	12 cans
Cost	\$2.25		

2. An ice-cream factory makes 180 quarts of ice cream in 2 hours. How many quarts could be made in 12 hours?

Ice Cream	180 quarts					
Hours	2 hours	4 hours	6 hours	8 hours		

3. A jet travels 650 miles in 3 hours. At this rate, how far could the jet fly in 9 hours?

Distance	650 miles		
Hours	3 hours		

4. A bakery can make 640 bagels in 4 hours. How many can they bake in 16 hours?

Bagels	640 bagels			
Hours	4 hours			

Lesson 3.4 Understanding Unit Rates

A **rate** is a special ratio that compares quantities of two different types of items—for example, *340 miles per 10 gallons (340 mi./10 gal.)*. In a **unit rate**, the second quantity is always 1, such as in *34 miles per gallon (34 mi./1 gal.)*. This allows you to see how many of the first item corresponds to just one of the second item.

Suppose you want to divide students equally between buses for a field trip. To see how many students should go on each bus, find the unit rate.

If there are 160 students and 4 buses, how many students should go on each bus?

$\frac{160}{4} = \frac{s}{1}$ To find the number of students for one bus, divide by the number of buses total.

$\frac{160}{4} = \frac{40}{1}$ The unit rate is $\frac{40}{1}$, or 40 students per bus.

SHOW YOUR WORK

Solve each problem by finding the unit rate.

- John can create 20 paintings in 4 weeks. How many paintings can he create each week?
- Sasha can walk 6 miles in 3 hours. If she has to walk 1 mile, how long will it take her?
- Todd keeps his 4-room house very clean. It takes him 1 hour and 36 minutes to clean his whole house. How long does it take him to clean one room?
- Victoria can make 8 necklaces in 4 days. How long does it take her to make one necklace?
- Byron has his own bakery. He bakes 84 cakes each week. How many cakes can he make in one day?
- Charlie buys 3 computer tables for \$390. How much did he pay for each table?

1.

2.

3.

4.

5.

6.

Lesson 3.5 Problem Solving**SHOW YOUR WORK**

Solve the problems below using ratios and unit rates.

1. Gas mileage is the number of miles you can drive on a gallon of gasoline. A test of a new car results in 440 miles driven on 20 gallons of gas. How far could you drive on 60 gallons of gas? _____

What is the car's gas mileage? _____

2. An ice-cream factory makes 100 quarts of ice cream in 5 hours. How many quarts could be made in 36 hours? _____

What was that rate per day? _____

3. A jet travels 590 miles in 5 hours. At this rate, how far could the jet fly in 10 hours? _____

What is the rate of speed of the jet? _____

4. You can buy 5 cans of green beans at the Village Market for \$2.30, or you can buy 10 of them at Best Food for \$5.10.

Which place is the better buy? _____

5. You can buy 3 apples at the Quick Stop for \$1.29. You can buy 5 apples at Shop and Save for \$2.45.

Which place is the better buy? _____

6. A ferris wheel can accommodate 55 people in 15 minutes.

How many people could ride the ferris wheel in 2 hours? _____

What is the rate per hour? _____

1.

2.

3.

4.

5.

6.

Lesson 3.5 Problem Solving**SHOW YOUR WORK**

Solve the problems below using ratios and unit rates.

1. Keith makes 9 out of every 10 free throws. Josie makes 10 out of every 12 free throws. Who is better at making free throws?

_____ is better at making free throws.

2. Carl reads 3 books every week. Jonna reads 6 books a month. Ray reads 85 books a year. Who reads the most books?

_____ reads the most books.

3. Mary runs 4 laps in 8 minutes. Nicole runs 12 laps in 18 minutes. Who runs faster?

_____ runs faster.

4. CD City sells 5 CDs for \$49. Music Land sells 8 CDs for \$59.50. Which store is the better place to buy CDs?

_____ is the better place to buy CDs.

5. Two classes are ordering pizza for a pizza party. Mrs. Jimenez's class has 10 students and is planning to share 4 large pizzas. Mr. Nichols's class has 8 students and will share 3 large pizzas. If everyone in each class will receive the same amount of pizza, will students in Mrs. Jimenez's class or Mr. Nichols's class receive more pizza?

Students in _____ class will receive more pizza.

6. Laura earns \$7 per hour baby-sitting for her neighbor. How much will Laura make if she baby-sits for 4 hours?

Laura will make _____.

1.

2.

3.

4.

5.

6.

Lesson 3.6 Understanding Percents

The symbol % (percent) means $\frac{1}{100}$ or 0.01 (one hundredth).

$$\begin{aligned} 7\% &= 7 \times \frac{1}{100} \\ &= \frac{7}{1} \times \frac{1}{100} \\ &= \frac{7}{100} \end{aligned}$$

$$\begin{aligned} 6\% &= 6 \times 0.01 \\ &= 0.06 \end{aligned}$$

$$\begin{aligned} 23\% &= 23 \times \frac{1}{100} \\ &= \frac{23}{100} \end{aligned}$$

$$\begin{aligned} 47\% &= 47 \times 0.01 \\ &= 0.47 \end{aligned}$$

Write the fraction and decimal for each percent. Write fractions in simplest form.

	Percent	Fraction	Decimal
1.	2%	_____	_____
2.	8%	_____	_____
3.	27%	_____	_____
4.	13%	_____	_____
5.	68%	_____	_____
6.	72%	_____	_____
7.	56%	_____	_____
8.	11%	_____	_____
9.	3%	_____	_____
10.	22%	_____	_____
11.	17%	_____	_____
12.	83%	_____	_____
13.	97%	_____	_____
14.	43%	_____	_____

Lesson 3.6 Understanding Percents

Write the fraction and decimal for each percent. Write fractions in simplest form.

	Percent	Fraction	Decimal
1.	7%	_____	_____
2.	13%	_____	_____
3.	48%	_____	_____
4.	71%	_____	_____
5.	27%	_____	_____
6.	2%	_____	_____
7.	15%	_____	_____
8.	39%	_____	_____
9.	10%	_____	_____
10.	62%	_____	_____
11.	75%	_____	_____
12.	97%	_____	_____
13.	53%	_____	_____
14.	82%	_____	_____

Lesson 3.7 Finding Percents Using Fractions

$$\begin{aligned}
 35\% \text{ of } 60 &= 35\% \times 60 \\
 &= \frac{35}{100} \times 60 \\
 &= \frac{7}{20} \times \frac{60}{1} = \frac{420}{20} = \frac{42}{2} \\
 &= 21
 \end{aligned}$$

$$\begin{aligned}
 40\% \text{ of } 32 &= \\
 40\% \times 32 &= \frac{40}{100} \times 32 \\
 &= \frac{2}{5} \times \frac{32}{1} = \frac{64}{5} \\
 &= 12\frac{4}{5}
 \end{aligned}$$

Complete the following. Write each answer in simplest form.

a

1. 8% of 65 = _____
2. 30% of 32 = _____
3. 150% of 12 = _____
4. 28% of 7 = _____
5. 40% of 20 = _____
6. 80% of 80 = _____
7. 45% of 70 = _____
8. 4% of 92 = _____
9. 90% of 60 = _____
10. 12% of 40 = _____
11. 60% of 60 = _____
12. 21% of 50 = _____

b

- 95% of 80 = _____
- 25% of 28 = _____
- 25% of 30 = _____
- 10% of 38 = _____
- 15% of 45 = _____
- 20% of 75 = _____
- 18% of 45 = _____
- 16% of 90 = _____
- 25% of 86 = _____
- 9% of 60 = _____
- 95% of 20 = _____
- 3% of 25 = _____

Lesson 3.8 Finding Percents Using Decimals

26% of 73.2

$$\begin{array}{r}
 73.2 \\
 \times 0.26 \\
 \hline
 4392 \\
 + 1464 \\
 \hline
 19.032
 \end{array}$$

26% = $26 \times 0.01 = 0.26$

26% of 73.2 = 19.032

Complete the following.

a**b**

1. 32% of 64 = _____
2. 2.5% of 89 = _____
3. 58% of 12 = _____
4. 73% of 8.4 = _____
5. 0.8% of 256 = _____
6. 120% of 35 = _____
7. 84% of 7 = _____
8. 20% of 45 = _____
9. 9.2% of 63 = _____
10. 7% of 112 = _____
11. 16% of 16 = _____
12. 1.8% of 240 = _____

- 26% of 40 = _____
- 1.2% of 385 = _____
- 250% of 8 = _____
- 49% of 86 = _____
- 11% of 29 = _____
- 7.5% of 60 = _____
- 40% of 95 = _____
- 22% of 142 = _____
- 80% of 80 = _____
- 62% of 45 = _____
- 12% of 200 = _____
- 18% of 15 = _____

Lesson 3.9 Finding Percents

Use these methods to find the percent one number is of another number:

50 is what percent of 80?

$$50 = n\% \times 80$$

$$50 = \frac{n}{100} \times 80 \quad 50 = \frac{80n}{100}$$

$$5000 = 80n$$

$$5000 \div 80 = 80n \div 80$$

$$62.5 = n$$

50 is 62.5% of 80.

$\frac{1}{4}$ is what percent of $\frac{5}{8}$?

$$\frac{1}{4} = n\% \times \frac{5}{8}$$

$$\frac{1}{4} = \frac{n}{100} \times \frac{5}{8} \quad \frac{1}{4} = \frac{5n}{800}$$

$$800 = 20n$$

$$800 \div 20 = 20n \div 20$$

$$40 = n$$

$\frac{1}{4}$ is 40% of $\frac{5}{8}$.

Complete the following.

a

1. 12 is _____% of 20.
2. 15 is _____% of 100.
3. 0.9 is _____% of 6.
4. 1.8 is _____% of 18.
5. 48 is _____% of 64.
6. 19 is _____% of 95.
7. 1.8 is _____% of 6.
8. 12 is _____% of 32.
9. $\frac{3}{8}$ is _____% of $\frac{3}{4}$.
10. 0.6 is _____% of 0.5.

b

- 0.9 is _____% of 4.5.
- 16 is _____% of 25.
- $\frac{1}{3}$ is _____% of $\frac{5}{6}$.
- 45 is _____% of 50.
- 16 is _____% of 40.
- 39 is _____% of 26.
- 5.6 is _____% of 2.8.
- 64 is _____% of 51.2.
- 1.4 is _____% of 5.6.
- $\frac{7}{10}$ is _____% of $\frac{7}{8}$.

Lesson 3.10 Problem Solving**SHOW YOUR WORK**

Solve each problem.

1. The sales tax on the purchase of a refrigerator that costs \$695 is 7 percent. What is the amount of sales tax?

The sales tax is _____.

2. A stove that costs \$695 will be on sale next week for 28 percent off its regular price. What is the amount of savings?

The savings will be _____.

3. In math class, 60 percent of the students are males. There are 30 students in the class. How many students are males?

There are _____ males.

4. East Side Middle School has 1,500 students. Thirty-two percent of them are in sixth grade. How many sixth-grade students are there?

There are _____ sixth-grade students.

5. Lauren is saving for gymnastics camp. Camp costs \$225 to attend. She has 40 percent of the money saved. How much money has she saved?

Lauren has saved _____.

6. Of the 1,500 students attending East Side Middle School, twenty-five percent are running for student council. How many students are running for student council?

_____ students are running for student council.

1.

2.

3.

4.

5.

6.

Lesson 3.10 Problem Solving**SHOW YOUR WORK**

Solve each problem.

1. The Jacksons' dinner cost \$125. They left \$21.25 for a tip. What percent did they tip?

The Jacksons tipped _____.

2. A sweater was originally \$55. It is now marked down to 65% of its original price. How much is the sweater now?

The sweater now costs _____.

3. Ms. Martino's new home cost \$260,000. She paid \$39,000 in a down payment. What percent of the home cost did she pay in the down payment?

Ms. Martino paid _____ of the total price.

4. Workers have painted 920 square feet of an office. They have completed 80% of their job. How many square feet do they need to paint in all?

They need to paint _____ square feet.

5. The Franklins are taking a cross-country trip. They will drive 3,150 miles in all. On the first day, they drove 567 miles. What percent of their trip did they drive?

The Franklins drove _____ of their trip.

6. Jen is reading a 276-page book. She is 25% finished. How many pages has she read?

Jen has read _____ pages.

7. Pete's dog weighed 30 pounds. It then lost 16% of its weight. How much did Pete's dog lose?

The dog lost _____ pounds.

8. Karla has read 85% of her book, which amounts to 238 pages. How long is the book?

The book is _____ pages long.

1.

2.

3.

4.

5.

6.

7.

8.



Check What You Learned

Ratios, Rates, and Percents

Solve each proportion.

- | | | | | | |
|---|----------|--|----------|---|----------|
| <p>1. $\frac{\square}{12} = \frac{5}{4}$ _____</p> <p>2. $\frac{15}{21} = \frac{\square}{7}$ _____</p> <p>3. $\frac{5}{\square} = \frac{20}{24}$ _____</p> <p>4. $\frac{\square}{10} = \frac{21}{15}$ _____</p> | a | <p>$\frac{18}{16} = \frac{\square}{24}$ _____</p> <p>$\frac{\square}{8} = \frac{18}{24}$ _____</p> <p>$\frac{4}{7} = \frac{\square}{28}$ _____</p> <p>$\frac{15}{\square} = \frac{20}{12}$ _____</p> | b | <p>$\frac{2}{\square} = \frac{10}{15}$ _____</p> <p>$\frac{10}{14} = \frac{15}{\square}$ _____</p> <p>$\frac{8}{6} = \frac{20}{\square}$ _____</p> <p>$\frac{3}{12} = \frac{\square}{16}$ _____</p> | c |
|---|----------|--|----------|---|----------|

Write the equivalent decimal and fraction for each percent.

- | | a | b | | c | d |
|---------------|----------|----------|---------|----------|----------|
| Percent | Decimal | Fraction | Percent | Decimal | Fraction |
| 5. 24% | _____ | _____ | 110% | _____ | _____ |
| 6. 37% | _____ | _____ | 55% | _____ | _____ |
| 7. 6% | _____ | _____ | 235% | _____ | _____ |

For each fraction or decimal, write the equivalent percent.

- | | | | | | |
|---|----------|---|----------|--|----------|
| <p>8. $\frac{4}{25} =$ _____</p> <p>9. 0.8 = _____</p> | a | <p>0.05 = _____</p> <p>$\frac{7}{8} =$ _____</p> | b | <p>$\frac{3}{5} =$ _____</p> <p>1.3 = _____</p> | c |
|---|----------|---|----------|--|----------|

Complete each sentence.

- | | | | |
|---|----------|--|----------|
| <p>10. 24 is 30% of _____.</p> <p>11. 20% of 75 is _____.</p> <p>12. 6.2 is _____% of 124.</p> <p>13. 9 is 12.5% of _____.</p> <p>14. 125% of 48 is _____.</p> | a | <p>42 is _____% of 50.</p> <p>112 is 70% of _____.</p> <p>32% of 85 is _____.</p> <p>7 is _____% of 56.</p> <p>5.5 is 125% of _____.</p> | b |
|---|----------|--|----------|

**Check What You Learned****SHOW YOUR WORK****Ratios, Rates, and Percents**

Solve each problem.

- 15.** Jeans are \$20 for 2 pairs. Kerry spent \$40 on jeans. How many pairs did she buy?

Kerry bought _____ pairs of jeans.

- 16.** Skirts are 4 for \$30. Marta and her sisters bought 6 skirts. How much did they pay?

They paid _____.

- 17.** Sweaters are 3 for \$50. Leslie and her mother spent \$100 on sweaters. How many did they buy?

They bought _____ sweaters.

- 18.** T-shirts are 3 for \$18. Tia bought 4 T-shirts. How much did she spend?

Tia spent _____.

- 19.** In Keon's homeroom class, $\frac{3}{5}$ of the students participate in sports. What percent of students participate in sports?

_____ participate in sports.

- 20.** Fifty-five percent of the students at West Side Middle School walk to school. What fraction of the students walk to school?

_____ of the students walk to school.

- 21.** A new car that costs \$17,500 loses 25% of its value in the first year. How much is the loss of value?

The loss of value is _____.

- 22.** The 140-member chorus at West Side Middle School wants to add 30 percent more members next year. How many members do they want to add?

They want to add _____ members.

15.**16.****17.****18.****19.****20.****21.****22.**



Check What You Know

Integer Concepts

Name the opposite of each number.

a

1. The opposite of 8 is _____.

2. The opposite of 5 is _____.

3. The opposite of -21 is _____.**b**The opposite of -1 is _____.

The opposite of 35 is _____.

The opposite of -16 is _____.

Find the absolute value of each integer.

a4. $|-3| =$ _____5. $|-9| =$ _____6. $|-13| =$ _____**b** $|10| =$ _____ $|23| =$ _____ $|5| =$ _____**c** $|5| =$ _____ $|-7| =$ _____ $|-1| =$ _____

Compare the integers using $<$, $>$, or $=$.

a7. $82 \square 91$ 8. $23 \square 74$ 9. $74 \square -42$ **b**31 \square -27 $-10 \square 70$ 99 \square 66**c** $-44 \square -84$ 51 \square 24 $-23 \square -21$

Order from least to greatest.

a10. $-89, 42, -26, 8$ _____11. $20, -81, -5, 87$ _____12. $-91, -46, 52, 12$ _____**b** $-84, 91, -57, -90$ _____

73, 53, 89, 55 _____

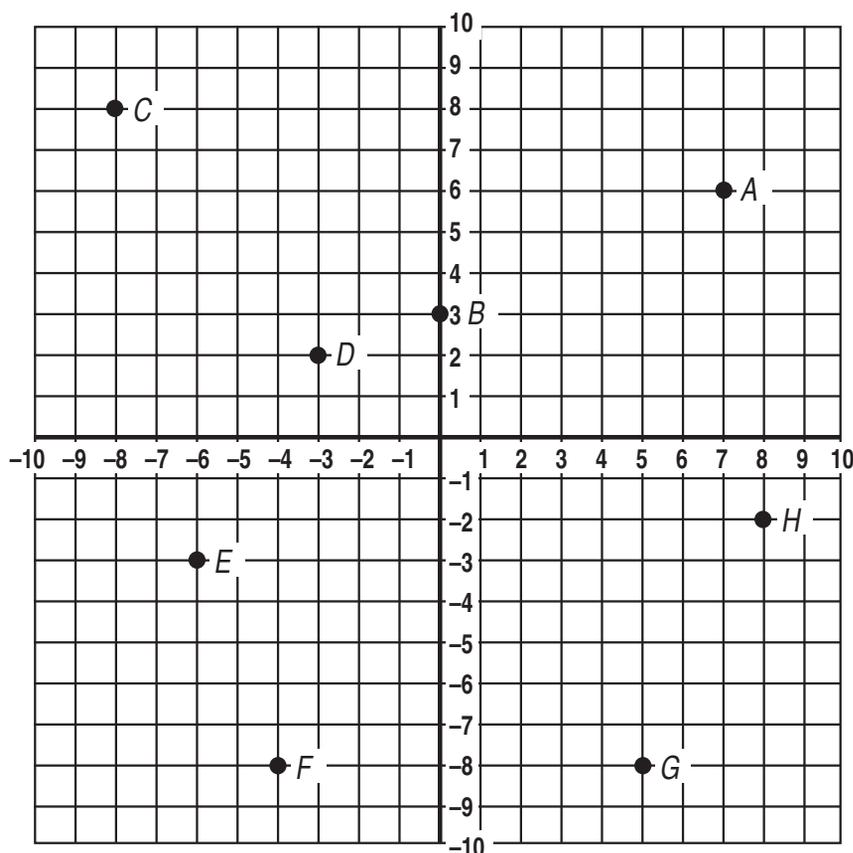
22, 41, $-23, -38$ _____



Check What You Know

Integer Concepts

Use the coordinate grid to answer the questions.



Write the ordered pair for each coordinate.

13. A _____

14. C _____

15. E _____

16. G _____

Name the point located at each ordered pair.

17. $(8, -2)$ _____

18. $(-3, 2)$ _____

19. $(-4, -8)$ _____

20. $(0, 3)$ _____

Mark the following points on the coordinate grid.

21. I at $(4, -3)$

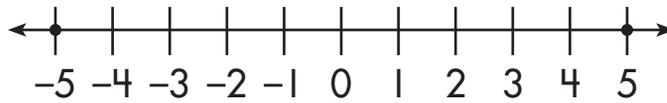
22. J at $(-8, -5)$

23. K at $(-5, -5)$

24. L at $(6, 2)$

Lesson 4.1 Integers as Opposite Numbers

Every positive number has an opposite, negative number. A negative number is less than 0.



Draw a number line to show the opposite of each number.

a

1. What is the opposite of 8?
2. What is the opposite of -10 ?
3. What is the opposite of 12?
4. What is the opposite of -6 ?
5. What is the opposite of 11?
6. What is the opposite of -20 ?

b

- What is the opposite of 25?
- What is the opposite of -7 ?
- What is the opposite of -9 ?
- What is the opposite of 2?
- What is the opposite of -14 ?
- What is the opposite of 16?

Name the opposite of each number.

- | | |
|-------------------------------------|---------------------------------|
| 7. The opposite of 10 is _____. | The opposite of 1 is _____. |
| 8. The opposite of -3 is _____. | The opposite of 7 is _____. |
| 9. The opposite of -4 is _____. | The opposite of -8 is _____. |
| 10. The opposite of 13 is _____. | The opposite of -15 is _____. |
| 11. The opposite of -32 is _____. | The opposite of 27 is _____. |
| 12. The opposite of 17 is _____. | The opposite of -20 is _____. |

Lesson 4.2 Integer Values in Real Life

Integers can be used to describe real-life situations.

A driver is going 15 miles per hour below the speed limit. The integer -15 can describe this situation. The negative sign shows that the speed is less than the speed limit.

Use integers to represent each real-life situation.

a

1. 45 feet below sea level _____
2. \$528 deposit into a checking account _____
3. stock market increases of 345 points _____
4. 7,500 feet above sea level _____
5. a 10-pound weight gain _____
6. 3 units to the right on a number line _____
7. 10 units to the left on a number line _____
8. \$60 deposit into a savings account _____
9. stock market decrease of 97 points _____
10. 100 feet below sea level _____
11. a 25-pound weight loss _____
12. 95° above zero _____

b

- a gain of 8 yards on a play _____
- 62° above zero _____
- an 8-pound weight loss _____
- withdrawal of \$80 from an ATM _____
- stock market decrease of 250 points _____
- 8 units to the left on a number line _____
- 7 units to the right on a number line _____
- withdrawal of \$95 from an ATM _____
- 34° below zero _____
- a gain of 15 yards on a play _____
- stock market increase of 390 points _____
- 6,000 feet above sea level _____

Lesson 4.3 Absolute Value

The **absolute value** of a number is its distance from zero.

Absolute value is represented by vertical lines on either side of an integer.

What is the absolute value of 8? $|8| = 8$

What is the absolute value of -8? $|-8| = 8$

Find the absolute value of each integer.

a

1. $|4| = \underline{\hspace{2cm}}$

2. $-|-7| = \underline{\hspace{2cm}}$

3. $-|12| = \underline{\hspace{2cm}}$

4. $|-14| = \underline{\hspace{2cm}}$

5. $|3| = \underline{\hspace{2cm}}$

6. $-|-15| = \underline{\hspace{2cm}}$

7. $|16| = \underline{\hspace{2cm}}$

8. $-|40| = \underline{\hspace{2cm}}$

9. $|33| = \underline{\hspace{2cm}}$

10. $|26| = \underline{\hspace{2cm}}$

11. $-|53| = \underline{\hspace{2cm}}$

12. $|25| = \underline{\hspace{2cm}}$

b

$|-13| = \underline{\hspace{2cm}}$

$|11| = \underline{\hspace{2cm}}$

$-|5| = \underline{\hspace{2cm}}$

$-|8| = \underline{\hspace{2cm}}$

$|-7| = \underline{\hspace{2cm}}$

$|9| = \underline{\hspace{2cm}}$

$|-6| = \underline{\hspace{2cm}}$

$-|-24| = \underline{\hspace{2cm}}$

$-|-41| = \underline{\hspace{2cm}}$

$|-18| = \underline{\hspace{2cm}}$

$|-21| = \underline{\hspace{2cm}}$

$-|-21| = \underline{\hspace{2cm}}$

c

$-|10| = \underline{\hspace{2cm}}$

$|-2| = \underline{\hspace{2cm}}$

$|1| = \underline{\hspace{2cm}}$

$-|-13| = \underline{\hspace{2cm}}$

$-|4| = \underline{\hspace{2cm}}$

$|-12| = \underline{\hspace{2cm}}$

$-|20| = \underline{\hspace{2cm}}$

$|17| = \underline{\hspace{2cm}}$

$|-19| = \underline{\hspace{2cm}}$

$-|35| = \underline{\hspace{2cm}}$

$|30| = \underline{\hspace{2cm}}$

$|-47| = \underline{\hspace{2cm}}$

Lesson 4.3 Absolute Value

Find the absolute value of each integer.

a

1. $|64| = \underline{\hspace{2cm}}$

2. $-|-8| = \underline{\hspace{2cm}}$

3. $-|76| = \underline{\hspace{2cm}}$

4. $|-62| = \underline{\hspace{2cm}}$

5. $|2| = \underline{\hspace{2cm}}$

6. $-|-13| = \underline{\hspace{2cm}}$

7. $|35| = \underline{\hspace{2cm}}$

8. $-|51| = \underline{\hspace{2cm}}$

9. $|73| = \underline{\hspace{2cm}}$

10. $|65| = \underline{\hspace{2cm}}$

11. $|-67| = \underline{\hspace{2cm}}$

12. $|34| = \underline{\hspace{2cm}}$

13. $|58| = \underline{\hspace{2cm}}$

14. $-|6| = \underline{\hspace{2cm}}$

15. $|10| = \underline{\hspace{2cm}}$

16. $-|-22| = \underline{\hspace{2cm}}$

b

$|-81| = \underline{\hspace{2cm}}$

$|19| = \underline{\hspace{2cm}}$

$-|3| = \underline{\hspace{2cm}}$

$-|95| = \underline{\hspace{2cm}}$

$|-36| = \underline{\hspace{2cm}}$

$|48| = \underline{\hspace{2cm}}$

$|-29| = \underline{\hspace{2cm}}$

$|-57| = \underline{\hspace{2cm}}$

$-|-55| = \underline{\hspace{2cm}}$

$|-37| = \underline{\hspace{2cm}}$

$|-70| = \underline{\hspace{2cm}}$

$-|-63| = \underline{\hspace{2cm}}$

$|-93| = \underline{\hspace{2cm}}$

$-|-17| = \underline{\hspace{2cm}}$

$|-49| = \underline{\hspace{2cm}}$

$-|79| = \underline{\hspace{2cm}}$

c

$-|32| = \underline{\hspace{2cm}}$

$|-53| = \underline{\hspace{2cm}}$

$|11| = \underline{\hspace{2cm}}$

$-|-42| = \underline{\hspace{2cm}}$

$-|9| = \underline{\hspace{2cm}}$

$|-27| = \underline{\hspace{2cm}}$

$-|23| = \underline{\hspace{2cm}}$

$|80| = \underline{\hspace{2cm}}$

$|-46| = \underline{\hspace{2cm}}$

$-|59| = \underline{\hspace{2cm}}$

$|50| = \underline{\hspace{2cm}}$

$|-71| = \underline{\hspace{2cm}}$

$|-21| = \underline{\hspace{2cm}}$

$-|88| = \underline{\hspace{2cm}}$

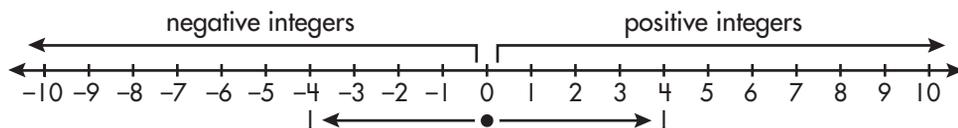
$-|5| = \underline{\hspace{2cm}}$

$|31| = \underline{\hspace{2cm}}$

Lesson 4.4 Comparing and Ordering Integers

Integers are the set of whole numbers and their opposites.

Positive integers are greater than zero. **Negative integers** are less than zero. Zero is neither positive nor negative. A negative integer is less than a positive integer. On a number line, an integer and its opposite are the same distance from zero. The smaller of two integers is always the one to the left on a number line.



The opposite of 4 is -4 . They are both 4 spaces from 0.

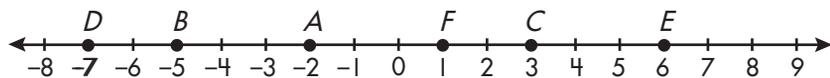
$$-7 < -2$$

-7 is to the left of -2 .

$$-4 > -9$$

-4 is to the right of -9 .

Use integers to name each point on the number line.



a

b

c

1. A _____

D _____

F _____

2. E _____

C _____

B _____

Use $>$ or $<$ to compare each pair of numbers.

3. $2 \square 7$

$-1 \square -4$

$5 \square 0$

4. $-4 \square 1$

$0 \square -8$

$-8 \square -10$

5. $7 \square -7$

$-2 \square 0$

$4 \square 6$

6. $1 \square -1$

$6 \square 3$

$-6 \square -3$

7. $4 \square -2$

$-6 \square -4$

$3 \square -3$

Order from least to greatest.

a

b

8. $-3, -5, 0$ _____

$8, -8, 2$ _____

9. $0, 5, -3, -7$ _____

$4, -1, 2, -2$ _____

10. $-6, 5, -2, -3, 2$ _____

$5, -8, -2, -3, 0$ _____

Lesson 4.4 Comparing and Ordering Integers

Compare the integers using $<$, $>$, or $=$.

a

1. $66 \square 3$

2. $99 \square -84$

3. $28 \square 7$

4. $-27 \square -52$

5. $88 \square -99$

6. $46 \square -26$

7. $8 \square -18$

8. $-12 \square -14$

b

43 \square 83

-33 \square -90

-24 \square 61

-49 \square -69

47 \square -44

13 \square -1

61 \square -70

-1 \square 0

c

-24 \square 82

-37 \square -37

-36 \square -88

42 \square 98

-8 \square -45

39 \square 51

-4 \square -1

57 \square -73

Order from least to greatest.

a

9. 16, -37, 51, 61 _____

10. -84, -67, 10, -65 _____

11. -35, 81, -37, 48 _____

12. -37, 51, 61, 9 _____

13. 14, -4, 9, -11 _____

14. -80, -79, 2, 81 _____

b

-86, 21, 90, -49 _____

-62, 11, -97, -78 _____

-68, -9, 95, 19 _____

21, 90, -49, 15 _____

74, -23, 27, -75 _____

47, 93, -39, -47 _____

Lesson 4.4 Comparing and Ordering Integers

Compare the integers using $<$, $>$, or $=$.

a

1. $92 \square 35$

2. $78 \square -96$

3. $-1 \square -37$

4. $4 \square -4$

5. $-10 \square 51$

6. $18 \square 80$

7. $33 \square -64$

8. $18 \square 80$

b

$-56 \square -57$

$-99 \square -94$

$6 \square -78$

$-66 \square -13$

$76 \square 13$

$-12 \square -81$

$17 \square 13$

$-12 \square -81$

c

$-77 \square 37$

$34 \square -60$

$34 \square -43$

$-66 \square -45$

$-69 \square -79$

$-61 \square 57$

$-21 \square 19$

$-61 \square 57$

Order from least to greatest.

a

9. $-67, 10, -65, 20$ _____

10. $81, -37, 48, -39$ _____

11. $51, 61, 9, 47$ _____

12. $10, -65, 20, 55$ _____

13. $-16, -34, 14, 0$ _____

14. $46, 52, -2, -46$ _____

b

$11, -97, -78, -57$ _____

$-9, 95, 19, -96$ _____

$90, -49, 15, 22$ _____

$-97, -78, -57, -68$ _____

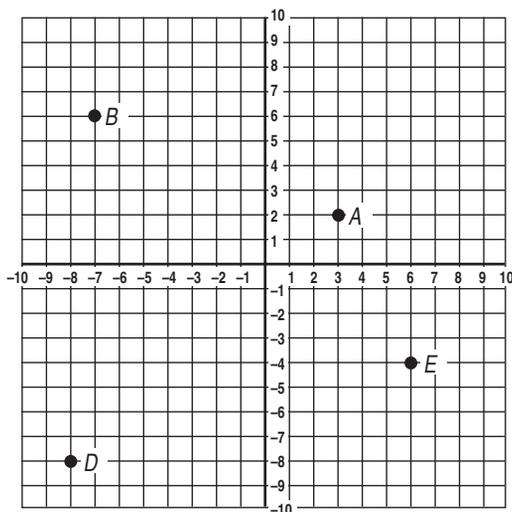
$72, -12, -7, 67$ _____

$-3, -92, -51, -28$ _____

Lesson 4.5 Using Integers in the Coordinate Plane

Positive and negative coordinates can be graphed using the coordinate plane system.

The first number in an ordered pair represents its point on the x -axis. The second number represents the point on the y -axis.



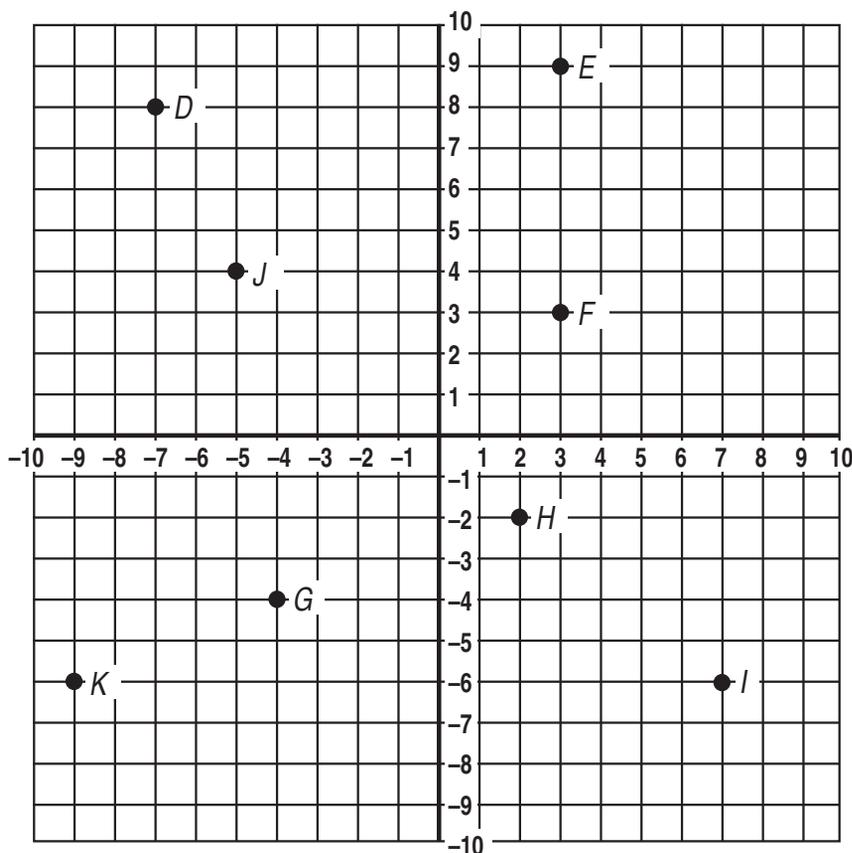
Point A: $(3, 2)$

Point B: $(-7, 6)$

Point C: $(6, -4)$

Point D: $(-8, -8)$

Use the coordinate grid to answer the questions.



Write the ordered pair for each coordinate.

1. D _____

2. E _____

3. G _____

4. H _____

5. K _____

Name the point located at each ordered pair.

6. $(-5, 4)$ _____

7. $(7, -6)$ _____

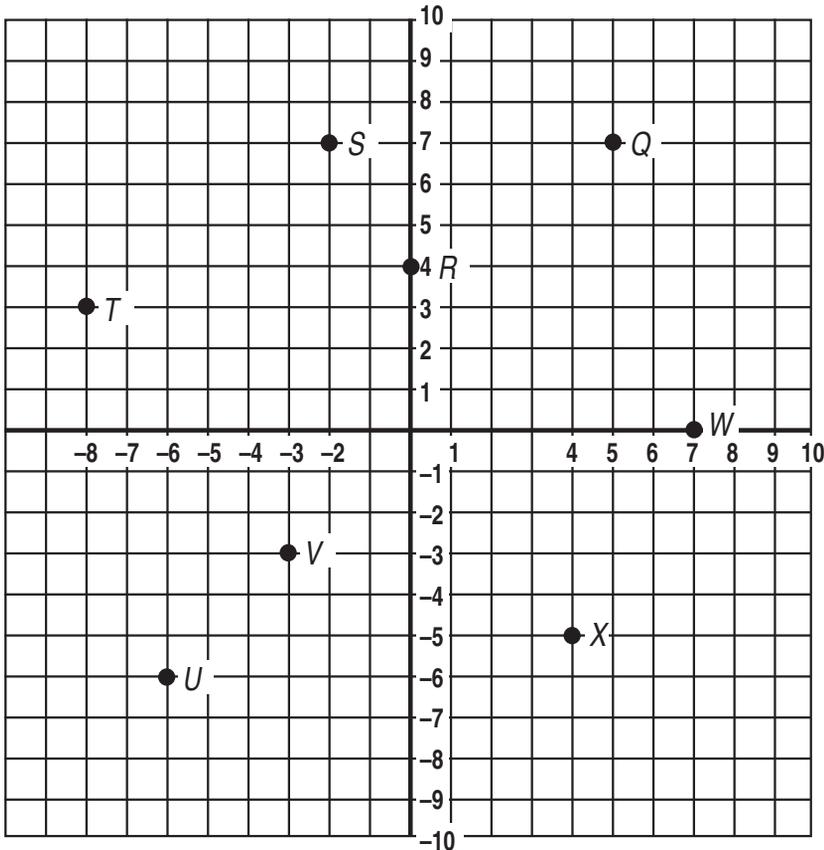
8. $(-9, -6)$ _____

9. $(3, 3)$ _____

10. $(-7, 8)$ _____

Lesson 4.5 Using Integers in the Coordinate Plane

Use the coordinate grid to answer the questions.



Write the ordered pair for each coordinate.

1. R _____

2. T _____

3. U _____

4. W _____

5. V _____

6. Q _____

7. S _____

8. X _____

Name the point located at each ordered pair.

9. $(-2, 7)$ _____

10. $(5, 7)$ _____

11. $(-3, -3)$ _____

12. $(4, -5)$ _____

13. $(0, 4)$ _____

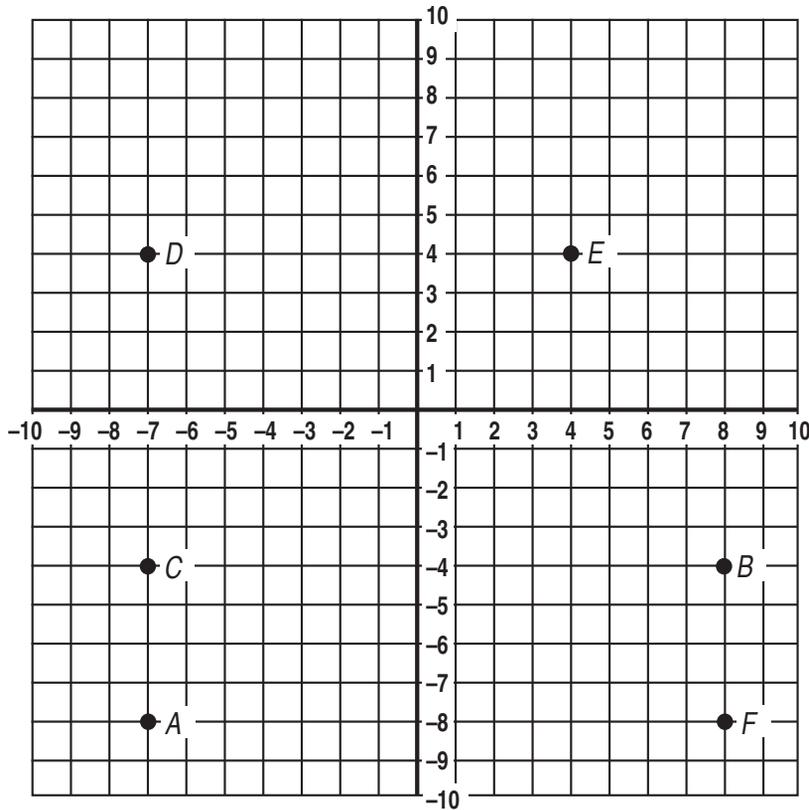
14. $(7, 0)$ _____

15. $(-8, 3)$ _____

16. $(-6, -6)$ _____

**Lesson 4.6****Problem Solving in the Coordinate Plane**

Use the coordinate grid to answer the questions.



A – stream

D – school

B – home

E – park

C – bookstore

F – fire station

How far is it from the fire station to the bookstore?

Begin at the fire station.

First move 15 units left. Then, move 4 units up.

$$\underline{15} + \underline{4} = \underline{19} \text{ units}$$

It takes 19 units to get from the fire station to the bookstore.

1. How far is it from school to the park? _____ units
2. How far is it from the stream to the fire station? _____ units
3. How far is it from the bookstore to home? _____ units
4. How far is it from the stream to the school? _____ units
5. How far is from the fire station to home? _____ units



Check What You Learned

Integer Concepts

Name the opposite of each number.

a

1. The opposite of -9 is _____.

2. The opposite of 22 is _____.

3. The opposite of -5 is _____.

b

The opposite of 17 is _____.

The opposite of -41 is _____.

The opposite of 76 is _____.

Find the absolute value of each integer.

a

4. $|3| =$ _____

5. $-|-29| =$ _____

6. $|-26| =$ _____

b

$-|10| =$ _____

$|12| =$ _____

$|2| =$ _____

c

$|-45| =$ _____

$|-8| =$ _____

$-|-18| =$ _____

Compare the integers using $<$, $>$, or $=$.

a

7. $92 \square 79$

8. $-77 \square 15$

9. $-18 \square -76$

b

$50 \square -76$

$-11 \square -49$

$44 \square 72$

c

$-74 \square -35$

$-14 \square -73$

$-45 \square -12$

Order from least to greatest.

a

10. $-70, 60, -28, 86$ _____

11. $-97, -71, 36, -63$ _____

12. $38, 56, 89, 48$ _____

b

$-17, 45, -54, -38$ _____

$-36, 60, 26, 63$ _____

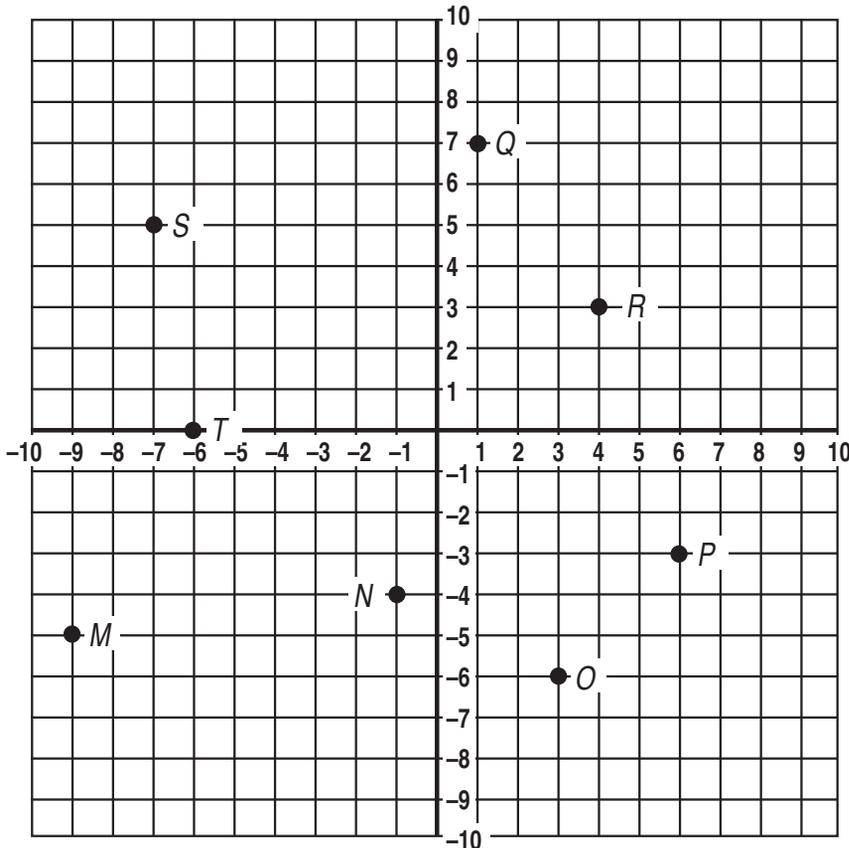
$49, 97, -47, 78$ _____



Check What You Learned

Integer Concepts

Use the coordinate grid to answer the questions.



Write the ordered pair for each coordinate.

13. M _____

14. O _____

15. Q _____

16. S _____

Name the point located at each ordered pair.

17. $(6, -3)$ _____

18. $(-6, 0)$ _____

19. $(-1, -4)$ _____

20. $(4, 3)$ _____

Mark the following points on the coordinate grid.

21. U at $(-3, 4)$

22. V at $(-5, -8)$

23. W at $(5, -5)$

24. X at $(2, 6)$

25. How many units is it from Point P to Point M? _____ units

26. How many units is it from Point T to Point Q? _____ units

Mid-Test Chapters 1–4

Multiply or divide. Write fractions in simplest form.

	a	b	c	d	e
1.	$\begin{array}{r} 329 \\ \times 17 \\ \hline \end{array}$	$\begin{array}{r} 1843 \\ \times 51 \\ \hline \end{array}$	$\begin{array}{r} 432 \\ \times 57 \\ \hline \end{array}$	$\begin{array}{r} 2945 \\ \times 612 \\ \hline \end{array}$	$\begin{array}{r} 6281 \\ \times 408 \\ \hline \end{array}$

2.	$58 \overline{)704}$	$8 \overline{)62472}$	$45 \overline{)6208}$	$15 \overline{)38725}$	$68 \overline{)29104}$
-----------	----------------------	-----------------------	-----------------------	------------------------	------------------------

3.	$\begin{array}{r} 6.4 \\ \times 8.7 \\ \hline \end{array}$	$\begin{array}{r} 0.786 \\ \times 0.41 \\ \hline \end{array}$	$\begin{array}{r} \$67.52 \\ \times 20 \\ \hline \end{array}$	$\begin{array}{r} \$16.52 \\ \times 6.93 \\ \hline \end{array}$	$\begin{array}{r} 27.63 \\ \times 6 \\ \hline \end{array}$
-----------	--	---	---	---	--

4.	$0.5 \overline{)37.5}$	$0.07 \overline{)46.55}$	$6.3 \overline{)476.28}$	$0.3 \overline{)742.8}$	$1.8 \overline{)705.6}$
-----------	------------------------	--------------------------	--------------------------	-------------------------	-------------------------

5.	$\frac{2}{3} \times \frac{3}{4} =$	$\frac{5}{6} \times \frac{7}{8} =$	$6 \times \frac{5}{8} =$	$2 \times 4\frac{2}{3} =$	$3\frac{1}{3} \times 4\frac{1}{5} =$
-----------	------------------------------------	------------------------------------	--------------------------	---------------------------	--------------------------------------

6.	$5 \div \frac{1}{6} =$	$\frac{3}{5} \div 4 =$	$\frac{7}{8} \div \frac{2}{3} =$	$4\frac{1}{3} \div 5 =$	$3\frac{1}{8} \div 1\frac{2}{3} =$
-----------	------------------------	------------------------	----------------------------------	-------------------------	------------------------------------

Mid-Test Chapters 1–4

Find the unknown value in each ratio.

7. $\frac{9}{2} = \frac{18}{\square}$ _____ **a**

$\frac{5}{11} = \frac{\square}{77}$ _____ **b**

$\frac{\square}{36} = \frac{5}{12}$ _____ **c**

8. $\frac{12}{7} = \frac{48}{\square}$ _____

$\frac{42}{\square} = \frac{7}{3}$ _____

$\frac{4}{9} = \frac{\square}{54}$ _____

9. $\frac{9}{\square} = \frac{54}{66}$ _____

$\frac{\square}{7} = \frac{14}{49}$ _____

$\frac{5}{4} = \frac{10}{\square}$ _____

SHOW YOUR WORK

Find the unit rate for each problem.

- 10.** The Wilson Student Government sold \$126 worth of tickets for a talent show in 3 hours. How many tickets did they sell in one hour?

They sold _____ tickets in one hour.

- 11.** One thousand sixty-five people visited the carnival in 5 hours. How many people visited in one hour?

_____ people visited in one hour.

- 12.** You can buy 6 apples at Shop and Save for \$0.96. You can buy 4 of the same apples at Value Food for \$1.20. Which store has the better buy?

_____ has the better buy.

10.

11.

12.

Convert to percents.

13. $\frac{3}{20} =$ _____ **a**

$\frac{4}{5} =$ _____ **b**

$\frac{14}{50} =$ _____ **c**

Convert to decimals.

14. 30% = _____

$72\frac{1}{4}\% =$ _____

346% = _____

Convert to fractions.

15. 75% = _____

20% = _____

140% = _____

Mid-Test Chapters 1–4

Complete each statement.

- | a | b | c |
|----------------------------------|-----------------------|-----------------------|
| 16. _____ is 9% of 30. | _____ is 8% of 15. | _____ is 22% of 90. |
| 17. 36.9 is 45% of _____. | 0.36 is 12% of _____. | 120 is 150% of _____. |
| 18. 13 is _____% of 52. | 5 is _____% of 125. | 38 is _____% of 40. |

Find the absolute value of each integer.

- | | | |
|-----------------------------|-----------------|------------------|
| 19. $ 7 =$ _____ | $ 71 =$ _____ | $- -68 =$ _____ |
| 20. $ -100 =$ _____ | $- 25 =$ _____ | $ 95 =$ _____ |
| 21. $- 37 =$ _____ | $ -68 =$ _____ | $- -25 =$ _____ |

Compare the integers using $<$, $>$, or $=$.

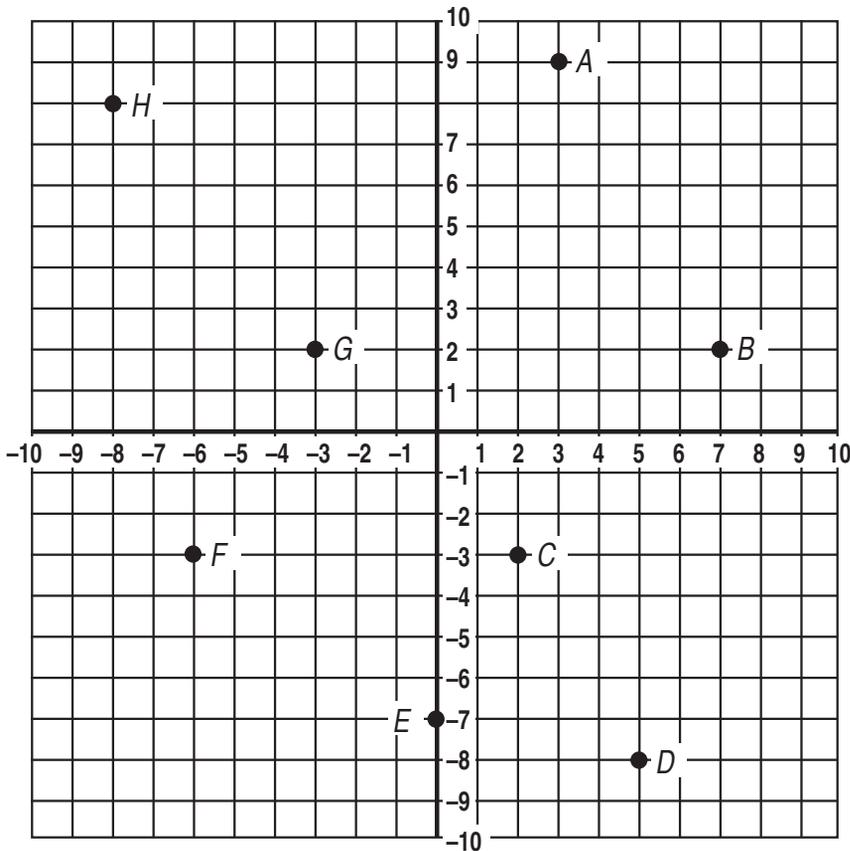
- | | | |
|------------------------------|-------------------|------------------|
| 22. $-32 \square -35$ | $-68 \square -41$ | $40 \square 27$ |
| 23. $96 \square 17$ | $20 \square 36$ | $20 \square 48$ |
| 24. $72 \square -15$ | $-29 \square 62$ | $14 \square -77$ |

Order from least to greatest.

- | a | b |
|-------------------------------------|--------------------------|
| 25. $-85, -56, 6, -6$ _____ | $-3, -47, 80, -82$ _____ |
| 26. $5, 10, -60, 99$ _____ | $37, 76, 66, 73$ _____ |
| 27. $-7, 16, -47, -37$ _____ | $-56, 97, 75, 61$ _____ |

Mid-Test Chapters 1–4

Use the coordinate grid to answer the questions.



Write the ordered pair for each coordinate.

28. A _____

29. C _____

30. E _____

31. G _____

Name the point located at each ordered pair.

32. $(-8, 8)$ _____

33. $(-6, -3)$ _____

34. $(5, -8)$ _____

35. $(7, 2)$ _____

Mark the following points on the coordinate grid.

36. I at $(-3, -5)$

37. J at $(4, -8)$

38. K at $(5, 2)$

39. L at $(-1, 6)$

40. How many units is it from Point B to Point H? _____ units

41. How many units is it from Point F to Point D? _____ units



Check What You Know

Expressions and Equations

Write each power as a product of factors.

- | a | b | c |
|----------------|-------------|-------------|
| 1. 2^4 _____ | 9^2 _____ | 5^3 _____ |
| 2. 4^2 _____ | 8^5 _____ | 7^3 _____ |

Use exponents to rewrite each expression.

- | | | |
|---|-------------------------------|--|
| 3. $4 \times 4 \times 4 \times 4 =$ _____ | $2 \times 2 \times 2 =$ _____ | $6 \times 6 \times 6 \times 6 \times 6 =$ _____ |
| 4. $3 \times 3 =$ _____ | $9 \times 9 \times 9 =$ _____ | $8 \times 8 \times 8 \times 8 \times 8 \times 8 =$ _____ |

Identify each of the following as an *expression* or an *equation*.

- | | | |
|----------------------|--------------------|---------------------|
| 5. $5 + x$ _____ | $6 + 4 = 10$ _____ | $75 \times n$ _____ |
| 6. $9 - 4 = 5$ _____ | $10 + x$ _____ | $20 \div 5$ _____ |

For each term below, identify the coefficient (C) and the variable (V).

- | | | |
|--------------------------|----------------------|----------------------|
| 7. $5y$ C _____ V _____ | $2x$ C _____ V _____ | n C _____ V _____ |
| 8. $12z$ C _____ V _____ | $4m$ C _____ V _____ | $9d$ C _____ V _____ |

Write the expression for each statement.

- | | |
|--|-------|
| 9. the product of 4 and the difference between 8 and 3 | _____ |
| 10. 4 increased by the product of 5 and 3 | _____ |
| 11. the difference between 16 and the product of 4 and 2 | _____ |
| 12. the quotient of 25 and 5 increased by 3 | _____ |
| 13. the product of 6 and 2 decreased by 1 | _____ |
| 14. three times the quotient of 40 and 8 | _____ |
| 15. 7 decreased by the product of 4 and 2 | _____ |

**Check What You Know****Expressions and Equations**

Solve each equation.

a

16. $x - 4 = 4$ _____

17. $b + 8 = 19$ _____

18. $a + 4 = 11$ _____

19. $\frac{a}{4} = 4$ _____

20. $y \times 20 = 30$ _____

21. $\frac{x}{5} = 20$ _____

b

$x + 3 = 5$ _____

$n + 5 = 5$ _____

$n - 8 = 8$ _____

$a \times 4 = 4$ _____

$\frac{x}{12} = 3$ _____

$n \times 5 = 25$ _____

c

$n - 2 = 0$ _____

$y + 3 = 3$ _____

$y - 5 = 5$ _____

$\frac{m}{5} = 5$ _____

$b \times 7 = 21$ _____

$\frac{x}{9} = 1$ _____

SHOW YOUR WORK

Solve the problems.

- 22.** Eva spent \$48 on a shirt and a pair of pants. The pants cost twice as much as the shirt. How much did each item cost?

Let s stand for the cost of the shirt.Equation: _____ $s =$ _____

The shirt cost _____. The pants cost _____.

- 23.** In Ben's office, there are 5 more women than men. There are 23 women. How many men are there?

What is the unknown number? _____

Equation: _____ $n =$ _____

There are _____ men in the office.

22.**23.**

Lesson 5.1 Using Exponents

A **power** of a number represents repeated multiplication of the number by itself.

$10^3 = 10 \times 10 \times 10$ and is read 10 to the third power.

In **exponential** numbers, the **base** is the number that is multiplied, and the **exponent** represents the number of times the base is used as a factor. In 2^5 , 2 is the base and 5 is the exponent.

2^5 means 2 is used as a factor 5 times.

$$2 \times 2 \times 2 \times 2 \times 2 = 32 \quad 2^5 = 32$$

Scientific notation for a number is expressed by writing the number as the product of a number between one and ten, and a power of ten.

3,000 can be written as $3 \times 1,000$ or 3×10^3 .

3×10^3 is scientific notation for 3,000.

Some powers of 10 are shown in the table at right.

10^1	10	10
10^2	10×10	100
10^3	$10 \times 10 \times 10$	1,000
10^4	$10 \times 10 \times 10 \times 10$	10,000
10^5	$10 \times 10 \times 10 \times 10 \times 10$	100,000

Use the table above to write each number in scientific notation.

- | a | b | c |
|------------------|---------------|--------------|
| 1. 30 _____ | 4,000 _____ | 50,000 _____ |
| 2. 600,000 _____ | 700 _____ | 90 _____ |
| 3. 40,000 _____ | 100,000 _____ | 400 _____ |

Write each power as the product of factors.

- | | | |
|-----------------|-------------|--------------|
| 4. 3^3 _____ | 5^5 _____ | 1^6 _____ |
| 5. 12^2 _____ | 8^3 _____ | 6^3 _____ |
| 6. 7^4 _____ | 4^4 _____ | 11^4 _____ |

Use exponents to rewrite each expression.

- | | | |
|---|--------------------------------|--|
| 7. $3 \times 3 \times 3$ _____ | 8×8 _____ | $7 \times 7 \times 7 \times 7 \times 7$ _____ |
| 8. 24×24 _____ | $4 \times 4 \times 4$ _____ | $6 \times 6 \times 6 \times 6 \times 6 \times 6$ _____ |
| 9. $2 \times 2 \times 2 \times 2$ _____ | $38 \times 38 \times 38$ _____ | $5 \times 5 \times 5 \times 5 \times 5$ _____ |

Evaluate each expression.

- | | | |
|----------------------------|------------------------|-------------------------|
| 10. a^4 if $a = 2$ _____ | x^3 if $x = 4$ _____ | n^7 if $n = 1$ _____ |
| 11. n^2 if $n = 8$ _____ | b^4 if $b = 3$ _____ | x^3 if $x = 5$ _____ |
| 12. a^5 if $a = 3$ _____ | x^3 if $x = 6$ _____ | n^2 if $n = 11$ _____ |

Lesson 5.1 Using Exponents

Write each power as the product of factors.

- | a | b | c |
|-----------------|--------------|--------------|
| 1. 3^5 _____ | 9^3 _____ | 2^7 _____ |
| 2. 10^2 _____ | 3^4 _____ | 2^8 _____ |
| 3. 7^3 _____ | 4^2 _____ | 7^2 _____ |
| 4. 9^3 _____ | 8^1 _____ | 12^2 _____ |
| 5. 5^4 _____ | 11^3 _____ | 6^5 _____ |
| 6. 4^4 _____ | 10^3 _____ | 8^6 _____ |

Use exponents to rewrite each expression.

- | | | |
|---|---|--|
| 7. $3 \times 3 \times 3 =$ _____ | $5 \times 5 \times 5 \times 5 \times 5 =$ _____ | $2 \times 2 \times 2 \times 2 \times 2 \times 2 =$ _____ |
| 8. $9 \times 9 \times 9 =$ _____ | $4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 =$ _____ | $21 \times 21 =$ _____ |
| 9. $10 \times 10 \times 10 \times 10 =$ _____ | $8 \times 8 \times 8 \times 8 \times 8 =$ _____ | $7 \times 7 \times 7 \times 7 =$ _____ |

Evaluate each expression.

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

Lesson 5.2 Parts of an Expression

A **variable** is a symbol, usually a letter of the alphabet, that stands for an unknown number, or quantity. $a = \text{variable}$

An **algebraic expression** is a combination of numbers, variables, and at least one operation. $x + 13$

A **term** is a number, variable, product, or quotient in an algebraic expression. In $3a + 5$, $3a$ is a term and 5 also is a term.

The term $3a$ means $3 \times a$. The number 3 is the coefficient of a . A **coefficient** is a number that multiplies a variable. In the expression $x + 5$, the coefficient of x is understood to be 1 .

An **equation** is a sentence that contains an equal sign. $x + 13 = 25$

Identify each of the following as an *expression* or an *equation*.

- | | | |
|-----------------------|--------------------|-------------------------|
| a | b | c |
| 1. $3 + x$ _____ | $7 + 4 = 11$ _____ | $55 \times n$ _____ |
| 2. $x - 7 = 15$ _____ | $b - 45$ _____ | $24 = 6 \times 4$ _____ |

For each term below, identify the coefficient and the variable.

- | | |
|--|---------------------------------------|
| a | b |
| 3. $3x$ coefficient _____ variable _____ | $4y$ coefficient _____ variable _____ |
| 4. z coefficient _____ variable _____ | $5n$ coefficient _____ variable _____ |
| 5. $7b$ coefficient _____ variable _____ | m coefficient _____ variable _____ |
| 6. r coefficient _____ variable _____ | $6d$ coefficient _____ variable _____ |

Translate each phrase into an algebraic expression.

- | | |
|-----------------------------|-----------------------------------|
| 7. five more than n _____ | eight decreased by x _____ |
| 8. x added to seven _____ | the product of n and 11 _____ |

Translate each sentence into an equation.

- | | |
|--|---|
| 9. Six times a number is 18 . _____ | Seventy less a number is 29 . _____ |
| 10. Eight divided by a number is 2 . _____ | The product of 7 and 12 is 84 . _____ |

Write the following expressions in words.

- | |
|------------------------------|
| 11. $6 - n = 3$ _____ |
| 12. $5 \times 13 = 65$ _____ |

Lesson 5.2 Parts of an Expression

Identify each of the following as an *expression* or an *equation*.

- | a | b | c |
|----------------------------|-------------------------|--------------------------|
| 1. $8 + x$ _____ | $9 + 7 = 16$ _____ | $20 \times m = 60$ _____ |
| 2. $b \div 5$ _____ | $32 = 8 \times 4$ _____ | 43×7 _____ |
| 3. $4h$ _____ | $91 - 20 = 71$ _____ | $17 + c$ _____ |
| 4. $36 = 9 \times 4$ _____ | $65 - x$ _____ | $30f$ _____ |

For each term below, identify the coefficient and the variable.

- | a | b |
|---|---------------------------------------|
| 5. $6g$ coefficient _____ variable _____ | p coefficient _____ variable _____ |
| 6. $5r$ coefficient _____ variable _____ | $9t$ coefficient _____ variable _____ |
| 7. $2x$ coefficient _____ variable _____ | $4n$ coefficient _____ variable _____ |
| 8. $3a$ coefficient _____ variable _____ | $7d$ coefficient _____ variable _____ |
| 9. $20s$ coefficient _____ variable _____ | y coefficient _____ variable _____ |

Translate each phrase into an expression or an equation.

- | | |
|--|------------------------------------|
| 10. the sum of 3 and b _____ | 8 times the sum of f and 7 _____ |
| 11. product of 8 and d _____ | p added to 4 equals 9 _____ |
| 12. subtract 3 from 4 times m _____ | r minus 2 is 8 _____ |
| 13. 4 times the sum of 5 and x _____ | product of 10 and 2 _____ |
| 14. 12 times r minus 7 _____ | the sum of 9 and k _____ |

Lesson 5.3 Writing Expressions

An **equation** is a number sentence that contains an equal sign.

An **expression** is a number phrase without an equal sign.

Equations and expressions may contain only numerals, or they also may contain variables. A

variable is a symbol, usually a letter, that stands for an unknown number.

	<i>Equation</i>	<i>Expression</i>
Numerical	$3 \times 5 = 15$	$9 + 2$
Variable	$2n + 2 = 18$	$a - 5$

All equations and expressions express an idea.

3×4 means "three 4s." $6 \div 3 = 2$ means "6 divided by 3 is 2."

$n - 7$ means " n decreased by 7" or "a number decreased by 7."

$4n + 2 = 6$ means "four times a number, plus 2, is 6" or "4ns, plus 2, is 6."

Translate each phrase into an expression or an equation.

a

b

- | | |
|-------------------------------------|---------------------------------|
| 1. x increased by 5 _____ | 12 divided by a number _____ |
| 2. seven n s _____ | c less than 7 _____ |
| 3. a number added to 15 is 23 _____ | one-fourth of x _____ |
| 4. p added to 6 _____ | the product of 15 and m _____ |

Translate each sentence into an equation. Use n for an unknown number.

- 11 decreased by a number is 7. _____
- 8 times a number, plus 4, is 84. _____
- A number divided by 5 is 6. _____

Write each expression in words.

- $n - 5$ _____
- $3n \div 6$ _____

Lesson 5.3 Writing Expressions

Translate each phrase into an algebraic expression or an equation.

a
1. subtract 8 from 3 times d _____

b
take away 3 from x _____

2. g minus 2 is 14 _____

z is added to 8 _____

3. the sum of 7 and z _____

2 is subtracted from 4 times d _____

4. two-fifths of the sum of 6 and s _____

9 minus c _____

5. 10 minus x _____

subtract 9 from the product of 4 and f _____

6. 3 is subtracted from 5 times a _____

y minus 3 is 15 _____

7. s is added to 9 _____

the sum of 8 and t _____

8. take away 9 from h _____

one-third of the sum of 7 and k _____

Write each expression in words.

9. $9 \div x$ _____

10. $3 \times g = 27$ _____

11. $6 \times m - 4$ _____

12. $\frac{1}{2} \times b + 9 = 11$ _____

13. $14 \div p$ _____

14. $6 \times b = 42$ _____

15. $9 \times d - 10$ _____

16. $\frac{1}{4} \times t + 8 = 16$ _____

Lesson 5.4 Equivalent Expressions

Equivalent expressions are created by simplifying values and combining terms.

$$4(6x - 5) = 24x - 20 \quad \text{Multiply each value by 4 to create an equivalent expression.}$$

$$3(4^3 + 7x) = 3(64 + 7x) \quad \text{First, calculate the value of the exponents.}$$

$$3(64 + 7x) = 192 + 21x \quad \text{Then, use the distributive property to create the equivalent expression.}$$

$$t + t + t = 3t \quad \text{Use multiplication in place of repeated addition.}$$

Create expressions equivalent to the ones below.

1. $7(4z + 8b)$ _____

2. $8(2x + 3^2)$ _____

3. $4(r + r + r + r)$ _____

4. $9(3 + 8x)$ _____

5. $4^2(3 + 6t)$ _____

6. $\frac{t+t+t}{4}$ _____

7. $2(4s^3 + 2)$ _____

8. $30(3x + 4)$ _____

9. $6(5a + 9b)$ _____

10. $9(3x + 5^4)$ _____

11. $7(c + c + c)$ _____

12. $9(2 + 7f)$ _____

13. $7^5(4g - 8d)$ _____

14. $\frac{e+e+e}{5}$ _____

15. $5(3z^6 + 3)$ _____

16. $10(y + 2)$ _____

Lesson 5.4 Equivalent Expressions

Create expressions equivalent to the ones below.

1. $4(a + b)$ _____

2. $3(9a + 8b)$ _____

3. $9(x + 2y)$ _____

4. $2(9x + 3^2)$ _____

5. $5^3(2 + 4c)$ _____

6. $\frac{x+x}{3}$ _____

7. $4^2(12 + 5c)$ _____

8. $17(14r + 3^3) - 7r$ _____

9. $6(c - f)$ _____

10. $4(10b - 10c)$ _____

11. $8(g - 3d)$ _____

12. $3(7h + 4^2)$ _____

13. $4^5(3 + 5t)$ _____

14. $\frac{d+d}{10}$ _____

15. $6^4(25 + t)$ _____

16. $19(20f - w^4) + 3f$ _____

Lesson 5.5 Solving 1-Step Equations: Addition & Subtraction

Subtraction Property of Equality

If you subtract the same number from each side of an equation, the two sides remain equal.

$$x + 12 = 20$$

To undo the addition of 12, subtract 12.

$$x + 12 - 12 = 20 - 12$$

$$x + 0 = 8$$

$$x = 8$$

Addition Property of Equality

If you add the same number to each side of an equation, the two sides remain equal.

$$n - 3 = 15$$

To undo the subtraction of 3, add 3.

$$n - 3 + 3 = 15 + 3$$

$$n - 0 = 18$$

$$n = 18$$

Write the operation that would undo the operation in the equation.

1. $x - 4 = 3$ _____ **a**

2. $y + 7 = 25$ _____

$8 = b + 4$ _____ **b**

$3 = a - 7$ _____

Solve each equation.

3. $a - 4 = 2$ _____ **a**

4. $7 = x - 4$ _____

5. $z - 7 = 5$ _____

6. $x + 7 = 10$ _____

7. $b + 4 = 4$ _____

8. $z - 10 = 20$ _____

$y + 5 = 9$ _____ **b**

$b + 7 = 19$ _____

$m - 5 = 5$ _____

$x - 3 = 18$ _____

$b - 8 = 12$ _____

$z + 5 = 20$ _____

$x - 3 = 14$ _____ **c**

$y + 5 = 5$ _____

$n + 1 = 1$ _____

$x + 0 = 9$ _____

$n + 8 = 12$ _____

$x - 2 = 8$ _____

Write and solve the equation for each problem below.

- 9.** Kelley went to the movies. She took 20 dollars with her. When she came home, she had 6 dollars. How much money did she spend? _____

- 10.** There are 27 students in Mrs. Yuen's homeroom. Twelve of them have home computers. How many students do not have home computers?

9.

10.

Lesson 5.5 Solving 1-Step Equations: Addition & Subtraction

Solve each equation.

- | a | b | c |
|-----------------------|---------------------|---------------------|
| 1. $9 + d = 16$ _____ | $y + 3 = 9$ _____ | $12 + a = 27$ _____ |
| 2. $18 - b = 4$ _____ | $23 - c = 21$ _____ | $w - 11 = 11$ _____ |
| 3. $n + 8 = 41$ _____ | $7 + m = 20$ _____ | $9 + s = 9$ _____ |
| 4. $t - 18 = 5$ _____ | $36 - a = 36$ _____ | $15 - b = 0$ _____ |
| 5. $17 = c + 3$ _____ | $29 = 5 + b$ _____ | $36 = 35 + n$ _____ |
| 6. $2 = d - 4$ _____ | $19 = 25 - a$ _____ | $12 = t - 12$ _____ |

Write an equation for each problem. Then, solve the equation.

7. Ruben read 37 pages in his history book over the weekend. He read 21 pages on Saturday. How many pages did he read on Sunday?
 _____ He read _____ pages on Sunday.
8. The Garcias ate 9 pieces of toast for breakfast. If there are 33 slices of bread left, how many slices were in the loaf of bread?
 _____ There were _____ slices in the loaf of bread.
9. In a 25-kilometer triathlon, competitors swim 2 kilometers, run 5 kilometers, and bike the rest. How far do they bike?
 _____ They bike _____ kilometers.

Lesson 5.6 Solving 1-Step Equations: Multiplication & Division

Division Property of Equality

If you divide each side of an equation by the same nonzero number, the two sides remain equal.

$$3y = 21$$

To undo multiplication by 3, divide by 3.

$$\frac{3y}{3} = \frac{21}{3}$$

$$y = 7$$

Multiplication Property of Equality

If you multiply each side of an equation by the same number, the two sides remain equal.

$$\frac{a}{4} = 4$$

To undo division by 4, multiply by 4.

$$\frac{a}{4} \times \frac{4}{1} = 5 \times 4$$

$$a = 20$$

Write the operation that would undo the operation in each equation.

a

1. $5 \times n = 40$ _____

2. $\frac{x}{2} = 8$ _____

b

$\frac{y}{5} = 80$ _____

$a \times 7 = 42$ _____

Solve each equation.

a

3. $3 \times a = 9$ _____

4. $\frac{x}{3} = 3$ _____

5. $5 \times b = 10$ _____

6. $\frac{m}{3} = 1$ _____

7. $4 \times n = 1$ _____

8. $n \times 15 = 30$ _____

9. $\frac{n}{18} = 2$ _____

10. $\frac{n}{2} = 20$ _____

11. $5 \times b = 30$ _____

12. $\frac{n}{4} = 1$ _____

b

$\frac{x}{5} = 5$ _____

$n \times 4 = 4$ _____

$\frac{b}{8} = 2$ _____

$8 \times n = 20$ _____

$\frac{n}{4} = 5$ _____

$\frac{n}{4} = 10$ _____

$n \times 3 = 18$ _____

$\frac{n}{16} = 1$ _____

$\frac{b}{5} = 30$ _____

$\frac{b}{2} = 2$ _____

c

$\frac{n}{4} = 3$ _____

$3 \times y = 24$ _____

$4 \times a = 20$ _____

$\frac{x}{5} = 2$ _____

$\frac{b}{3} = 27$ _____

$n \times 12 = 36$ _____

$n \times 2 = 20$ _____

$n \times 3 = 3$ _____

$n \times 8 = 24$ _____

$n \times 6 = 48$ _____

Lesson 5.6 Solving 1-Step Equations: Multiplication & Division

Solve each equation.

- | a | b | c |
|-----------------------------|--------------------------|-------------------------|
| 1. $2 \times d = 18$ _____ | $a \times 4 = 20$ _____ | $5 \times n = 30$ _____ |
| 2. $y \div 3 = 4$ _____ | $t \div 9 = 3$ _____ | $\frac{a}{5} = 3$ _____ |
| 3. $8 \times s = 64$ _____ | $p \times 16 = 16$ _____ | $7 \times r = 42$ _____ |
| 4. $\frac{n}{5} = 10$ _____ | $n \div 3 = 12$ _____ | $a \div 8 = 6$ _____ |
| 5. $25 = 5 \times d$ _____ | $0 = a \times 57$ _____ | $32 = b \times 2$ _____ |
| 6. $19 = \frac{x}{1}$ _____ | $7 = b \div 4$ _____ | $9 = \frac{c}{7}$ _____ |

Write an equation for each problem. Then, solve the equation.

7. Taryn practiced piano the same amount of time every day for 6 days. If she practiced a total of 12 hours, how many hours did she practice each day?
 _____ She practiced _____ hours each day.
8. A group of friends decided to equally share a package of trading cards. If there were 48 cards in the package and each person received 12, how many friends were in the group?
 _____ There were _____ friends in the group.
9. Twenty-five cars can take the ferry across the river at one time. If 150 cars took the ferry, and it was full each time, how many times did the ferry cross the river?
 _____ The ferry crossed the river _____ times.

Lesson 5.7 Problem Solving

Write an equation to represent the problem, using the variable n for the unknown number. Then, solve for the value of the variable. Look at the following problem as an example.

Hanna bought some peaches. Kevin bought 12 peaches. He bought 2 times as many as Hanna. How many did Hanna buy?

What is the unknown number? the number of peaches Hanna bought

If n stands for that, what stands for the number of peaches Kevin bought? $2n$
What number is that? 12

Equation: $2n = 12$ $n =$ 6

SHOW YOUR WORK

Solve each equation.

1. Jaden has a number of baseball cards. He has 35 more than his brother, who has 52. How many cards does Jaden have?

What is the unknown number? _____

Equation: _____ $n =$ _____

2. Orlando paid \$55.60 for a number of tickets to a hockey game. If each ticket was \$6.95, how many tickets did Orlando buy?

What is the unknown number? _____

Equation: _____ $n =$ _____

3. Erica's room is 1.5 times longer than it is wide. It is 18 feet long. How wide is it?

What is the unknown number? _____

Equation: _____ $n =$ _____

4. In a recent basketball game, the Grizzlies lost by 11 points. The Palominos beat them with a score of 92 points. How many points did the Grizzlies score?

What is the unknown number? _____

Equation: _____ $n =$ _____

1.

2.

3.

4.

Lesson 5.7 Problem Solving**SHOW YOUR WORK**

Solve each problem.

1. Martha bought a soft drink for \$3.00 and four candy bars. She spent a total of \$11.00. How much did each candy bar cost?

What is the unknown number? _____

Equation: _____ $n =$ _____

2. 248 students went on a trip to the zoo. All 6 buses were filled and 8 students had to travel in cars. How many students were in each bus?

What is the unknown number? _____

Equation: _____ $n =$ _____

3. Todd sold half of his comic books and then bought 6 more. He now has 16. How many did he begin with?

What is the unknown number? _____

Equation: _____ $n =$ _____

4. A bike shop charges \$12.00, plus \$6.00 an hour for renting a bike. Mike paid \$48.00 to rent a bike. How many hours did he pay to have the bike checked out?

What is the unknown number? _____

Equation: _____ $n =$ _____

5. Susan spent \$8 of her allowance going to the movies. She gave the dog a bath and earned \$5.00. What is her weekly allowance if she ended up with \$20.00?

What is the unknown number? _____

Equation: _____ $n =$ _____

1.

2.

3.

4.

5.

Lesson 5.8 Solving Inequalities

Inequalities can be solved the same way that equations are solved.

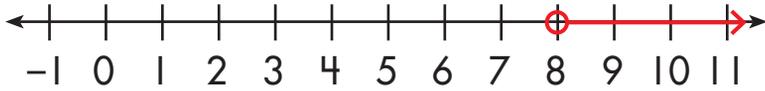
$$6 + q > 14$$

1. Subtract 6 from both sides of the inequality to isolate the variable on one side of the inequality.

$$6 + q - 6 > 14 - 6$$

$$q > 8$$

2. The variable q represents a value that is greater than 8.



A number line can be used to represent the possible values of the variable. An open circle shows that the values do not include 8. For inequalities that use \leq or \geq , a closed circle indicates that the values do include that point.

Solve the inequalities and represent the possible values of the variable on a number line.

1. $6 > z - 2$

2. $g + 7 < -12$

3. $d - 5 < 7$

4. $15 > k + 2$

5. $l + x > -16$

6. $y + 8 < -9$

7. $8 \leq 8 + r$

8. $w + 8 \geq 11$

Lesson 5.8 Solving Inequalities

Solve the inequalities and represent the possible values of the variable on a number line.

1. $x - 2 < 12$

2. $-1 + y > 17$

3. $p + 2 < -13$

4. $-7 + v < -17$

5. $6 + s \geq -6$

6. $f + 2 \geq 8$

7. $-10 > w - 1$

8. $-3 + g \leq 9$

**Lesson 5.9****Dependent and Independent Variables**

Sometimes word problems contain dependent and independent variables. The **dependent variable** in a problem is the value that is affected by the other values in the problem. The **independent variable** is the value that affects the outcome of the dependent variable.

If a car has to travel 200 miles, the speed (s) the car is driving is the independent variable and the time (t) it takes to make the trip is the dependent variable. This can be represented by the formula, $200 = s \times t$, and can be solved by creating a table.

Dependent Variable	Time	5 hours	4 hours	$3\frac{1}{3}$ hours
Independent Variable	Speed	40 miles/hr.	50 miles/hr.	60 miles/hr.

Use tables to identify the variables and find possible solutions to the problems.

1. Maria has to buy apples at the grocery store. Apples cost \$1.25 per pound. How much will Maria spend on apples?

What equation will you use? _____

Dependent Variable				
Independent Variable				

2. When a tree is planted, it is 6 feet tall. Each month, it grows by 2 feet. How tall will it get over time?

What equation will you use? _____

_____ Variable	Height			
_____ Variable	Time	3 months	6 months	2 years

Lesson 5.9 Dependent and Independent Variables

Use tables to identify the variables and find possible solutions to the problems.

1. Students have been assigned to read a book that is 150 pages. Every student reads at a different speed. Depending on reading speed, how many days will it take different students to read the assigned book?

Write the equation: _____

_____ Variable	Time (Days)			
_____ Variable	Reading Speed	15 pages/day	20 pages/day	30 pages/day

2. As a candle burns, it decreases in height by 2 inches every hour. If the candle is 12 inches tall when it is lit, how will the height change over time?

Write the equation: _____

Dependent Variable	Height (inches)			
Independent Variable	Time (hours)			

3. As a daffodil grows, it increases in height by 3 inches every 2 days. If the daffodil plant starts at 1 inch on day one, how will the height change over time?

Write the equation: _____

Dependent Variable				
Independent Variable				

4. The temperature in an oven increases by 8° every minute. If the starting temperature of the oven is 250, how will the temperature change over time?

Write the equation: _____

_____ Variable				
_____ Variable				



Check What You Learned

Expressions and Equations

Write each power as a product of factors.

- | a | b | c |
|----------------|--------------|-------------|
| 1. 3^5 _____ | 12^2 _____ | 6^4 _____ |
| 2. 5^4 _____ | 7^3 _____ | 8^5 _____ |
| 3. 4^5 _____ | 2^9 _____ | 9^3 _____ |

Use exponents to rewrite each expression.

- | | | |
|--|--|----------------------------------|
| 4. $2 \times 2 \times 2 \times 2 \times 2 =$ _____ | $8 \times 8 \times 8 =$ _____ | $25 \times 25 =$ _____ |
| 5. $4 \times 4 \times 4 =$ _____ | $5 \times 5 =$ _____ | $15 \times 15 \times 15 =$ _____ |

Identify each of the following as an *expression* or an *equation*.

- | | | |
|-----------------------|--------------------|---------------------|
| 6. $7 + x$ _____ | $9 + 4 = 13$ _____ | $85 \times n$ _____ |
| 7. $10 - 6 = 4$ _____ | $12v$ _____ | $18 - g$ _____ |

For each term below, identify the coefficient (C) and the variable (V).

- | | | |
|-------------------------|----------------------|---------------------|
| 8. $9y$ C _____ V _____ | $4b$ C _____ V _____ | m C _____ V _____ |
|-------------------------|----------------------|---------------------|

Write the expression for each statement.

- | | |
|--|-------|
| 9. the product of 2 and the difference between 7 and 3 | _____ |
| 10. 3 increased by the product of 4 and 2 | _____ |
| 11. the difference between 12 and the product of 4 and 3 | _____ |
| 12. the quotient of 20 and 5 increased by 16 | _____ |
| 13. the product of 7 and 2 divided by 3 | _____ |
| 14. twice the quotient of 45 and 9 | _____ |
| 15. the difference between 15 and the product of 4 and 2 | _____ |
| 16. triple the sum of 16 and 9 | _____ |

**Check What You Learned****Expressions and Equations**

Solve each equation.

a

17. $x - 5 = 3$ _____

18. $x - 19 = 8$ _____

19. $b - 7 = 0$ _____

20. $\frac{x}{3} = 3$ _____

21. $b \times 8 = 12$ _____

22. $\frac{n}{4} = 4$ _____

b

$x + 5 = 8$ _____

$x - 12 = 4$ _____

$n + 3 = 3$ _____

$n \times 5 = 5$ _____

$\frac{x}{3} = 3$ _____

$n \times 8 = 8$ _____

c

$y - 4 = 0$ _____

$n + 8 = 8$ _____

$x + 2 = 8$ _____

$\frac{b}{2} = 1$ _____

$a \times 2 = 3$ _____

$b \times 3 = 18$ _____

SHOW YOUR WORK

Solve each problem.

23. Patrick paid \$72.60 for some computer games. Each game cost \$24.20. How many games did Patrick buy?

What is the unknown number? _____

Equation: _____ $n =$ _____

24. Noelle and Gina have a combined height of 130 inches. Noelle is 4 inches taller than Gina. How tall is each girl?

Let n stand for Noelle's height.

Equation: _____

Noelle is _____ inches tall.

Gina is _____ inches tall.

23.

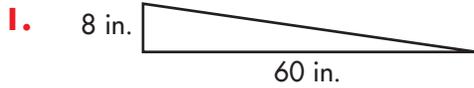
24.



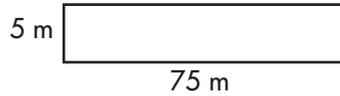
Check What You Know

Geometry

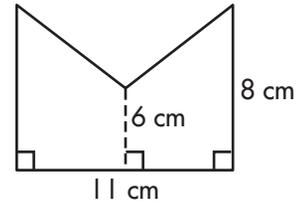
Find the area or surface area of each figure.

a

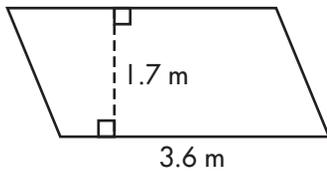
$$A = \underline{\hspace{2cm}} \text{ sq. in.}$$

b

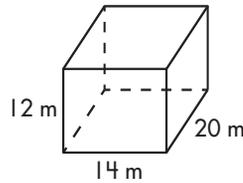
$$A = \underline{\hspace{2cm}} \text{ sq. m}$$

c

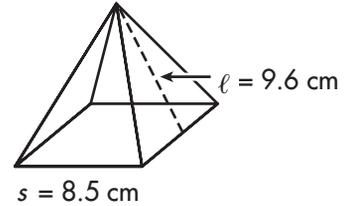
$$A = \underline{\hspace{2cm}} \text{ sq. cm}$$

2.

$$A = \underline{\hspace{2cm}} \text{ sq. m}$$

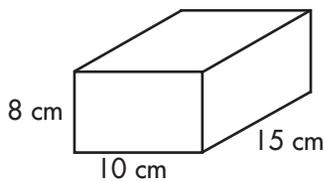


$$SA = \underline{\hspace{2cm}} \text{ sq. ft.}$$

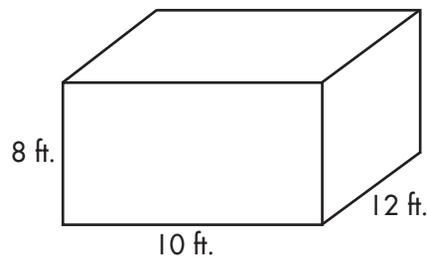


$$SA = \underline{\hspace{2cm}} \text{ sq. cm}$$

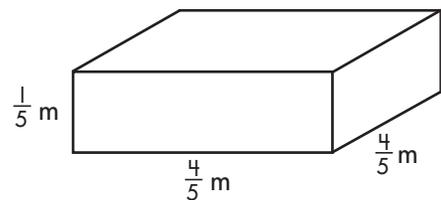
Find the volume of each rectangular solid.

a**3.**

$$V = \underline{\hspace{2cm}} \text{ cu. cm}$$

b

$$V = \underline{\hspace{2cm}} \text{ cu. ft.}$$

c

$$V = \underline{\hspace{2cm}} \text{ cu. m}$$



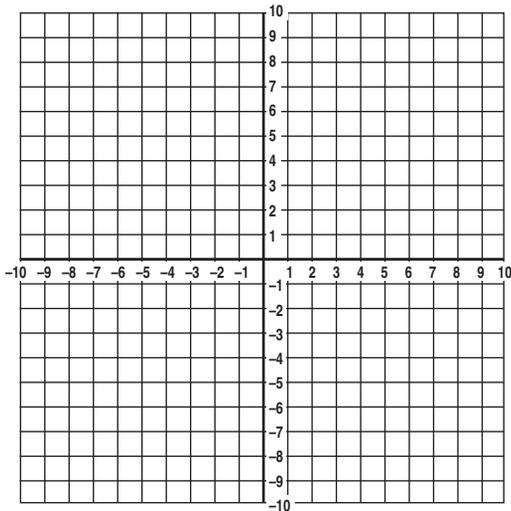
Check What You Know

Geometry

Use the coordinate grids to find the missing vertex of each polygon.

a

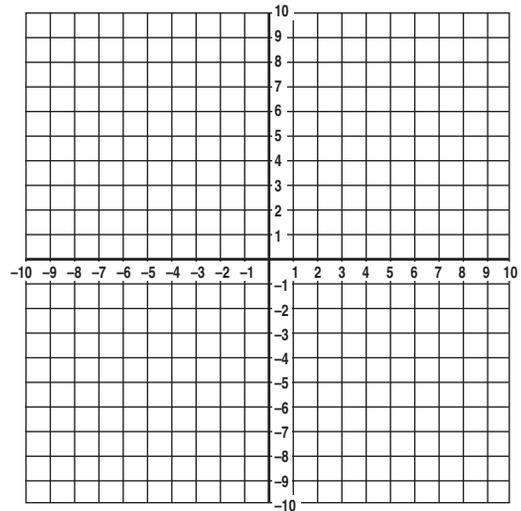
4. a rectangle with points at $(4, -3)$, $(4, -6)$, and $(-3, -6)$



The missing point is at _____.

b

- a right triangle with points at $(-3, 2)$ and $(4, -5)$



The missing point is at _____
or _____.

SHOW YOUR WORK

Solve each problem.

5. The sail on a boat is shaped like a right triangle. Its base is 15 feet and its height is 22 feet. What is the area?

The area is _____ square feet.

6. A shoe box is 6 inches wide, 10 inches long, and 5 inches high. What is the volume?

The volume is _____ cubic inches.

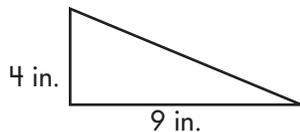
7. A ski jump is shaped like a right triangle. Its base is 27 feet long and the highest point on the ramp is 4 feet. What is the area of the ski jump?

The area is _____ square feet.

5.**6.****7.**

Lesson 6.1 Calculating Area: Triangles

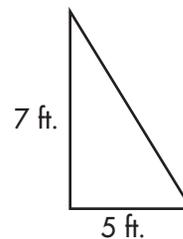
The area (A) of a triangle is one-half the of the base (b) times the height (h).



$$A = \frac{1}{2} \times b \times h$$

or

$$A = \frac{1}{2}bh$$



$$\begin{aligned} A &= \frac{1}{2} \times 9 \times 4 \\ &= \frac{1}{2} \times 36 \\ &= 18 \end{aligned}$$

$$A = 18 \text{ square inches}$$

$$\begin{aligned} A &= \frac{1}{2} \times 5 \times 7 \\ &= \frac{1}{2} \times 35 \\ &= 17\frac{1}{2} \end{aligned}$$

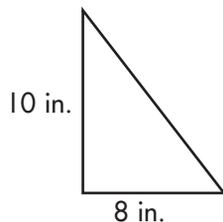
$$A = 17\frac{1}{2} \text{ square feet}$$

Find the area of each right triangle.

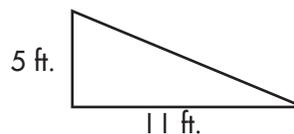
a

b

1.

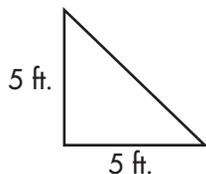


$$A = \underline{\hspace{2cm}} \text{ sq. in.}$$

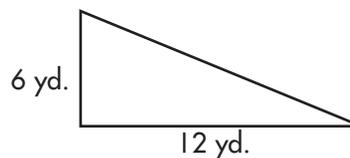


$$A = \underline{\hspace{2cm}} \text{ sq. ft.}$$

2.



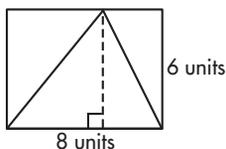
$$A = \underline{\hspace{2cm}} \text{ sq. ft.}$$



$$A = \underline{\hspace{2cm}} \text{ sq. yd.}$$

Lesson 6.1 Calculating Area: Triangles

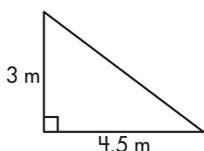
The area of a triangle is related to the area of a rectangle.



The dashed line indicates the height of the triangle.

rectangle: $A = 8 \times 6 = 48$ sq. units

triangle: $A = \frac{1}{2}(8)(6) = 24$ sq. units

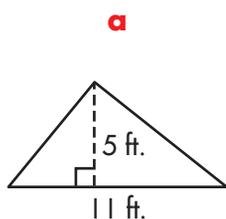


$$A = \frac{1}{2}(4.5)(3) = 6\frac{3}{4} \text{ sq. m}$$

Notice that in a right triangle the height is the length of one of the legs. This is not the case with acute and obtuse triangles.

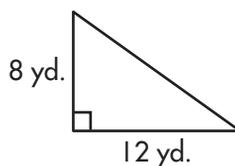
Find the area of each triangle below.

1.



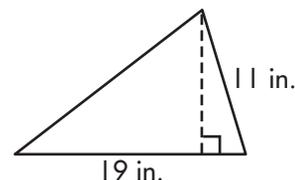
$$A = \underline{\hspace{2cm}} \text{ sq. ft.}$$

b



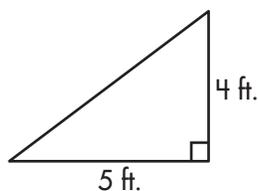
$$A = \underline{\hspace{2cm}} \text{ sq. yd.}$$

c

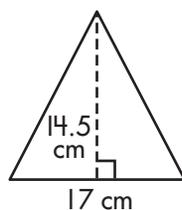


$$A = \underline{\hspace{2cm}} \text{ sq. in.}$$

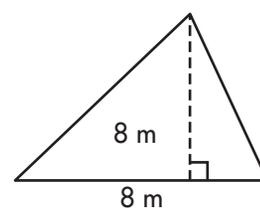
2.



$$A = \underline{\hspace{2cm}} \text{ sq. ft.}$$



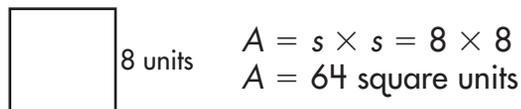
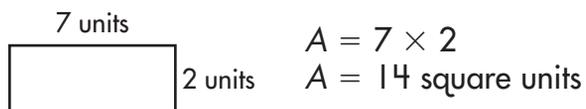
$$A = \underline{\hspace{2cm}} \text{ sq. cm}$$



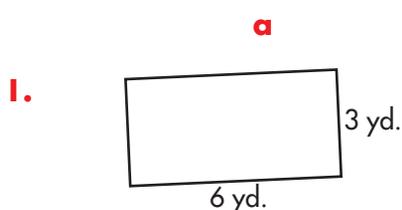
$$A = \underline{\hspace{2cm}} \text{ sq. m}$$

Lesson 6.2 Calculating Area: Quadrilaterals

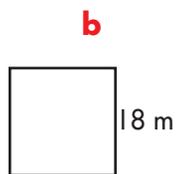
Area is the number of square units it takes to cover a figure. To find the **area of a rectangle**, multiply the length by the width. $A = lw$



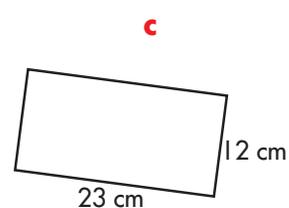
Find the area of each rectangle below.



$$A = \underline{\hspace{2cm}} \text{ sq. yd.}$$



$$A = \underline{\hspace{2cm}} \text{ sq. m}$$



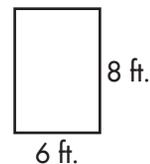
$$A = \underline{\hspace{2cm}} \text{ sq. cm}$$



$$A = \underline{\hspace{2cm}} \text{ sq. km}$$



$$A = \underline{\hspace{2cm}} \text{ sq. in.}$$



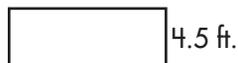
$$A = \underline{\hspace{2cm}} \text{ sq. ft.}$$

Find the length of each rectangle below.



$$A = 54 \text{ sq. in.}$$

$$\ell = \underline{\hspace{2cm}} \text{ in.}$$



$$A = 58.5 \text{ sq. ft.}$$

$$\ell = \underline{\hspace{2cm}} \text{ ft.}$$

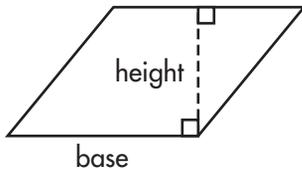


$$A = 81 \text{ sq. m}$$

$$\ell = \underline{\hspace{2cm}} \text{ m}$$

Lesson 6.2 Calculating Area: Quadrilaterals

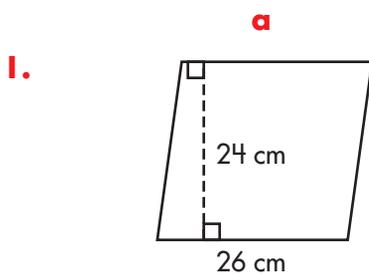
A parallelogram is a polygon with 2 sets of parallel sides. To find the **area of a parallelogram**, multiply the measure of its base by the measure of its height: $A = b \times h$ or $A = bh$.



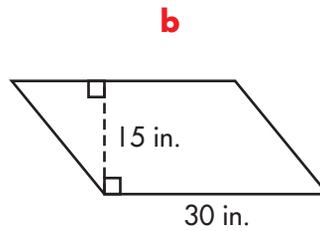
$b = 8$ in. and $h = 7$ in. What is A ?

$$A = b \times h \quad A = 8 \times 7 = 56 \text{ in.}^2 \text{ or } 56 \text{ square inches.}$$

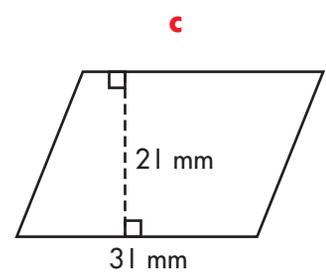
Find the area of each parallelogram.



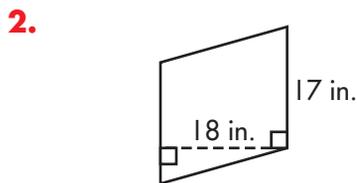
$$A = \underline{\hspace{2cm}} \text{ sq. cm}$$



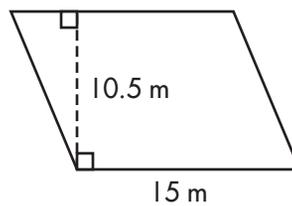
$$A = \underline{\hspace{2cm}} \text{ sq. in.}$$



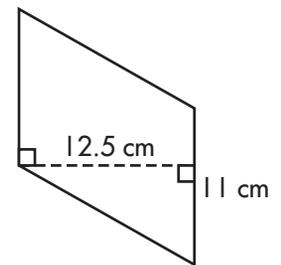
$$A = \underline{\hspace{2cm}} \text{ sq. mm}$$



$$A = \underline{\hspace{2cm}} \text{ sq. in.}$$



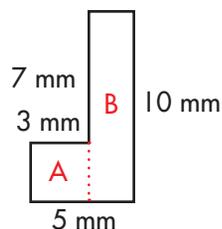
$$A = \underline{\hspace{2cm}} \text{ sq. m}$$



$$A = \underline{\hspace{2cm}} \text{ sq. cm}$$

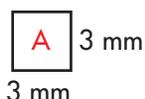
Lesson 6.3 Calculating Area: Other Polygons

To find the area of an irregular shape, separate the shape into its component figures and find the area of each one.



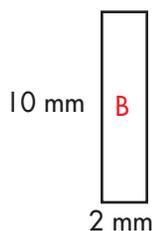
This figure can be divided into two rectangles, as shown by the dotted line.

To find the missing side measurement of shape A, look at the vertical measurements you already know: 10 mm and 7 mm. Because the missing side must be the difference between 10 and 7, subtract to get the answer: $10 - 7 = 3$ mm.



To find the area of shape A, multiply $l \times w$.

$$3 \times 3 = 9 \text{ mm}$$



Follow the same steps to find the area of shape B.

$$5 - 3 = 2 \text{ mm}$$

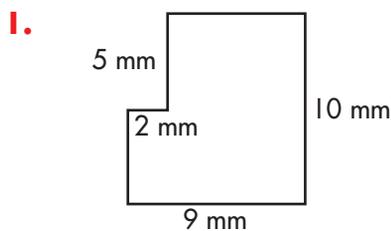
$$A = 10 \times 2 = 20 \text{ mm}$$

Then, add the two areas together to get the area of the entire irregular shape.

$$9 + 20 = 29 \text{ square mm}$$

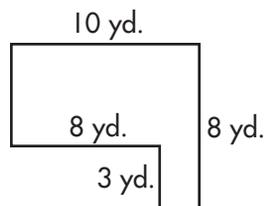
Find the area of each figure.

a



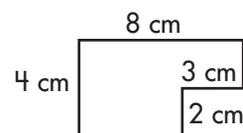
$$A = \underline{\hspace{2cm}} \text{ sq. mm}$$

b



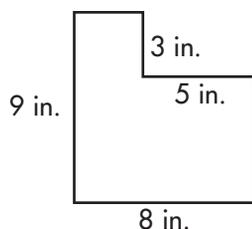
$$A = \underline{\hspace{2cm}} \text{ sq. yd.}$$

c

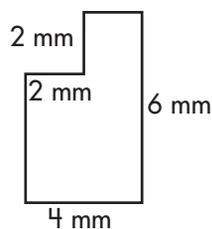


$$A = \underline{\hspace{2cm}} \text{ sq. cm}$$

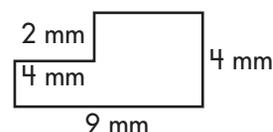
2.



$$A = \underline{\hspace{2cm}} \text{ sq. in.}$$



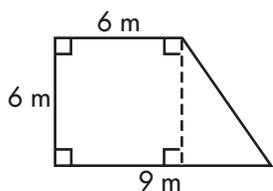
$$A = \underline{\hspace{2cm}} \text{ sq. mm}$$



$$A = \underline{\hspace{2cm}} \text{ sq. mm}$$

Lesson 6.3 Calculating Area: Other Polygons

Some irregular shapes are made up of more than one type of figure.



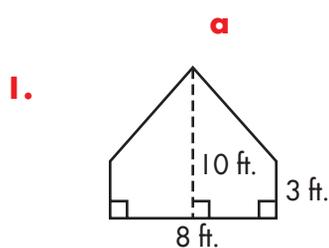
This figure can be divided into a square and a triangle.

area of square
 $A = 6 \times 6 = 36$

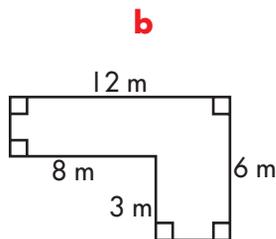
area of triangle
 $A = \frac{1}{2} \times 3 \times 6 = 9$

The area of the figure is $36 + 9 = 45$ square meters.

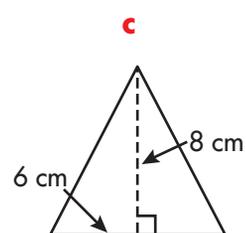
Find the area of each figure.



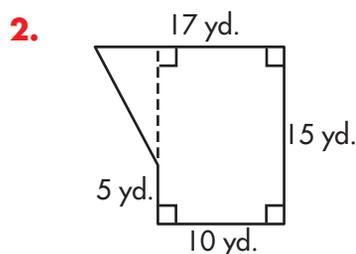
$A = \underline{\hspace{2cm}}$ sq. ft.



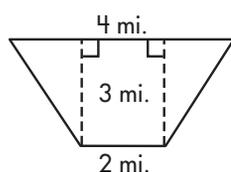
$A = \underline{\hspace{2cm}}$ sq. m



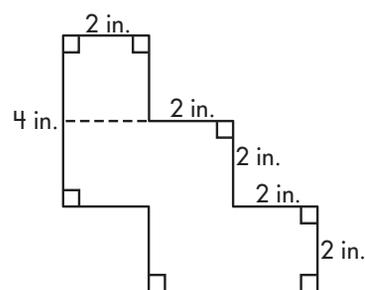
$A = \underline{\hspace{2cm}}$ sq. cm



$A = \underline{\hspace{2cm}}$ sq. yd.



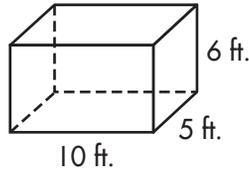
$A = \underline{\hspace{2cm}}$ sq. mi.



$A = \underline{\hspace{2cm}}$ sq. in.

Lesson 6.4 Volume of Rectangular Solids

The **volume** (V) of a rectangular solid is the product of the measure of its length (ℓ), the measure of its width (w), and the measure of its height (h). $V = \ell \times w \times h$



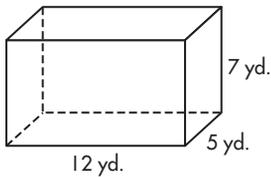
$$\begin{aligned} V &= 10 \times 5 \times 6 \\ &= 50 \times 6 \\ &= 300 \end{aligned}$$

The volume is 300 cubic feet.

Find the volume of each rectangular solid.

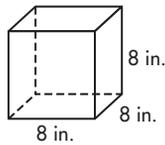
a

1.



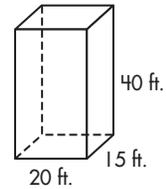
$$V = \underline{\hspace{2cm}} \text{ cu. yd.}$$

b



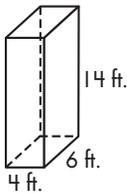
$$V = \underline{\hspace{2cm}} \text{ cu. in.}$$

c

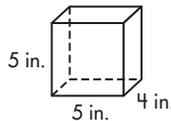


$$V = \underline{\hspace{2cm}} \text{ cu. ft.}$$

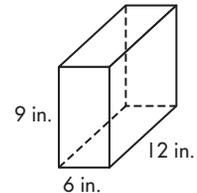
2.



$$V = \underline{\hspace{2cm}} \text{ cu. ft.}$$



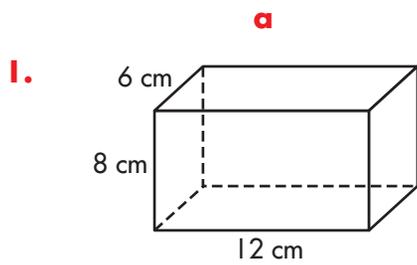
$$V = \underline{\hspace{2cm}} \text{ cu. in.}$$



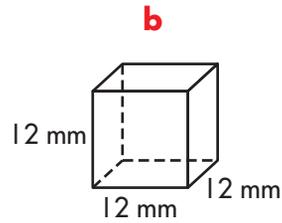
$$V = \underline{\hspace{2cm}} \text{ cu. in.}$$

Lesson 6.4 Volume of Rectangular Solids

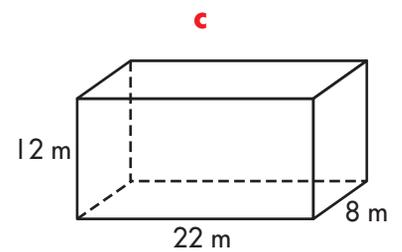
Find the volume of each rectangular solid.



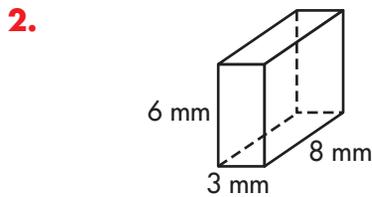
$$V = \underline{\hspace{2cm}} \text{ cu. cm}$$



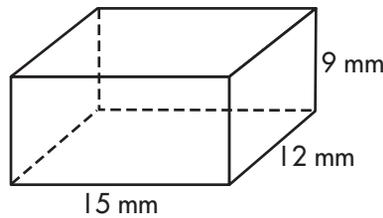
$$V = \underline{\hspace{2cm}} \text{ cu. mm}$$



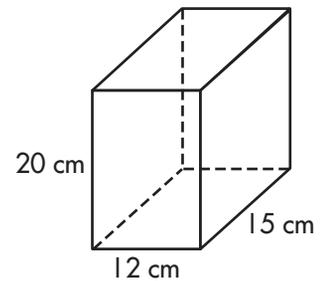
$$V = \underline{\hspace{2cm}} \text{ cu. m}$$



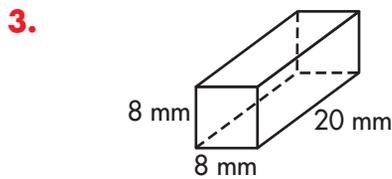
$$V = \underline{\hspace{2cm}} \text{ cu. mm}$$



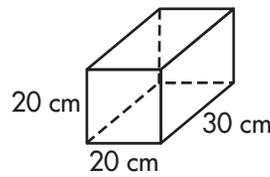
$$V = \underline{\hspace{2cm}} \text{ cu. mm}$$



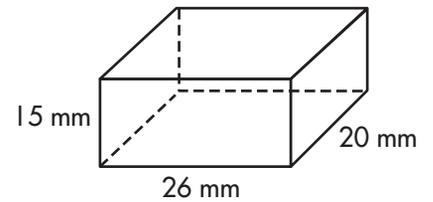
$$V = \underline{\hspace{2cm}} \text{ cu. cm}$$



$$V = \underline{\hspace{2cm}} \text{ cu. mm}$$



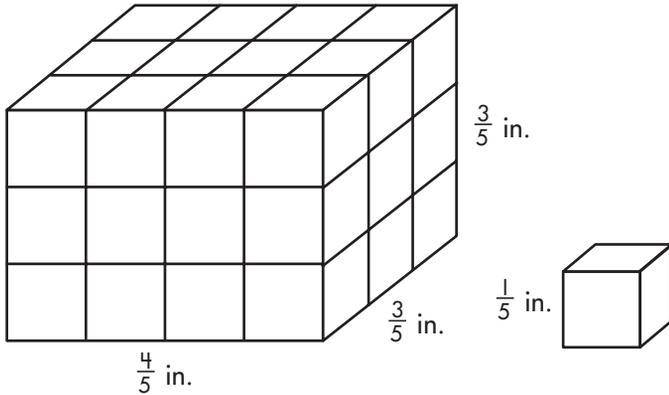
$$V = \underline{\hspace{2cm}} \text{ cu. cm}$$



$$V = \underline{\hspace{2cm}} \text{ cu. mm}$$

**Lesson 6.4****Volume of Rectangular Solids**

The volume of a rectangular solid with fractional edge lengths can also be measured by packing the solid with cubes that share a common denominator with the edge lengths. In this rectangular solid, each side length has a denominator of 5, so the solid can be packed with $\frac{1}{5}$ inch cubes to determine its volume.



First, calculate the volume of the cube itself.

$$\frac{1}{5} \times \frac{1}{5} \times \frac{1}{5} = \frac{1}{125} \text{ cubic inches}$$

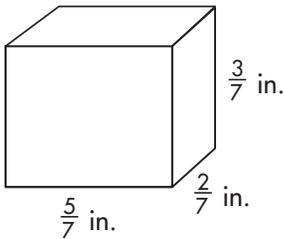
Next, add up the cubes in the solid. You can see from the top layer that there are 12 cubes per layer, and $12 \times 3 = 36$.

Last, multiply the number of cubes times the volume of one cube.

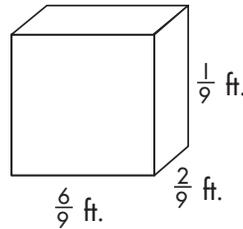
$$36 \times \frac{1}{125} = \frac{36}{125} \text{ cubic inches}$$

This is the same answer you get when you use the formula $l \times w \times h$. $\frac{4}{5} \times \frac{3}{5} \times \frac{3}{5} = \frac{36}{125}$

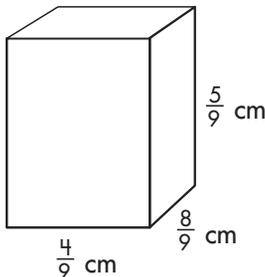
Find the volume of each rectangular solid.

a**1.**

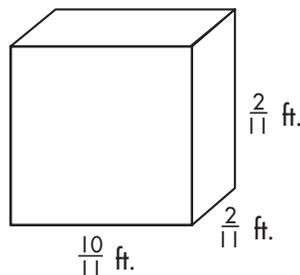
$$V = \underline{\hspace{2cm}} \text{ cu. in.}$$

b

$$V = \underline{\hspace{2cm}} \text{ cu. ft.}$$

2.

$$V = \underline{\hspace{2cm}} \text{ cu. cm}$$



$$V = \underline{\hspace{2cm}} \text{ cu. ft.}$$

Lesson 6.5 Problem Solving**SHOW YOUR WORK**

Solve each problem.

1. Mr. Ruiz's vase is 3 inches long, 2 inches wide, and 9 inches tall. What is the volume of the vase?

The volume of the vase is _____ cubic inches.

2. Andrew has an aquarium that is 16 inches long, 10 inches wide, and 9 inches deep. What is the volume of Andrew's aquarium?

The volume of Andrew's aquarium is _____ cubic inches.

3. A city park is shaped like a right triangle. Its base is 20 yards and its depth is 48 yards. What is the area of the park?

The area of the park is _____ square yards.

4. A paving brick is 3 inches wide, 2 inches high, and 6 inches long. What is the volume of the brick?

The volume is _____ cubic inches.

5. A tabletop is shaped like a right triangle with a base of 25 inches and a depth of 30 inches. What is the area of the tabletop?

The area of the tabletop is _____ square inches.

6. A rectangular playground is 90 yards long and 40 yards wide. What is the area of the playground?

The area of the playground is _____ square yards.

1.

2.

3.

4.

5.

6.

Lesson 6.5 Problem Solving**SHOW YOUR WORK**

Solve each problem.

1. Craig's backyard is a rectangle 25 meters long and 20 meters wide. What is the area of Craig's yard?

The area of Craig's yard is _____ square meters.

2. A shipping crate is 0.85 meters long, 0.4 meters wide, and 0.3 meters high. What is the volume of the crate?

The crate's volume is _____ cubic meters.

3. A rectangular poster is 45 centimeters long and 28 centimeters wide. What is the area of the poster?

The poster's area is _____ square centimeters.

4. A room is 8.6 meters wide and 10.2 meters long. What is the area of the room?

The area of the room is _____ square meters.

5. Megan's jewelry box is 25 centimeters long, 12 centimeters wide, and 10 centimeters high. What is the volume of Megan's jewelry box?

The volume of Megan's jewelry box is _____ cubic centimeters.

6. A rectangular CD jewel case is approximately 14 centimeters long and 12 centimeters wide. What is the area of the CD jewel case?

The area of the jewel case is _____ square centimeters.

1.

2.

3.

4.

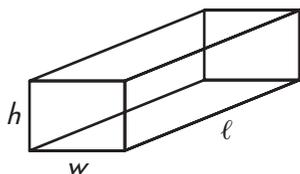
5.

6.

Lesson 6.6 Surface Area: Rectangular Solids

The **surface area** of a solid is the sum of the areas of all surfaces of the solid. A rectangular solid has 6 surfaces.

The area of each surface is determined by finding:



length \times width, length \times height, width \times height

The total surface area is found using this formula:

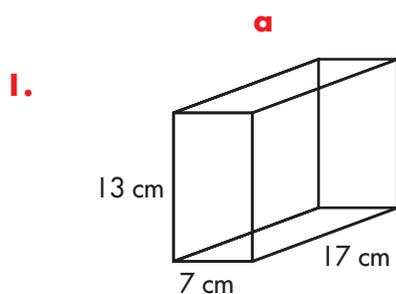
$$SA = 2lw + 2lh + 2wh$$

If $l = 10$ m, $w = 6$ m, and $h = 4$ m, the surface area is found as follows:

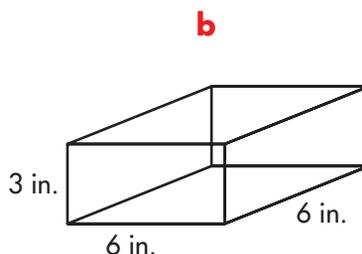
$$SA = 2(10 \times 6) + 2(10 \times 4) + 2(6 \times 4)$$

$$SA = 2(60) + 2(40) + 2(24) = 120 + 80 + 48 = 248 \text{ m}^2$$

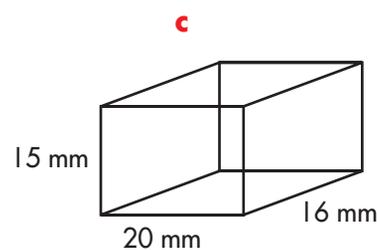
Find the surface area of each rectangular solid.



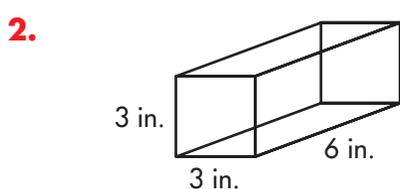
$$SA = \underline{\hspace{2cm}} \text{ cm}^2$$



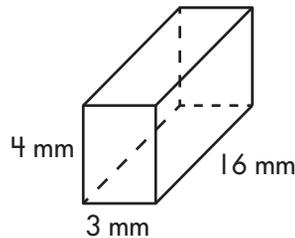
$$SA = \underline{\hspace{2cm}} \text{ in.}^2$$



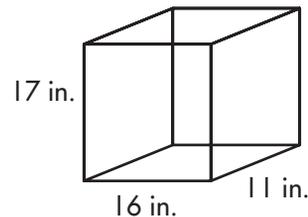
$$SA = \underline{\hspace{2cm}} \text{ mm}^2$$



$$SA = \underline{\hspace{2cm}} \text{ in.}^2$$



$$SA = \underline{\hspace{2cm}} \text{ ft.}^2$$



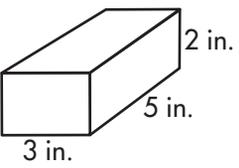
$$SA = \underline{\hspace{2cm}} \text{ in.}^2$$

Lesson 6.6 Surface Area: Rectangular Solids

Find the surface area of each rectangular solid.

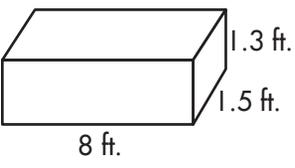
1.

a



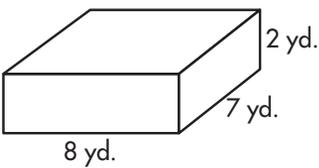
SA = _____ sq. in.

b



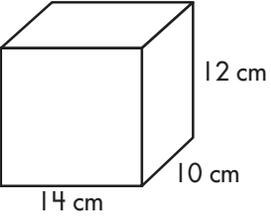
SA = _____ sq. ft.

c

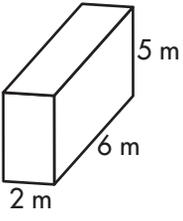


SA = _____ sq. yd.

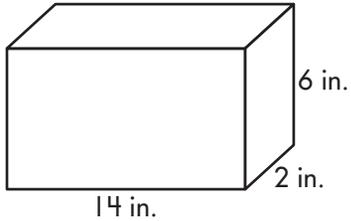
2.



SA = _____ sq. cm

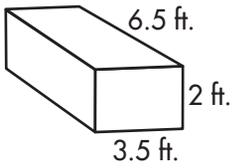


SA = _____ sq. m

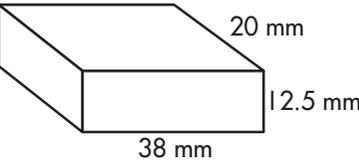


SA = _____ sq. in.

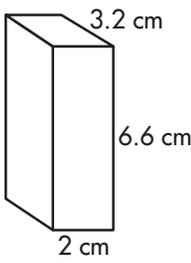
3.



SA = _____ sq. ft.



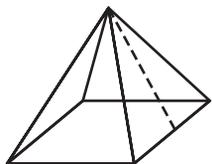
SA = _____ sq. mm



SA = _____ sq. cm

Lesson 6.7 Surface Area: Pyramids

The **surface area** of a solid is the sum of the areas of all surfaces of the solid. The surface area of a square pyramid is the sum of the area of the square base and each of the 4 triangular sides.



side

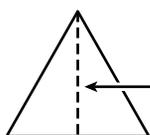
Each triangle's area is $\frac{1}{2}$ base \times height. In a pyramid, **base** refers to the side length and **height** refers to the slant height, or length. So surface area or $SA = (\text{side} \times \text{side}) + 4(\frac{1}{2} \text{side} \times \text{length})$.

$$SA = s^2 + 2s\ell \quad SA \text{ is given in } \mathbf{\text{square units}}, \text{ or } \mathbf{\text{units}^2}.$$

If $s = 6$ cm and $\ell = 10$ cm, what is the surface area?

$$SA = s^2 + 2s\ell$$

$$SA = 6^2 + 2 \times 6 \times 10 = 36 + 120 = 156 \text{ cm}^2$$

slant height, or *length* (ℓ) of the side

Find the surface area of each square pyramid.

1.

a

$s = 8$ in. $\ell = 11$ in.

$SA = \underline{\hspace{2cm}} \text{ in.}^2$

b

$s = 15$ cm $\ell = 10.5$ cm

$SA = \underline{\hspace{2cm}} \text{ cm}^2$

c

$s = 7$ m $\ell = 12$ m

$SA = \underline{\hspace{2cm}} \text{ m}^2$

2.

$s = 9$ ft. $\ell = 21$ ft.

$SA = \underline{\hspace{2cm}} \text{ ft.}^2$

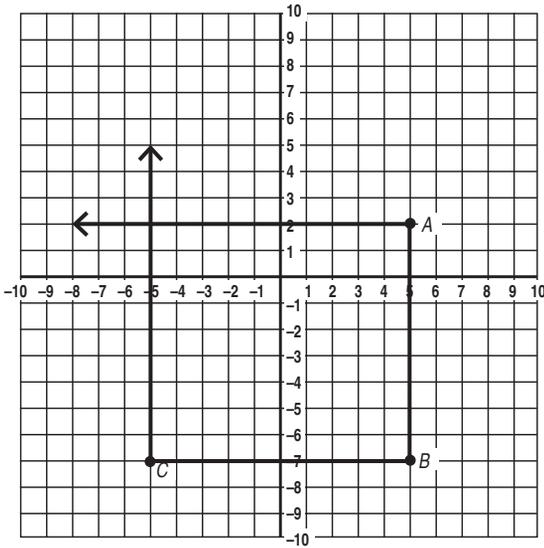
$s = 10$ cm $\ell = 8$ cm

$SA = \underline{\hspace{2cm}} \text{ cm}^2$

$s = 22$ in. $\ell = 17.5$ in.

$SA = \underline{\hspace{2cm}} \text{ in.}^2$

Lesson 6.8 Graphing Polygons: Rectangles



Coordinate planes can help you solve problems with polygons, such as rectangles.

If points $A(5, 2)$, $B(5, -7)$, and $C(-5, -7)$ are vertices of a rectangle, where does vertex D fall?

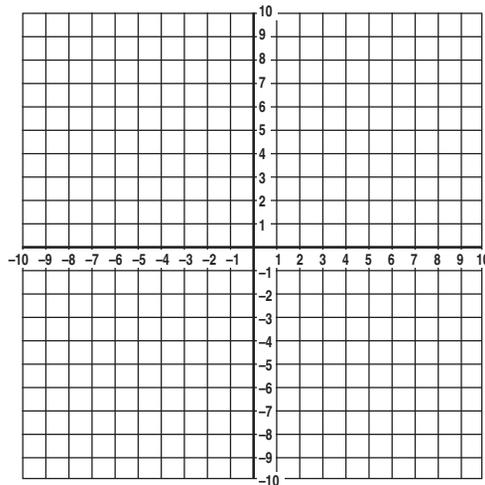
Connect the vertices and then draw lines straight from points A and C to find where vertex D will fall.

Point D occurs at point $(-5, 2)$.

Use the coordinate grids to find the missing vertex of each polygon.

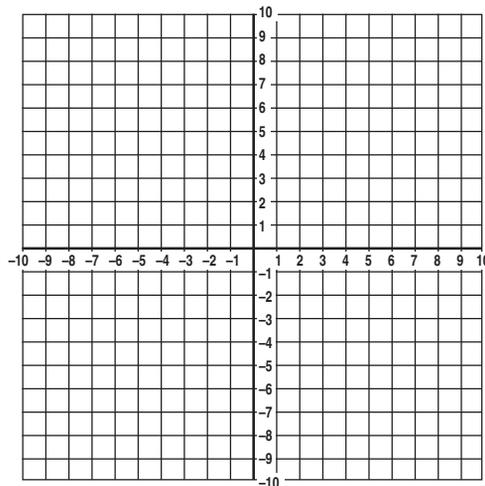
1. a rectangle with points at $(0, 2)$, $(-6, 2)$, and $(-6, 4)$

The missing point is at _____.

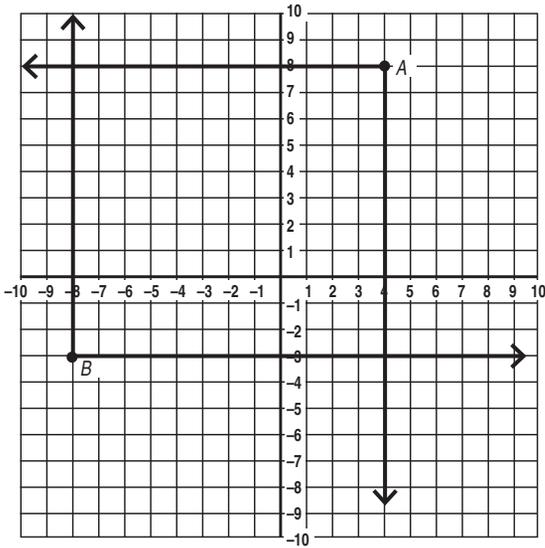


2. a rectangle with points at $(3, -4)$, $(3, 5)$, and $(-2, 5)$

The missing point is at _____.



Lesson 6.9 Graphing Polygons: Right Triangles



Triangle problems can also be solved through graphing on the coordinate plane.

If points $A(4, 8)$ and $B(-8, -3)$ are vertices of the hypotenuse (longest side) of a right triangle, where does vertex C fall?

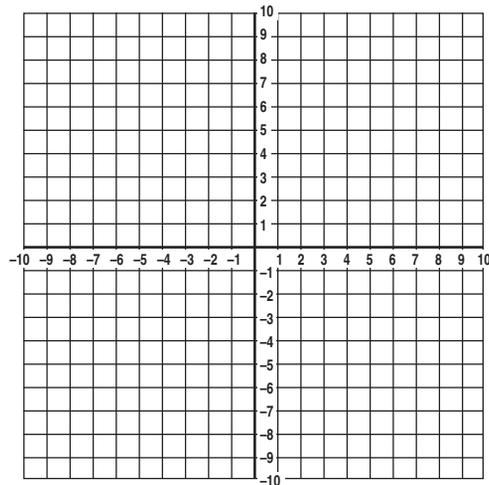
Connect the vertices and then draw lines straight from points A and B to find where vertex C will fall.

Point C can occur at point $(-8, 8)$ or point $(4, -3)$.

Use the coordinate grids to find the missing vertex of each polygon.

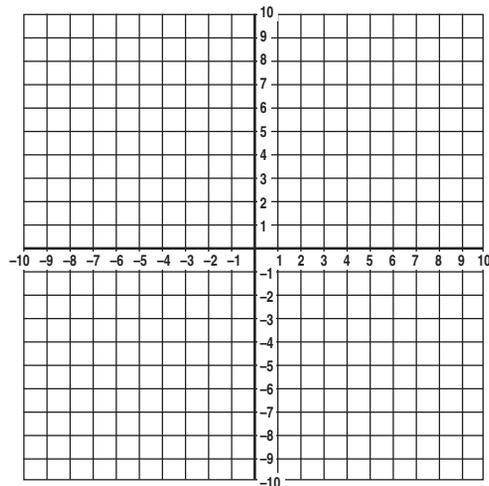
- a right triangle with points at $(3, 2)$ and $(-5, 6)$

The missing point is at _____
or _____.



- a right triangle with points at $(-4, -6)$ and $(5, 2)$

The missing point is at _____
or _____.

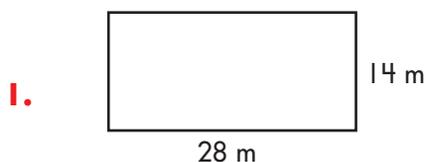




Check What You Learned

Geometry

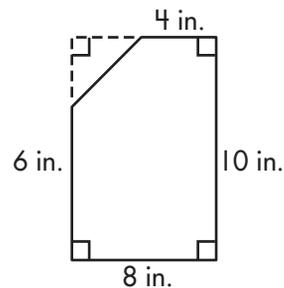
Find the area or surface area of each figure.

a

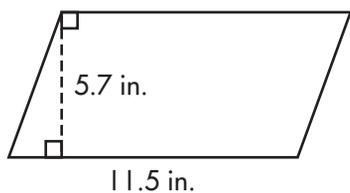
$$A = \underline{\hspace{2cm}} \text{ sq. in.}$$

b

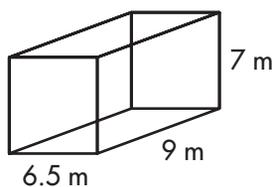
$$A = \underline{\hspace{2cm}} \text{ sq. cm}$$

c

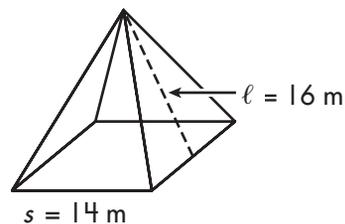
$$A = \underline{\hspace{2cm}} \text{ sq. in}$$

2.

$$A = \underline{\hspace{2cm}} \text{ sq. in.}$$

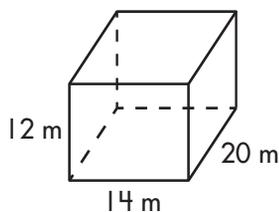


$$SA = \underline{\hspace{2cm}} \text{ sq. m}$$

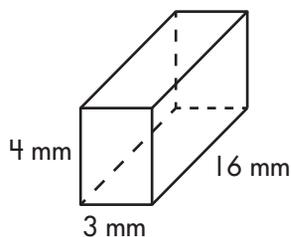


$$SA = \underline{\hspace{2cm}} \text{ sq. m}$$

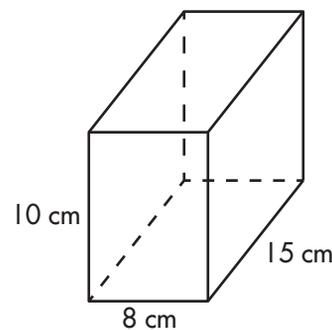
Find the volume of each rectangular solid.

3.

$$V = \underline{\hspace{2cm}} \text{ cu. m}$$



$$V = \underline{\hspace{2cm}} \text{ cu. mm}$$



$$V = \underline{\hspace{2cm}} \text{ cu. cm}$$



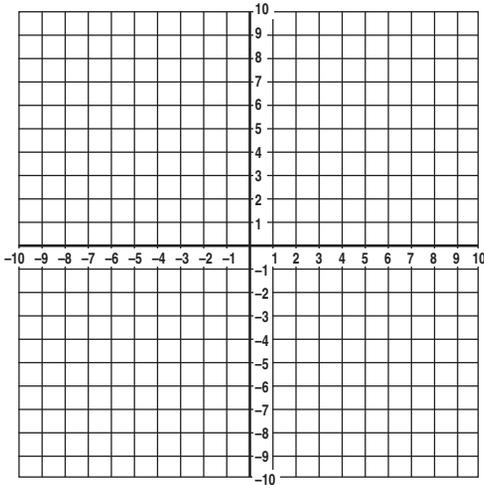
Check What You Learned

Geometry

Use the coordinate grids to find the missing vertex of each polygon.

a

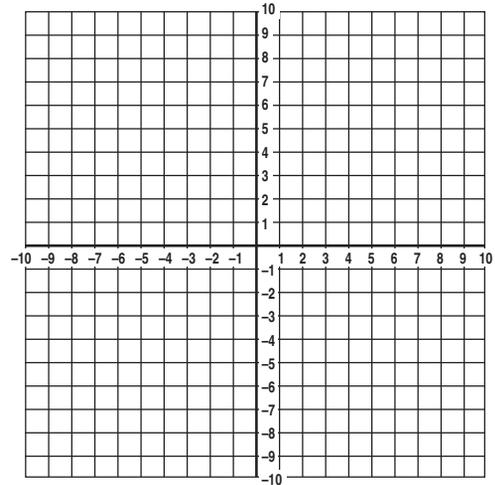
4. a rectangle with points at $(5, 2)$, $(-2, 2)$, and $(5, -4)$



The missing point is at _____.

b

- a right triangle with points at $(-1, 3)$ and $(2, 3)$



The missing point is at _____ or _____.

SHOW YOUR WORK

Solve each problem.

5. A piece of metal is shaped like a right triangle. Its base is 18 feet and its height is 24 feet. What is its area?

The area is _____ square feet.

6. Stephanie's hamster cage is 20 inches long, 12 inches wide, and 10 inches deep. What is the volume of the cage?

The volume is _____ cubic inches.

7. Pablo's snake cage is 30 inches long, 15 inches wide, and 12 inches deep. What is the volume of the cage?

The volume of the cage is _____ cubic inches.

What is the volume of the cage in cubic feet?

The volume of the cage is _____ cubic feet.

5.**6.****7.**



Check What You Know

Probability and Statistics

Circle the statistical questions below.

a

1. How often do students in my class text?
2. How many classes do I take in a day?

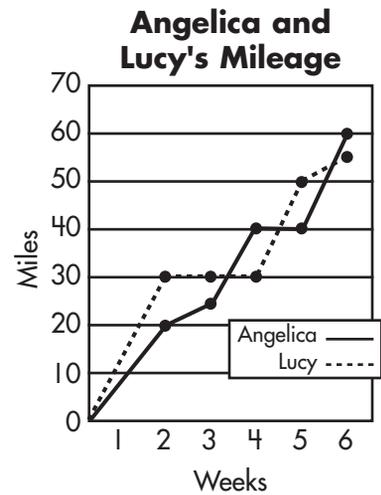
b

- What is my favorite subject?
- What are my classmates' favorite types of candy?

Use the line graph to answer each question.

Angelica and Lucy are on a fitness program. They are keeping track of how far they walk. They record their totals after each week.

3. After two weeks, how much farther did Lucy walk than Angelica? _____
4. During what week did Angelica not walk? _____
5. Who walked farthest during the 6 weeks? _____
6. How much farther did she walk? _____



Draw a stem-and-leaf plot for each set of numbers.

7. 25, 18, 36, 24, 31, 56, and 72

8. 16, 15, 41, 21, 23, 32, 30, 23, 26, and 26



Check What You Know

Probability and Statistics

Find the mean, median, mode, and range of each set of numbers.

9. 97, 82, 66, 98, 66, 85, 82, 66, and 78

mean: _____

mode: _____

median: _____

range: _____

10. 8, 14, 6, 12, 12, 12, 20

mean: _____

mode: _____

median: _____

range: _____

Use the histogram to answer the questions.

11. In which range did most exam scores fall?

12. In which range did the fewest scores fall?

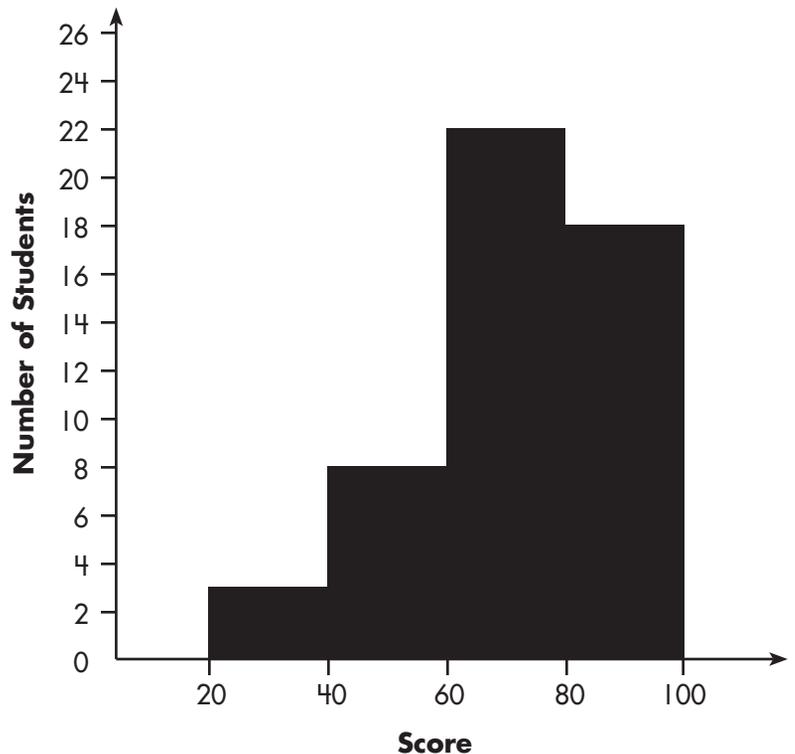
13. If 59 or less is a failing score, how many students failed the exam?

14. How many more students passed than failed?

15. How many students took the exam?

16. Did more or less than half the class pass the exam? _____

Students' Exam Scores



Lesson 7.1 Asking Statistical Questions

A **statistical question** has answers that will vary.

“How old are students in my school?” is a statistical question because not every answer will be the same.

“How old am I?” is not a statistical question because there is only one answer.

Read each question and write *statistical* or *not*.

a

1. How tall are the students in my class?

2. What grades did students score on the test?

3. How many marbles are in the jar?

4. What was the difference in rainfall between March and April?

5. Will I score a basket in the game tonight?

b

What does this apple cost?

How fast can dogs run 100 yards?

Does a chocolate bar weigh more than a pack of jelly beans?

How many miles can cars travel on a gallon of gas?

How often do adults eat breakfast?

Lesson 7.1 Asking Statistical Questions

Write one statistical question for each category below.

1. height of students

2. test scores

3. number of pages in books

4. number of students in classes

5. price of apples

6. type of automobile

7. exercise

Lesson 7.2 Describing Data

Data can be described by how the values relate to each other and how they are spread out.

10, 7, 8, 8, 23, 45, 77, 90, 90

The data is spread over 82 points.

All of the values are greater than 0.

The center value of the data is 23.

The highest value in the data is 90.

The lowest value in the data is 7.

8 and 90 appear twice each in the data.

Write three descriptions of each data set.

1. 62, 68, 63, 67, 69, 63, 67

A. _____

B. _____

C. _____

2. 0, 0, 2, 8, 6, 10, 100

A. _____

B. _____

C. _____

3. 0, 8, 20, 45, 84, 92, 45

A. _____

B. _____

C. _____

Lesson 7.2 Describing Data

Write three descriptions of each data set.

1. 7.3, 6.7, 6.6, 5.7, 5.4, 5.4, 6.4

A. _____

B. _____

C. _____

2. 2, 5, 9, 3, 5, 4, 7, 9, 0

A. _____

B. _____

C. _____

3. 7, 4, 5, 3, 9, 6, 2, 9, 3, 4, 3

A. _____

B. _____

C. _____

Lesson 7.3 Measures of Center: Mean

The **mean** of a data set is computed by adding all of the numbers in the data together and dividing by the number of values contained in the data set.

84, 66, 102, 114, 78, 90

$$84 + 66 + 102 + 114 + 78 + 90 = 534$$

$$\begin{array}{r} 89 \\ 6 \overline{)534} \end{array}$$

89

1. Add all of the values in the data set together.
2. Divide the sum by the number of values in the data set.
3. The mean of the data set is 89.

Find the mean of each data set.

a

1. 48, 64, 80, 48

2. 84, 140, 105, 119, 105, 84, 105

3. 119, 140, 119, 91, 91, 126, 91

4. 52, 52, 64, 80

5. 112, 140, 77, 126, 91, 77, 133

6. 99, 89, 46, 97, 17, 75

b

- 85, 75, 90, 60, 80

- 102, 78, 114, 96, 96, 102

- 96, 108, 78, 96, 72, 102

- 55, 90, 70, 90, 85

- 90, 84, 72, 102, 84, 66

- 60, 31, 24, 50, 44, 88

Lesson 7.4 Measures of Center: Median

The **median** of a data set is the middle number when the values are placed in order from least to greatest. If there are an even number of values in the data set, the median is the average of the two middle terms.

35, 29, 26, 37, 21, 38, 38

21, 26, 29, 35, 37, 38, 38

—————→ 35 ←————

35

1. Put the data in order from least to greatest.

2. Count in from the outside to find the middle value.

3. The median of this data set is 35.

Find the median of each data set.

a

1. 23, 31, 32, 34, 39, 38, 38, 34, 38

2. 19, 11, 28, 13, 23, 14, 28

3. 26, 34, 24, 37, 36, 22, 34, 26, 34

4. 23, 32, 38, 40, 30, 34, 23

5. 10, 3, 5, 1, 7, 8, 5, 1, 5

6. 78, 35, 85, 93, 62, 95, 88, 51, 45

b

24, 20, 28, 19, 18, 11, 19, 18, 19

3, 9, 6, 2, 1, 10, 1, 2, 1

10, 2, 3, 4, 6, 7, 6

15, 21, 23, 16, 19, 14, 23, 14, 23

51, 87, 77, 93, 67, 81, 77, 93, 77

97, 64, 25, 26, 8, 24, 36, 72, 56

Lesson 7.5 Measures of Center: Mode

The **mode** of a data set is the value that occurs the most often. Sometimes a data set has more than one mode.

2, 6, 1, 8, 10, 3, 10, 1, 10

1, 1, 2, 3, 6, 8, 10, 10, 10

(1, 1), 2, 3, 6, 8, 10, (10, 10)

10

1. Put the data in order from least to greatest.

2. Look for values that occur more than once.

3. The value that occurs the most times is the mode.

Find the mode for each data set.

a

1. 3, 2, 8, 5, 1, 4, 4, 3, 4

2. 24, 16, 26, 12, 28, 23, 28, 26, 28

3. 16, 18, 12, 15, 21, 26, 26

4. 253, 295, 204, 151, 118, 277, 277

5. 95, 73, 55, 69, 72, 65, 73, 72, 73

6. 14, 93, 14, 96, 13, 5, 84, 69, 93

b

39, 25, 40, 38, 22, 37, 40

118, 115, 108, 124, 106, 120, 108

32, 28, 22, 36, 24, 35, 24, 32, 24

22, 16, 14, 15, 25, 21, 21

3, 8, 4, 2, 7, 10, 4

92, 44, 32, 82, 86, 59, 22, 32

Lesson 7.6 Finding Measures of Center

The **mean** is the average of a set of numbers. To find the mean, add all the numbers and divide by the number of values in the set.

The **median** is the middle number of a data set. If there are two middle numbers, the median is the average of the two.

The **mode** is the number that appears most often in a data set.

Example: 12, 15, 18, 23, 8, 10, and 12

$$\text{Mean: } 12 + 15 + 18 + 23 + 8 + 10 + 12 = 98 \quad \frac{98}{7} = 14$$

To find the median, arrange the numbers in order. 8, 10, 12, 12, 15, 18, 23

Median: 12 Mode: 12

Find the mean, median, and mode of each data set. Show your work.

a

1. 32, 35, 25, 43, 43

mean _____

median _____

mode _____

2. 10, 18, 12, 14, 12, 12

mean _____

median _____

mode _____

3. 52, 61, 79, 78, 56, 79, 71

mean _____

median _____

mode _____

b

- 8, 12, 23, 12, 15

mean _____

median _____

mode _____

- 17, 15, 15, 28, 20, 26

mean _____

median _____

mode _____

- 37, 50, 67, 83, 34, 49, 37

mean _____

median _____

mode _____

Lesson 7.7 Using Measures of Center

Measures of center can be used to describe a data set. Each measure of center allows for different observations about the set.

The **mean** is the most popular measure of center. It is the average, so it provides the clearest picture of the center of the data, but only if there are no outliers (values that are far away from the majority of the numbers in the set).

The **median** is the most useful measure when the data set contains outliers.

The **mode** is the most useful measure when the values in the data set are non-numerical.

Tell which measure of center would be best for describing each data set.

a

1. 3, 4, 5, 5, 7, 6, 21

2. 54, 72, 85, 67, 93, 85, 61, 89

3. \$14.60, \$7.25, \$15.70, \$15.25, \$14.90

4. 0, 1, 3, 5, 5, 5, 7, 9, 9, 11, 15, 99

b

62, 65, 72, 68, 66

red, blue, green, red, blue, yellow, blue

8, 25, 19, 19, 25, 9, 9, 18, 25, 9, 8, 7, 10

A, B, C, A, B, C, D, A, B, B

**Lesson 7.7****Using Measures of Center**

Find the measures of center for each data set and decide which would be best to describe the data set.

a

1. Cesar's Test Scores: 84, 80, 78, 90, 76, 88, 86, 80, 94

Which is the best measure of center? _____

2. Basketball Team Scores: 78, 77, 81, 84, 67, 78, 75, 42

Which is the best measure of center? _____

3. Daily Theater Attendance: 124, 127, 111, 119, 107, 99, 115

Which is the best measure of center? _____

4. Marisa's Daily Tips: \$15, \$21, \$18, \$13, \$52, \$21, \$25

Which is the best measure of center? _____

b

mean: _____

median: _____

mode: _____

Lesson 7.8 Measures of Variability: Range

The **range** of a data set is the difference between the largest value and smallest value contained in the data set.

11, 12, 15, 15, 13, 12

11, 12, 12, 13, 15, 15

11, 12, 12, 13, 15, 15

$15 - 11 =$

4

1. Put the data set in order from least to greatest.

2. Find the largest value and smallest value.

3. Subtract.

4. The range of this data set is 4.

Find the range of each data set.

a

1. 11, 10, 12, 9

2. 25, 30, 32, 23, 27, 22

3. 36, 33, 37, 37, 41, 33

4. 277, 280, 287, 276

5. 12, 9, 16, 9

b

79, 79, 79, 84

96, 94, 101, 96, 91, 92

506, 508, 510, 509

10, 8, 9, 12, 6, 8

95, 92, 89, 97, 94, 88

Lesson 7.9 Measures of Variability: Interquartile Range

The **interquartile range** (IQR) of a data set is the difference between the median of the lower half of a data set and the median of the upper half of the same data set.

13, 15, 9, 35, 25, 17, 19

9, 13, 15, 17, 19, 25, 35

9, 13, 15 17 19, 25, 35

Q1=13 Q3=25

25 - 13 =

12

1. Put the data set in order from least to greatest.

2. Find the lower half, median, and upper half of the data set.

3. Find the medians of the lower half and upper half.

4. Subtract.

5. The interquartile range of the data set is 12.

Find the interquartile range for each set of data.

a

1. 6, 1, 3, 8, 5, 11, 1, 5

median: _____

Q1: _____

Q3: _____

IQR: _____

2. 70, 75, 90, 100, 95

median: _____

Q1: _____

Q3: _____

IQR: _____

3. 45, 39, 17, 16, 4, 1

median: _____

Q1: _____

Q3: _____

IQR: _____

b

80, 90, 95, 85, 70

median: _____

Q1: _____

Q3: _____

IQR: _____

45, 43, 13, 11, 5, 2

median: _____

Q1: _____

Q3: _____

IQR: _____

29, 58, 15, 75, 22, 16, 64

median: _____

Q1: _____

Q3: _____

IQR: _____

Lesson 7.10 Measures of Variability: Mean Absolute Deviation

The **mean absolute deviation** (MAD) of a data set is a value that shows if the data set is consistent. The closer the mean absolute deviation of a data set to zero, the more consistent it is.

17, 19, 8, 32, 21, 24, 19

8, 17, 19, 19, 21, 24, 32

Mean = 20

12, 3, 1, 1, 1, 4, 12

Mean = 8.71

MAD = 8.71

1. Put the data set in order from least to greatest.

2. Find the mean of the data set.

3. Find the absolute value of the difference between the mean and each value in the set.

(For example, $20 - 8 = 12$; $|12| = 12$)

4. Find the mean of those absolute values.

5. The mean absolute deviation of this data set is 8.71. This tells us that the values in the set are on average about 8.71 away from the middle.

Find the mean absolute deviation of each data set. Round each answer to two decimal places.

a

1. 10, 16, 18, 15, 15, 10, 23

mean: _____

value differences:

MAD: _____

b

41, 56, 38, 45, 55, 51, 52

mean: _____

value differences:

MAD: _____

2. 10, 12, 18, 25, 25, 11, 22

mean: _____

value differences:

MAD: _____

22, 33, 44, 55, 66, 88, 55, 55, 11, 22

mean: _____

value differences:

MAD: _____

Lesson 7.1 | Using Measures of Variability

The **range** of a data set is the difference between the largest value and smallest value contained in the data set.

The **interquartile range** (IQR) of a data set is the difference between the median of the lower half of a data set and the median of the upper half of the same data set.

The **mean absolute deviation** (MAD) of a data set is a value that helps understand if the data set is consistent. If the mean absolute deviation of a data set is close to zero, the data set is more consistent.

Complete the table by listing the measures of variability for each data set. Round answers to two decimal places.

Data	Range	IQR	MAD
1. 43, 48, 80, 53, 59, 65, 58, 66, 70, 50, 76, 62	_____	_____	_____
2. 12, 47, 26, 25, 38, 45, 35, 35, 41, 39, 32, 25, 18, 30	_____	_____	_____
3. 99, 45, 23, 67, 45, 91, 82, 78, 62, 51	_____	_____	_____
4. 10, 2, 5, 6, 7, 3, 4	_____	_____	_____
5. 23, 56, 45, 65, 59, 55, 61, 54, 85, 25	_____	_____	_____
6. 55, 63, 88, 97, 58, 90, 88, 71, 65, 77, 75, 88, 95, 86	_____	_____	_____

Lesson 7.12 Plotting Data: Stem-and-Leaf Plots

A set of data can be organized into a **stem-and-leaf plot** by using place values.

87, 38, 35, 76, 48, 57, 68, 44, 63, 49, 63, 64, 71

The tens digits are the stems and the ones digits are the leaves.

Stem	Leaves
3	5 8
4	4 8 9
5	7
6	3 3 4 8
7	1 6
8	7

This allows you to see the least (35), the largest (87), the range (52), the median (63), and the mode (63).

Key: 3 | 5 = 35

Create a stem-and-leaf plot for each set of data. Include a key for each plot.

a

1. 14, 31, 34, 21, 13, 28, 33

b

63, 38, 72, 54, 50, 79, 64, 39, 57, 49

2. 48, 38, 34, 25, 27, 37, 49

88, 96, 99, 75, 87, 93, 81, 84, 91, 73

3. 19, 25, 38, 17, 24, 33, 13

26, 37, 25, 33, 35, 46, 27, 45, 23, 41

Lesson 7.13 Plotting Data: Box-and-Whisker Plots

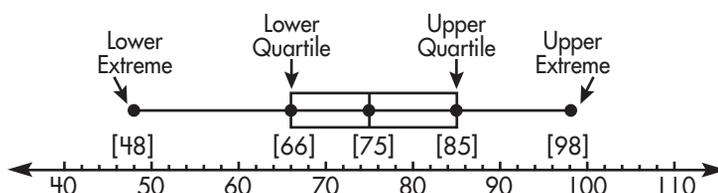
Box-and-whisker plots are helpful in interpreting the distribution of data. For example, the results of a test might include these 15 scores:

66, 56, 75, 77, 98, 72, 48, 83, 73, 89, 65, 74, 87, 85, 81

The numbers should be arranged in order:

48, 56, 65, 66, 72, 73, 74, 75, 77, 81, 83, 85, 87, 89, 98

The median is 75. The **lower quartile** is the median of the lower half (66). The **upper quartile** is the median of the upper half (85). Draw a box around the median with its ends going through the quartiles. Each quartile contains one-fourth of the scores.

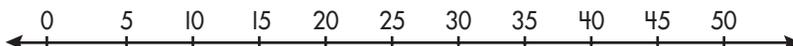


Answer the questions using the box-and-whisker plot above.

- Half of the students scored higher than _____ on the test.
- _____ scores are represented in the box part of the plot.
- The range of the scores on the test is _____.

The scores on a recent daily quiz were 10, 15, 20, 20, 30, 30, and 40.

- What is the median of these scores? _____
- What is the lower quartile? _____
- What is the upper quartile? _____
- Using the number line below, draw a box-and-whisker plot for these scores.

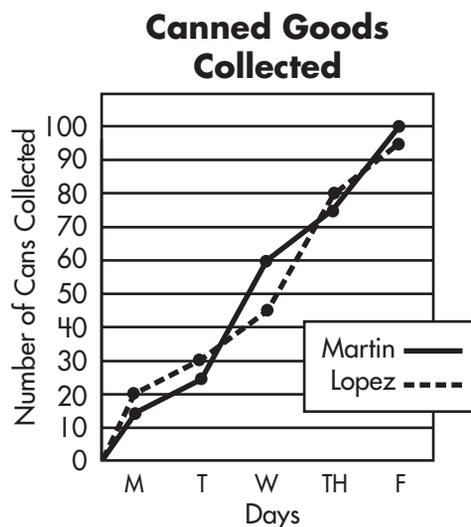


Lesson 7.14 Plotting Data: Line Graphs

Mrs. Martin's homeroom and Mr. Lopez's homeroom had a canned food drive. The **line graph** shows how many cans were collected after each day.

On Monday, how many more cans did Mr. Lopez's class collect than Mrs. Martin's class?

Mr. Lopez's class collected 5 more cans than Mrs. Martin's class on Monday.

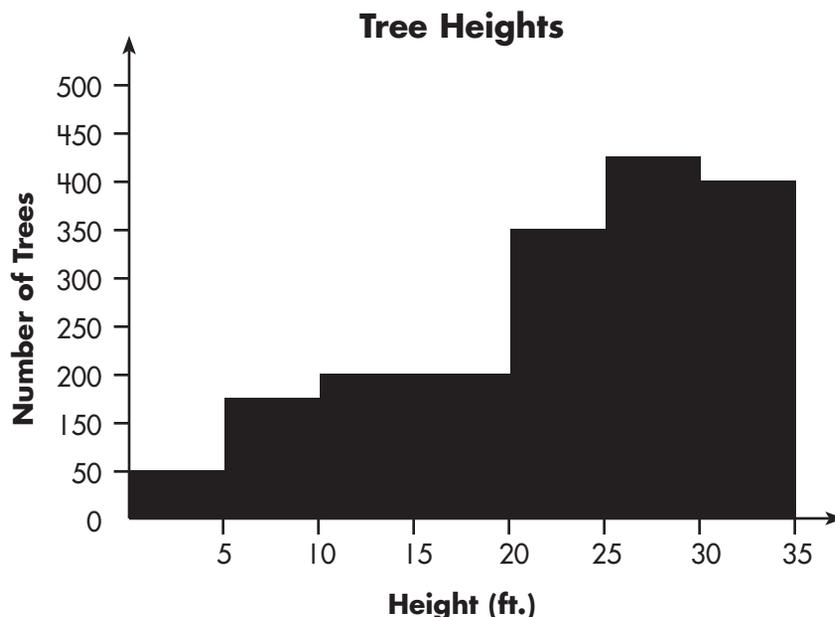


Use the line graph above to answer the following questions

1. On Monday, whose homeroom collected the most cans? _____
2. By Tuesday, how many cans had Mr. Lopez's homeroom collected? _____
3. On which day was the difference between the number of cans collected by each homeroom the greatest? _____
4. Which homeroom collected the most cans on that day? _____
5. How many cans total had been collected by both homerooms by Tuesday? _____
6. On what day did Mrs. Martin's homeroom bring in the most cans? _____
7. On what day did Mr. Lopez's homeroom bring in the most cans? _____
8. On what day did Mrs. Martin's homeroom bring in the least number of cans? _____
9. By Wednesday, how many cans had been collected by both homerooms? _____
10. How many cans were collected by both homerooms during the week? _____

Lesson 7.15 Plotting Data: Histograms

A **histogram** displays data using bars of different heights. It is different from a bar graph because it shows data grouped into ranges. Both axes of a histogram should be numerical.



Use the histogram above to answer the following questions.

1. How many trees were measured in all? _____
2. In what range did the most trees fall? _____
3. In what range did the least trees fall? _____
4. What percentage of trees were less than 20 feet tall? _____
5. What percentage of trees were greater than 20 feet tall? _____
6. How many more trees were 30–35 feet tall than 20–25 feet tall? _____
7. What is the range of heights shown? _____
8. Predict how many trees would be in the 35–40 foot range if it were included on the graph. _____
9. Explain the basis for your prediction.

10. Draw a star above the bar where a tree that measures 21 feet would be included.

Lesson 7.16 Summarizing Data Sets

Use measures of center and variability to help summarize these data sets. Round answers to two decimal places. Then, plot the data using a box-and-whisker plot to show how the data is spread.

1. The height of twelve 6th graders is collected in inches. Their heights are 60, 54, 48, 64, 52, 50, 68, 64, 58, 56, 56, and 64.

mode: _____

Box-and-Whisker Plot

median: _____

mean: _____

range: _____

IQR: _____

MAD: _____

Write 2 to 3 sentences that describe this data set.

2. A teacher decides to collect information on how long students spend doing homework each evening. She talks to 15 students and receives this data (in minutes): 30, 15, 60, 45, 15, 45, 45, 60, 75, 30, 45, 30, 45, 15, and 45.

mode: _____

Box-and-Whisker Plot

median: _____

mean: _____

range: _____

IQR: _____

MAD: _____

Write 2 to 3 sentences that describe this data set.

Lesson 7.16 Summarizing Data Sets

Use measures of center and variability to help summarize this data set. Round answers to two decimal places. Then, plot the data using a line graph to show how the data is spread.

A school keeps track of how many students are buying notebooks each month from the school store. They collected this information.

Month	Notebooks Sold
Jan.	25
Feb.	30
Mar.	15
Apr.	20
May	15
June	5
July	0
Aug.	35
Sept.	20
Oct.	15
Nov.	20
Dec.	30

mode: _____

median: _____

mean: _____

range: _____

IQR: _____

MAD: _____



Write 2 to 3 sentences that describe this data set.



Check What You Learned

Probability and Statistics

Write a statistical question for each category.

1. age _____
2. saving money _____

Use the set of data below to complete the following.

38, 25, 22, 18, 12, 36, 31, 22

3. Draw a stem-and leaf plot to show how this data is distributed.
4. Draw a box-and-whisker plot to show how this data is distributed.

Find the measures of center and variability for each set of data. Circle the best measure of center for describing the data set.

5. 9, 15, 7, 13, 13, 13, 21

mean: _____ range: _____

median: _____ IQR: _____

mode: _____ MAD: _____



Check What You Learned

Probability and Statistics

Find the measures of center and variability for each set of data. Circle the best measure of center for describing the data set.

6. 45, 38, 52, 47, 33, 54, 47, 39, 41

mean: _____ range: _____

median: _____ IQR: _____

mode: _____ MAD: _____

Use the data below to complete the following.

Renee's parents are going to buy a new car. To help them choose an environmentally-friendly car, Renee recorded the gas mileage of their top 10 choices. She used letters for the cars so her parents wouldn't be biased. Use her data to complete a histogram showing the range of gas mileages.

Car	Gas Mileage (mpg)
A	19
B	14
C	21
D	38
E	8
F	36
G	26
H	18
I	16
J	28

7.



8. How many cars are they considering that get fewer than 20 miles per gallon? _____
9. How many cars are they considering that get more than 20 miles per gallon? _____
10. In what range do the most cars fall? _____

Final Test Chapters 1–7

Multiply or divide.

- | | a | b | c | d |
|-----------|---|--|---|---|
| 1. | $\begin{array}{r} 248 \\ \times 32 \\ \hline \end{array}$ | $\begin{array}{r} 432 \\ \times 218 \\ \hline \end{array}$ | $\begin{array}{r} 0.68 \\ \times 8.9 \\ \hline \end{array}$ | $\begin{array}{r} 10.65 \\ \times 2.31 \\ \hline \end{array}$ |
| 2. | $24 \overline{)5482}$ | $17 \overline{)45820}$ | $0.89 \overline{)3.84}$ | $3.5 \overline{)9.52}$ |
| 3. | $\frac{1}{8} \times \frac{3}{5} =$ | $\frac{2}{3} \times \frac{3}{7} =$ | $3\frac{1}{7} \times \frac{5}{8} =$ | $2\frac{1}{3} \times \frac{13}{8} =$ |
| 4. | $\frac{6}{7} \div \frac{1}{2} =$ | $\frac{3}{5} \div \frac{7}{10} =$ | $\frac{5}{8} \div \frac{1}{3} =$ | $1\frac{2}{3} \div \frac{3}{5} =$ |

Complete the chart with the equivalent decimals, percents, and fractions.

	a	b	c	d
	Percent	Decimal	Fraction	Percent
	Decimal	Fraction	Percent	Decimal
	Fraction	Percent	Decimal	Fraction
5.	25%	_____	_____	_____%
6.	110%	_____	_____	_____%
7.	73%	_____	_____	_____%

Solve each ratio.

- | | a | b | c |
|-----------|--|--|---|
| 8. | $\frac{3}{5} = \frac{\square}{20}$ _____ | $\frac{\square}{6} = \frac{12}{18}$ _____ | $\frac{4}{\square} = \frac{10}{20}$ _____ |
| 9. | $\frac{5}{8} = \frac{15}{\square}$ _____ | $\frac{8}{25} = \frac{\square}{100}$ _____ | $\frac{12}{\square} = \frac{1}{3}$ _____ |

Final Test Chapters 1–7

Compare the integers using $<$, $>$, or $=$.

- a** **b** **c** **d** **e** **f**
10. $-12 \square -30$ $82 \square 17$ $-21 \square -57$ $-29 \square -45$ $-57 \square 15$ $15 \square -69$

Write each power as a product of factors.

- a** **b** **c**
11. 4^2 _____ 15^3 _____ 2^6 _____

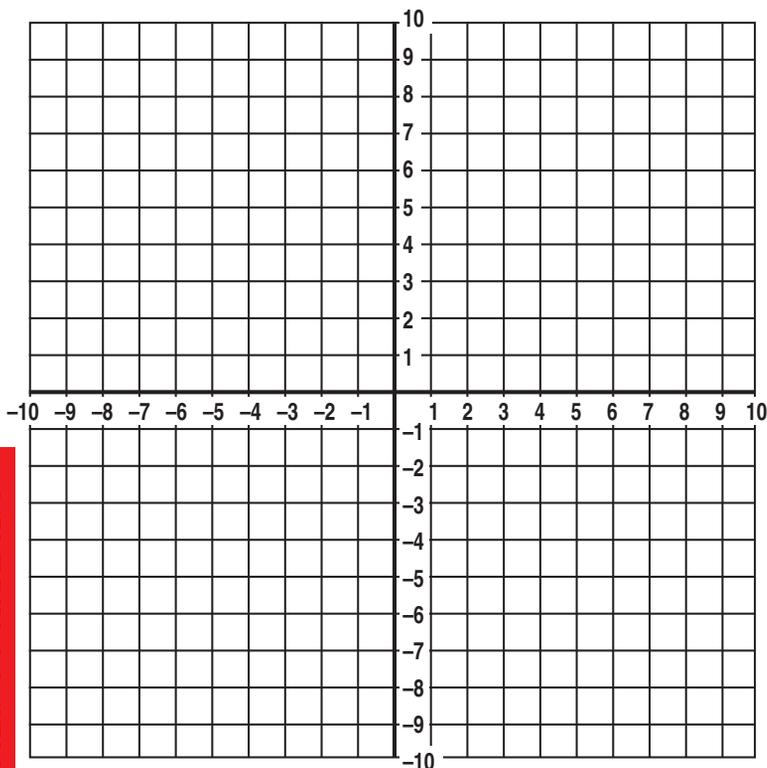
Use exponents to rewrite each expression.

- 12.** $5 \times 5 \times 5 =$ _____ $6 \times 6 \times 6 \times 6 \times 6 =$ _____ $12 \times 12 \times 12 \times 12 =$ _____

Write the expression for each statement.

- 13.** the quotient of 24 and the difference between 8 and 4 _____
14. the sum of 6 and the product of 4 and 7 _____

Plot the given coordinates on the grid. Then, answer the questions.



- 15.** A $(-3, 7)$
16. B $(3, -3)$
17. C $(-8, -6)$
18. D $(4, -6)$
19. E $(-10, 5)$
20. How many units is it from Point A to Point E? _____ units
21. How many units is it from Point B to Point C? _____ units
22. How many units is it from Point D to Point E? _____ units

Final Test Chapters 1–7

Create expressions equivalent to the ones below.

23. $3 \times (4 + 2) =$ _____ **a**

$(5 \times 2) - (3 \times 2) =$ _____ **b**

24. $(6 \times 8) + (6 \times 4) =$ _____

$8 \times (7 - 4) =$ _____

Solve each inequality or equation.

25. $23 - c < 6$ _____ **a**

$d + 11 > 15$ _____ **b**

$28 = a + 9$ _____ **c**

26. $8 \times b = 48$ _____

$p - 13 = 5$ _____

$n \div 8 = 5$ _____

Use a table to identify the variables and find possible solutions to the problem.

- 27.** Joy has to get from her house to the park, which is 10 miles away. If she walks, she can go 4 miles per hour. If she rides her bike, she can go 10 miles per hour. And, if she rides in a car she can travel at 40 miles per hour. How long will it take her to get to the park?

What equation will you use? _____

Dependent Variable				
Independent Variable				

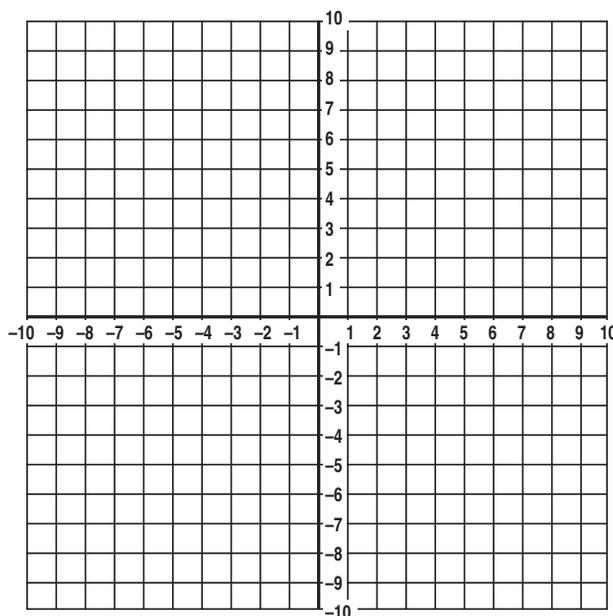
Use the coordinate grid to find the missing vertex of each polygon.

- 28.** a rectangle with points at $(4, 6)$, $(-2, 6)$, and $(-2, 1)$

The missing point is at _____.

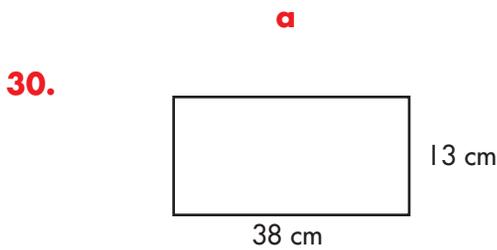
- 29.** a right triangle with points at $(4, 0)$ and $(10, -4)$

The missing point is at _____
or _____.

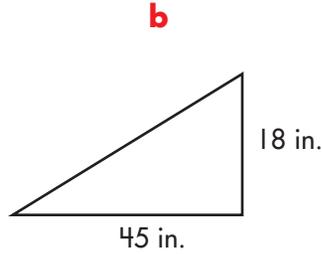


Final Test Chapters 1-7

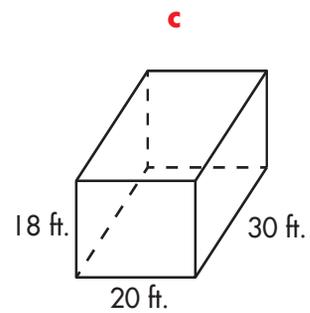
Find the area, surface area, or volume of each figure.



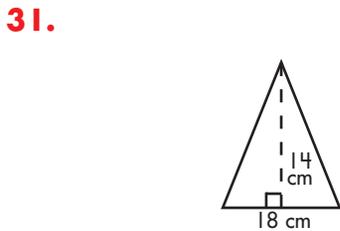
$A = \underline{\hspace{2cm}} \text{ sq. cm}$



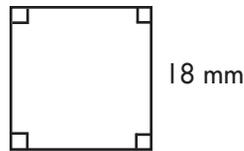
$A = \underline{\hspace{2cm}} \text{ sq. in.}$



$V = \underline{\hspace{2cm}} \text{ cu. ft.}$



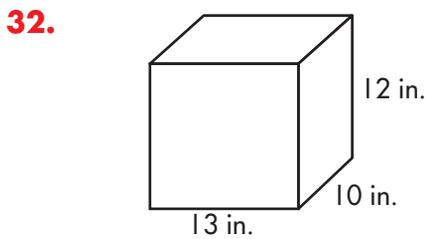
$A = \underline{\hspace{2cm}} \text{ sq. cm}$



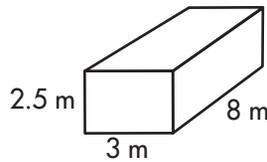
$A = \underline{\hspace{2cm}} \text{ sq. mm}$



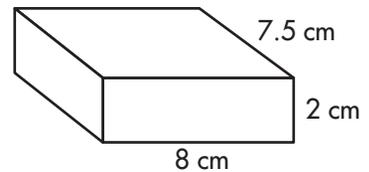
$A = \underline{\hspace{2cm}} \text{ sq. ft.}$



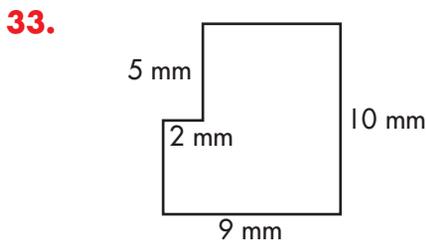
$SA = \underline{\hspace{2cm}} \text{ sq. in.}$



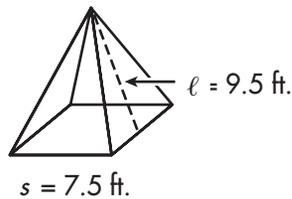
$V = \underline{\hspace{2cm}} \text{ cu. m}$



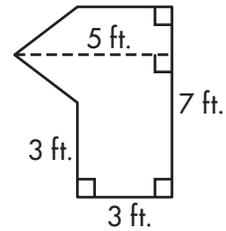
$SA = \underline{\hspace{2cm}} \text{ sq. cm}$



$A = \underline{\hspace{2cm}} \text{ sq. mm}$



$SA = \underline{\hspace{2cm}} \text{ sq. ft.}$



$A = \underline{\hspace{2cm}} \text{ sq. ft.}$

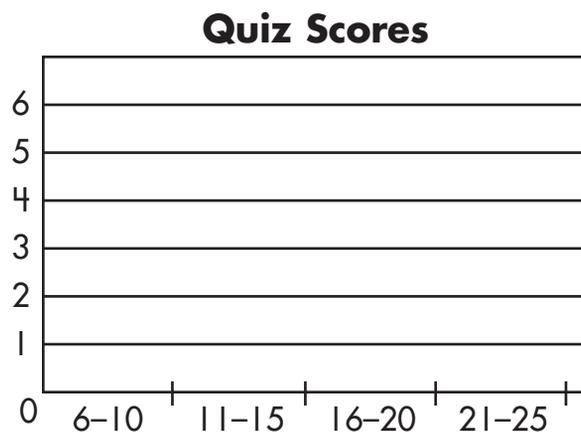
Final Test Chapters 1–7

Use this data set to complete the following.

Points scored on quiz: 9, 18, 12, 9, 13, 22, 8, 23, 16, 17, 22, 20, 22, 15, 10, 17, 21, 23, 14, 11

34. Make a stem-and-leaf plot of the data.

35. Complete the histogram.



36. Find the measures of center and variability for the data.

mean: _____ range: _____

median: _____ IQR: _____

mode: _____ MAD: _____

37. What percentage of the people scored 16–20 points? _____%

38. What was the highest number of points scored on the quiz? _____

39. What was the lowest number of points scored on the quiz? _____

40. What percentage of the scores range from 21 to 25 points? _____%

Scoring Record for Posttests, Mid-Test, and Final Test

Chapter Posttest	Your Score	Performance			
		Excellent	Very Good	Fair	Needs Improvement
1	_____ of 36	32–36	29–31	25–28	24 or fewer
2	_____ of 39	35–39	31–34	27–30	26 or fewer
3	_____ of 48	43–48	38–42	33–37	32 or fewer
4	_____ of 44	39–44	35–38	31–34	30 or fewer
5	_____ of 59	53–59	47–52	41–46	40 or fewer
6	_____ of 16	14–16	12–13	10–11	9 or fewer
7	_____ of 20	18–20	16–17	14–15	13 or fewer
Mid-Test	_____ of 98	88–98	78–87	69–77	68 or fewer
Final Test	_____ of 105	95–105	84–94	74–83	73 or fewer

Record your test score in the Your Score column. See where your score falls in the Performance columns. Your score is based on the total number of required responses. If your score is fair or needs improvement, review the chapter material.

Grade 6 Answers

Chapter 1

Pretest, page 5

	a	b	c
1.	$(4 \times 6) + (4 \times 2)$	$2 \times (5 + 4)$	
2.	$(4 \times 2) + (4 \times 6)$	$(6 \times 5) - (6 \times 1)$	
3.	$6 \times (6 - 3)$	$(8 \times 3) - (8 \times 1)$	
4.	5	12	12
5.	13	19	16
6.	12	30	28
7.	210	12	105

Pretest, page 6

	a	b	c	d
8.	82,056	137,388	471,960	1,183,572
9.	86	152 R31	2,026	1,163 R13
10.	0.858	0.3526	\$1,256.48	\$27.99
11.	800	2,420	2.65	\$0.55
12.	23			
13.	140			

Lesson 1.1, page 7

	a	b
1.	Commutative	Associative
2.	Identity	Commutative
3.	Associative	Property of Zero
4.	Identity	Commutative
5.	$3 + (5 + 2)$	7×5
6.	4	$(3 \times 2) \times 5$
7.	$9 + 7$	$2 + (5 + 4)$
8.	7	37
9.	0	0

Lesson 1.2, page 8

	a	b
1.	multiply	add
2.	add	multiply
3.	$(4 \times 6) + (4 \times 2)$	$2 \times (5 + 4)$
4.	$5 \times (1 + 6)$	$(4 \times 2) + (4 \times 6)$
5.	$(8 \times 4) + (8 \times 3)$	$5 \times (0 + 1)$
6.	5	2
7.	6	5
8.	2	4
9.	16	16
10.	21	25

Lesson 1.2, page 9

- 1a. $(22 \times 100) + (22 \times 2) = 2,244$
 1b. $(40 \times 25) - (1 \times 25) = 975$
 2a. $(146 \times 30) + (146 \times 3) = 4,818$
 2b. $(30 \times 16) - (2 \times 16) = 448$
 3a. $(30 \times 35) + (6 \times 35) = 1,260$
 3b. $(50 \times 106) + (1 \times 106) = 5,406$
 4a. $(20 \times 256) - (1 \times 256) = 4,864$
 4b. $(40 \times 17) + (5 \times 17) = 765$
 5a. $(57 \times 40) - (57 \times 2) = 2,166$
 5b. $(48 \times 40) + (48 \times 5) = 2,160$
 6a. $(80 \times 80) + (2 \times 80) = 6,560$
 6b. $(50 \times 82) + (1 \times 82) = 4,182$
 7a. $(40 \times 142) + (3 \times 142) = 6,106$
 7b. $(264 \times 70) - (264 \times 3) = 17,688$

- 8a. $(10 \times 39) + (2 \times 39) = 468$
 8b. $(60 \times 35) - (2 \times 35) = 2,030$

Lesson 1.3, page 10

	a	b	c	d
1.	8,748	13,056	11,220	49,795
2.	113,300	86,184	227,664	284,886
3.	331,364	471,534	342,042	440,295
4.	747,612	901,550	955,192	2,070,672

Lesson 1.4, page 11

	a	b	c	d	e
1.	5 r4	2 r14	4	4 r2	2 r14
2.	2 r2	7	27 r1	32	29 r14
3.	30 r5	13 r23	19 r25	26 r17	18

Lesson 1.4, page 12

	a	b	c	d	e
1.	110 r25	312	369 r21	179 r2	110
2.	154 r20	113	270 r2	523	225
3.	1,467 r1	725	828 r40	886	569

Lesson 1.5, page 13

	a	b	c	d
1.	8,624	14,340	71,687	13,888
2.	10,615	16,399	52,125	90,396
3.	138	359	83	151
4.	318	158	117	694

Lesson 1.6, page 14

1. 540; 60 3. 560; 80 5. 40; 10
 2. 40; 30; 1,200 4. 300; 90; 27,000 6. 690; 230

Lesson 1.7, page 15

1.	1, 2, 4, 8	1, 2, 4	4
	1, 2, 3, 4, 6, 12		
2.	1, 2, 3, 6	1, 2, 3, 6	6
	1, 2, 3, 6, 9, 18		
3.	1, 2, 3, 4, 6, 8, 12, 24	1, 3	3
	1, 3, 5, 15		
4.	1, 2, 4	1, 2	2
	1, 2, 3, 6		
5.	1, 5	1	1
	1, 2, 3, 4, 6, 12		
6.	1, 2, 4, 8, 16	1, 2, 4	4
	1, 2, 3, 4, 6, 12		

Lesson 1.7, page 16

	a	b	a	b
1.	1	3	5.	2
2.	14	9	6.	26
3.	12	5	7.	3
4.	18	7	8.	5
				9

Lesson 1.8, page 17

	a	b	a	b
1.	306	1976	5.	224
2.	1728	260	6.	405
3.	4290	126	7.	21624
4.	92	75		14620

Grade 6 Answers

Lesson 1.8, page 18

	a	b		a	b
1.	130	805	5.	132	135
2.	2655	2255	6.	684	168
3.	4828	4788	7.	325	4851
4.	140	200	8.	135	216

Lesson 1.9, page 19

	a	b	c	d	e
1.	5.6	0.04	0.0975	13.44	17.5
2.	0.0918	0.0486	28.105	2.1087	275.04
3.	19.8468	206.703	303.986	20.4102	563.85
4.	95.934	58.734	15.036	2.2382	0.6724
5.	0.1698	9.434	0.1909	0.09	12.532

Lesson 1.10, page 20

	a	b	c	d
1.	2.2	85	0.4	1.5
2.	40	5.3	40	65
3.	3000	30	0.25	1.2
4.	0.4	40	5	6

Lesson 1.11, page 21

1.	20.8 lb.	3.	0.465 lb.	5.	\$54.48	7.	21.6
2.	15	4.	372	6.	300		

Lesson 1.11, page 22

1.	0.347	3.	\$4.02	5.	\$22.42	7.	0.705
2.	\$25.12	4.	115.84	6.	1.433		

Posttest, page 23

	a	b
1.	$(3 \times 5) - (3 \times 2)$	$(5 + 8) \times 2$
2.	$(7 \times 7) - (7 \times 4)$	$7 \times (6 - 3)$
3.	$(3 \times 8) + 3 \times 2$	$(5 \times 9) - (5 \times 4)$

	a	b	c
4.	4	6	2
5.	4	1	2
6.	30	15	20
7.	60	24	120

Posttest, page 24

	a	b	c	d
8.	77,106	57,288	744,111	1,981,692
9.	83	185 r4	1,757 r20	1,158
10.	1,899.56	0.4028	\$1,551.35	32.4612
11.	130	8,200	720	\$0.75
12.	5.208	13.	32	

Chapter 2

Pretest, page 25

	a	b	c
1.	$\frac{21}{32}$	$3\frac{3}{8}$	$3\frac{1}{8}$
2.	$12\frac{1}{2}$	$20\frac{4}{5}$	$40\frac{1}{2}$
3.	$13\frac{5}{12}$	$7\frac{1}{5}$	$4\frac{1}{8}$
4.	12	$\frac{4}{15}$	$26\frac{2}{3}$
5.	$\frac{32}{35}$	$\frac{4}{5}$	$\frac{3}{7}$

6. $\frac{22}{25}$ $2\frac{2}{13}$ $\frac{59}{72}$

Pretest, page 26

7.	$\frac{21}{32}$	9.	$4\frac{3}{8}$	11.	$16\frac{1}{2}$	13.	$\frac{3}{4}$
8.	$3\frac{1}{8}$	10.	$13\frac{1}{8}$	12.	$5\frac{1}{3}$		

Lesson 2.1, page 27

	a	b	c	d
1.	$\frac{4}{15}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{10}$
2.	$\frac{7}{16}$	$\frac{16}{27}$	$\frac{3}{10}$	$\frac{9}{35}$
3.	$\frac{1}{9}$	$\frac{11}{18}$	$\frac{4}{25}$	$\frac{9}{28}$
4.	$2\frac{5}{6}$	$4\frac{3}{8}$	$6\frac{33}{40}$	4
5.	$18\frac{2}{15}$	$20\frac{1}{4}$	$7\frac{7}{12}$	$8\frac{3}{4}$
6.	14	$5\frac{4}{9}$	$3\frac{21}{32}$	$3\frac{5}{6}$

Lesson 2.2, page 28

1.	2	2.	4	3.	9
----	---	----	---	----	---

Lesson 2.2, page 29

1.	$\frac{1}{4}$	2.	$\frac{1}{4}$	3.	$\frac{1}{3}$	4.	$\frac{2}{3}$
----	---------------	----	---------------	----	---------------	----	---------------

Lesson 2.3, page 30

	a	b	c	d
1.	$\frac{5}{6}$	$\frac{9}{16}$	$\frac{5}{6}$	$1\frac{1}{15}$
2.	$\frac{4}{7}$	$1\frac{1}{15}$	$2\frac{2}{9}$	$\frac{5}{6}$
3.	$2\frac{5}{8}$	$1\frac{1}{6}$	$\frac{1}{2}$	$2\frac{1}{2}$
4.	$\frac{9}{10}$	$1\frac{1}{27}$	$\frac{4}{5}$	$\frac{6}{7}$

Lesson 2.3, page 31

	a	b	c	d
1.	$2\frac{1}{10}$	$1\frac{1}{2}$	$1\frac{1}{24}$	$8\frac{1}{3}$
2.	$\frac{4}{5}$	$\frac{3}{4}$	$6\frac{6}{7}$	$\frac{1}{2}$
3.	$2\frac{4}{5}$	$\frac{11}{12}$	$1\frac{4}{5}$	$\frac{2}{3}$
4.	$2\frac{11}{12}$	$\frac{1}{12}$	$3\frac{1}{5}$	$\frac{8}{9}$
5.	$2\frac{7}{10}$	$\frac{7}{12}$	$\frac{2}{9}$	$\frac{3}{5}$

Lesson 2.3, page 32

	a	b	c	d
1.	$1\frac{1}{3}$	60	3	$\frac{3}{5}$
2.	$\frac{5}{21}$	$\frac{8}{9}$	$7\frac{1}{2}$	6
3.	$\frac{7}{32}$	$\frac{34}{225}$	$\frac{9}{16}$	$\frac{69}{187}$

Grade 6 Answers

4. $\frac{6}{11}$ $\frac{7}{55}$ $\frac{17}{20}$ $\frac{20}{21}$
 5. $\frac{11}{15}$ $\frac{1}{3}$ $\frac{42}{55}$ $\frac{17}{24}$

Lesson 2.4, page 33

- | | a | b | c | d |
|----|----------------|------------------|-----------------|-----------------|
| 1. | $\frac{3}{4}$ | $\frac{1}{2}$ | $2\frac{2}{7}$ | $\frac{7}{15}$ |
| 2. | $3\frac{6}{7}$ | $2\frac{1}{72}$ | $\frac{13}{18}$ | $\frac{12}{25}$ |
| 3. | $2\frac{2}{5}$ | $\frac{1}{2}$ | $1\frac{1}{3}$ | $\frac{17}{24}$ |
| 4. | $\frac{9}{10}$ | $1\frac{23}{57}$ | $\frac{3}{13}$ | $5\frac{2}{5}$ |

Lesson 2.4, page 34

- | | a | b | c | d |
|----|-------------------|-------------------|-----------------|-----------------|
| 1. | $2\frac{5}{8}$ | $5\frac{2}{5}$ | $\frac{5}{18}$ | $\frac{17}{24}$ |
| 2. | $5\frac{1}{2}$ | $10\frac{2}{3}$ | $\frac{16}{49}$ | $2\frac{1}{42}$ |
| 3. | $\frac{13}{16}$ | $\frac{26}{37}$ | $\frac{69}{91}$ | $1\frac{1}{15}$ |
| 4. | $\frac{112}{155}$ | $\frac{130}{171}$ | $\frac{39}{74}$ | $1\frac{1}{13}$ |
| 5. | $\frac{31}{150}$ | $2\frac{18}{19}$ | $1\frac{2}{7}$ | $4\frac{8}{9}$ |

Lesson 2.5, page 35

1. $\frac{1}{2}$ 3. $3\frac{3}{4}$ 5. 5 7. $5\frac{1}{4}$
 2. $3\frac{1}{3}$ 4. $1\frac{1}{3}$ 6. $2\frac{2}{5}$

Lesson 2.5, page 36

1. $3\frac{1}{16}$ 3. $\frac{7}{27}$ 5. 18 7. $20\frac{2}{5}$
 2. 8 4. $17\frac{1}{2}$ 6. $8\frac{1}{3}$

Posttest, page 37

- | | a | b | c | d |
|----|-----------------|-----------------|------------------|------------------|
| 1. | $\frac{1}{2}$ | $\frac{3}{16}$ | $\frac{21}{40}$ | $\frac{5}{28}$ |
| 2. | $3\frac{1}{3}$ | $3\frac{1}{2}$ | $7\frac{1}{5}$ | $4\frac{4}{7}$ |
| 3. | $12\frac{1}{2}$ | $37\frac{1}{2}$ | 22 | $16\frac{2}{3}$ |
| 4. | $8\frac{1}{3}$ | $4\frac{1}{2}$ | $6\frac{1}{4}$ | $11\frac{4}{15}$ |
| 5. | $\frac{8}{3}$ | $\frac{1}{5}$ | $\frac{5}{12}$ | $\frac{7}{4}$ |
| 6. | $7\frac{1}{2}$ | $\frac{4}{25}$ | $18\frac{2}{3}$ | $\frac{7}{16}$ |
| 7. | $\frac{5}{6}$ | $1\frac{5}{16}$ | $1\frac{11}{21}$ | $\frac{5}{9}$ |
| 8. | $1\frac{1}{4}$ | $1\frac{1}{3}$ | 1 | $\frac{12}{25}$ |

Posttest, page 38

9. $\frac{5}{18}$ 10. $3\frac{3}{4}$ 11. $8\frac{1}{3}$ 12. $11\frac{2}{3}$

13. $10\frac{5}{6}$ 14. $1\frac{1}{3}$ 15. $\frac{4}{5}$

Chapter 3

Pretest, page 39

- | | a | b | c | d |
|-----|--------------------------------|---------------------------------|---------------------------------|-----------------|
| 1. | $\frac{7}{5} = \frac{28}{20}$ | $\frac{4}{6} = \frac{14}{21}$ | $\frac{6}{8} = \frac{15}{20}$ | |
| 2. | $\frac{7}{9} = \frac{14}{18}$ | $\frac{15}{18} = \frac{10}{12}$ | $\frac{39}{30} = \frac{13}{10}$ | |
| 3. | $\frac{10}{8} = \frac{30}{24}$ | $\frac{11}{12} = \frac{44}{48}$ | $\frac{3}{2} = \frac{9}{6}$ | |
| 4. | $\frac{12}{15} = \frac{4}{5}$ | $\frac{10}{14} = \frac{25}{35}$ | $\frac{10}{6} = \frac{25}{15}$ | |
| | a | b | c | d |
| 5. | 0.15 | $\frac{3}{20}$ | 0.22 | $\frac{11}{50}$ |
| 6. | 1.2 | $1\frac{1}{5}$ | 0.54 | $\frac{27}{50}$ |
| 7. | 0.36 | $\frac{9}{25}$ | 2.05 | $2\frac{1}{20}$ |
| | a | b | c | |
| 8. | 12% | 1% | 40% | |
| 9. | 406% | 12.5% | 60% | |
| | a | b | | |
| 10. | 108 | 45 | | |
| 11. | 72 | 25 | | |
| 12. | 24 | 140 | | |
| 13. | 75 | 140 | | |
| 14. | 60.5 | 205 | | |

Pretest, page 40

15. \$8 17. \$3 19. 75% 21. 184
 16. 20 18. 9 20. 85% 22. \$11.98

Lesson 3.1, page 41

- | | a | b | | a | b |
|----|----------------|----------------|--|-----------------|----------------|
| 1. | $\frac{5}{12}$ | $\frac{1}{7}$ | | $\frac{7}{11}$ | $\frac{1}{3}$ |
| 2. | $\frac{4}{5}$ | $\frac{4}{7}$ | | $\frac{1}{2}$ | $\frac{1}{6}$ |
| 3. | $\frac{1}{2}$ | $\frac{8}{11}$ | | $\frac{9}{25}$ | $\frac{7}{10}$ |
| 4. | $\frac{5}{6}$ | $\frac{7}{10}$ | | $\frac{8}{9}$ | $\frac{2}{19}$ |
| 5. | $\frac{1}{4}$ | $\frac{3}{4}$ | | $\frac{21}{62}$ | $\frac{1}{12}$ |

Lesson 3.1, page 42

- | | a | b | | a | b |
|----|----------------|---------------|--|----------------|----------------|
| 1. | $\frac{15}{2}$ | $\frac{4}{5}$ | | $\frac{5}{16}$ | $\frac{7}{12}$ |
| 2. | $\frac{3}{1}$ | $\frac{8}{7}$ | | $\frac{2}{1}$ | $\frac{8}{7}$ |
| 3. | $\frac{7}{11}$ | $\frac{4}{5}$ | | $\frac{3}{5}$ | $\frac{3}{2}$ |

Lesson 3.2, page 43

- | | a | b | c |
|----|---|----|---|
| 1. | 8 | 16 | 1 |

Grade 6 Answers

2. 9 1 10
 3. 21 2 21
 4. 64 11 15
 5. 15 36 10

Lesson 3.2, page 44

- | | a | b | c |
|----|----|----|----|
| 1. | 1 | 9 | 8 |
| 2. | 4 | 16 | 5 |
| 3. | 8 | 6 | 6 |
| 4. | 49 | 5 | 10 |
| 5. | 70 | 9 | 10 |

Lesson 3.3, page 45

1. Cans, 4, 8, 12; Cost, \$2.25, \$4.50, \$6.75
 2. Ice Cream, 180, 360, 540, 720, 900, 1,080; Hours, 2, 4, 6, 8, 10, 12
 3. Distance, 650, 1300, 1950; Hours, 3, 6, 9
 4. Bagels, 640, 1280, 1920, 2560; Hours, 4, 8, 12, 16

Lesson 3.4, page 46

1. 5 3. 24 minutes 5. 12
 2. $\frac{1}{2}$ hour 4. $\frac{1}{2}$ day 6. \$130

Lesson 3.5, page 47

1. 1,320; 22 miles per gallon 4. Village Market
 2. 720; 480 quarts per day 5. Quick Stop
 3. 1,180; 118 miles per hour 6. 440; 220 people per hour

Lesson 3.5, page 48

1. Keith 3. Nicole 5. Mrs. Jimenez's class
 2. Carl 4. Music Land 6. \$28

Lesson 3.6, page 49

- | Fraction | Decimal | Fraction | Decimal |
|---------------------|---------|----------------------|---------|
| 1. $\frac{1}{50}$ | 0.02 | 8. $\frac{11}{100}$ | 0.11 |
| 2. $\frac{2}{25}$ | 0.08 | 9. $\frac{3}{100}$ | 0.03 |
| 3. $\frac{27}{100}$ | 0.27 | 10. $\frac{11}{50}$ | 0.22 |
| 4. $\frac{13}{100}$ | 0.13 | 11. $\frac{17}{100}$ | 0.17 |
| 5. $\frac{17}{25}$ | 0.68 | 12. $\frac{83}{100}$ | 0.83 |
| 6. $\frac{18}{25}$ | 0.72 | 13. $\frac{97}{100}$ | 0.97 |
| 7. $\frac{14}{25}$ | 0.56 | 14. $\frac{43}{100}$ | 0.43 |

Lesson 3.6, page 50

- | Fraction | Decimal | Fraction | Decimal |
|---------------------|---------|----------------------|---------|
| 1. $\frac{7}{100}$ | 0.07 | 8. $\frac{39}{100}$ | 0.39 |
| 2. $\frac{13}{100}$ | 0.13 | 9. $\frac{1}{10}$ | 0.10 |
| 3. $\frac{12}{25}$ | 0.48 | 10. $\frac{31}{50}$ | 0.62 |
| 4. $\frac{71}{100}$ | 0.71 | 11. $\frac{3}{4}$ | 0.75 |
| 5. $\frac{27}{100}$ | 0.27 | 12. $\frac{97}{100}$ | 0.97 |

6. $\frac{1}{50}$ 0.02

7. $\frac{3}{20}$ 0.15

Lesson 3.7, page 51

	a	b
1.	$5\frac{1}{5}$	76

2.	$9\frac{3}{5}$	7
----	----------------	---

3.	18	$7\frac{1}{2}$
----	----	----------------

4.	$1\frac{24}{25}$	$3\frac{4}{5}$
----	------------------	----------------

5.	8	$6\frac{3}{4}$
----	---	----------------

6.	64	15
----	----	----

13. $\frac{53}{100}$ 0.53

14. $\frac{41}{50}$ 0.82

	a	b
7.	$31\frac{1}{2}$	$8\frac{1}{10}$

8.	$3\frac{17}{25}$	$14\frac{2}{5}$
----	------------------	-----------------

9.	54	$21\frac{1}{2}$
----	----	-----------------

10.	$4\frac{4}{5}$	$5\frac{2}{5}$
-----	----------------	----------------

11.	36	19
-----	----	----

12.	$10\frac{1}{2}$	$\frac{3}{4}$
-----	-----------------	---------------

Lesson 3.8, page 52

	a	b
1.	20.48	10.4

2.	2.225	4.62
----	-------	------

3.	6.96	20
----	------	----

4.	6.132	42.14
----	-------	-------

5.	2.048	3.19
----	-------	------

6.	42	4.5
----	----	-----

	a	b
7.	5.88	38

8.	9	31.24
----	---	-------

9.	5.796	64
----	-------	----

10.	7.84	27.9
-----	------	------

11.	2.56	24
-----	------	----

12.	4.32	2.7
-----	------	-----

Lesson 3.9, page 53

	a	b
1.	60%	20%

2.	15%	64%
----	-----	-----

3.	15%	40%
----	-----	-----

4.	10%	90%
----	-----	-----

5.	75%	40%
----	-----	-----

	a	b
6.	20%	150%

7.	30%	200%
----	-----	------

8.	37.5%	125%
----	-------	------

9.	50%	25%
----	-----	-----

10.	120%	80%
-----	------	-----

Lesson 3.10, page 54

1.	\$48.65	3.	18
----	---------	----	----

2.	\$194.60	4.	480
----	----------	----	-----

5.	\$90	6.	375
----	------	----	-----

Lesson 3.10, page 55

1.	17%	3.	15%
----	-----	----	-----

2.	\$35.75	4.	1,150
----	---------	----	-------

5.	18%	7.	4.8
----	-----	----	-----

6.	69	8.	280
----	----	----	-----

Posttest, page 56

	a	b	c
1.	15	27	3

2.	5	6	21
----	---	---	----

3.	6	16	15
----	---	----	----

4.	14	9	4
----	----	---	---

	a	b	c	d
5.	0.24	$\frac{6}{25}$	1.10	$1\frac{1}{10}$

6.	0.37	$\frac{37}{100}$	0.55	$\frac{11}{20}$
----	------	------------------	------	-----------------

7.	0.06	$\frac{3}{50}$	2.35	$2\frac{7}{20}$
----	------	----------------	------	-----------------

	a	b	c
8.	16%	5%	60%

9.	80%	87.5%	130%
----	-----	-------	------

	a	b
10.	80	84%

11.	15	160
-----	----	-----

12.	5%	27.2
-----	----	------

Grade 6 Answers

13. 72 12.5%
14. 60 4.4

Posttest, page 57

15. 4 17. 6 19. 60% 21. \$4,375.00
16. \$45 18. \$24 20. $\frac{11}{20}$ 22. 42

Chapter 4

Pretest, page 58

- | | | | |
|-----|------------------|-------------------|---|
| 1. | a | b | |
| 2. | -8 | 1 | |
| 3. | -5 | -35 | |
| 4. | 21 | 16 | |
| 5. | a | b | c |
| 6. | 3 | 10 | 5 |
| 7. | 9 | 23 | 7 |
| 8. | 13 | 5 | 1 |
| 9. | < | > | > |
| | < | < | > |
| | > | > | < |
| 10. | a | b | |
| 11. | -89, -26, 8, 42 | -90, -84, -57, 91 | |
| 12. | -81, -5, 20, 87 | 53, 55, 73, 89 | |
| | -91, -46, 12, 52 | -38, -23, 22, 41 | |

Pretest, page 59

13. (7, 6) 16. (5, -8) 19. F
14. (-8, 8) 17. H 20. B
15. (-6, -3) 18. D 21-24. Check graph.

Lesson 4.1, page 60

- | | | |
|-----|-----|-----|
| 1. | a | b |
| 2. | -8 | -25 |
| 3. | 0 | 0 |
| 4. | 8 | 25 |
| 5. | -10 | -7 |
| 6. | 10 | 7 |
| 7. | -12 | -9 |
| 8. | 12 | 9 |
| 9. | -6 | -2 |
| 10. | 6 | 2 |
| 11. | -11 | -14 |
| 12. | 11 | 14 |
| 13. | -20 | -16 |
| 14. | 20 | 16 |
| 15. | -10 | -1 |
| 16. | 3 | -7 |
| 17. | 4 | 8 |
| 18. | -13 | 15 |
| 19. | 32 | -27 |
| 20. | -17 | 20 |

Lesson 4.2, page 61

- | | | | | | |
|----|------|------|-----|------|-------|
| 1. | a | b | 7. | a | b |
| 2. | -45 | 8 | 8. | -10 | 7 |
| 3. | 528 | 62 | 9. | 60 | -95 |
| 4. | 345 | -8 | 10. | -97 | -34 |
| 5. | 7500 | -80 | 11. | -100 | 15 |
| 6. | 10 | -250 | 12. | -25 | 390 |
| | 3 | -8 | | 95 | 6,000 |

Lesson 4.3, page 62

- | | | | |
|-----|-----|-----|-----|
| 1. | a | b | c |
| 2. | 4 | 13 | -10 |
| 3. | -7 | 11 | 2 |
| 4. | -12 | -5 | 1 |
| 5. | 14 | -8 | -13 |
| 6. | 3 | 7 | -4 |
| 7. | -15 | 9 | 12 |
| 8. | 16 | 6 | -20 |
| 9. | -40 | -24 | 17 |
| 10. | 33 | -41 | 19 |
| 11. | 26 | 18 | -35 |
| 12. | -53 | 21 | 30 |
| | 25 | -21 | 47 |

Lesson 4.3, page 63

- | | | | |
|-----|-----|-----|-----|
| 1. | a | b | c |
| 2. | 64 | 81 | -32 |
| 3. | -8 | 19 | 53 |
| 4. | -76 | -3 | 11 |
| 5. | 62 | -95 | -42 |
| 6. | 2 | 36 | -9 |
| 7. | -13 | 48 | 27 |
| 8. | 35 | 29 | -23 |
| 9. | -51 | 57 | 80 |
| 10. | 73 | -55 | 46 |
| 11. | 65 | 37 | -59 |
| 12. | 67 | 70 | 50 |
| 13. | 34 | -63 | 71 |
| 14. | 58 | 93 | 21 |
| 15. | -6 | -17 | -88 |
| 16. | 10 | 49 | -5 |
| | -22 | -79 | 31 |

Lesson 4.4, page 64

- | | | | |
|-----|--------------|--------------|----------|
| 1. | a | b | c |
| 2. | -2 | -7 | 1 |
| 3. | 6 | 3 | -5 |
| 4. | 2 < 7 | -1 > -4 | 5 > 0 |
| 5. | -4 < 1 | 0 > -8 | -8 > -10 |
| 6. | 7 > -7 | -2 < 0 | 4 < 6 |
| 7. | 1 > -1 | 6 > 3 | -6 < -3 |
| 8. | 4 > -2 | -6 < -4 | 3 > -3 |
| 9. | -5, -3, 0 | -8, 2, 8 | |
| 10. | -7, -3, 0, 5 | -2, -1, 2, 4 | |
| | -6, -3, -2, | -8, -3, -2, | |
| | 2, 5 | 0, 5 | |

Lesson 4.4, page 65

- | | | | |
|-----|-------------------|-------------------|-----------|
| 1. | a | b | c |
| 2. | 66 > 3 | 43 < 83 | -24 < 82 |
| 3. | 99 > 84 | -33 > -90 | -37 = -37 |
| 4. | 28 > 7 | -24 < 61 | -36 > -88 |
| 5. | -27 > -52 | -49 > -69 | 42 < 98 |
| 6. | 88 > -99 | 47 > -44 | -8 > -45 |
| 7. | 46 > -26 | 13 > -1 | 39 < 51 |
| 8. | 8 > -18 | 61 > -70 | -4 < -1 |
| | -12 > -14 | -1 < 0 | 57 > -73 |
| 9. | a | b | |
| 10. | -37, 16, 51, 61 | -86, -49, 21, 90 | |
| | -84, -67, -65, 10 | -97, -78, -62, 11 | |

Grade 6 Answers

11. -37, -35, 48, 81 -68, -9, 19, 95
 12. -37, 9, 51, 61 -49, 15, 21, 90
 13. -11, -4, 9, 14 -75, -23, 27, 74
 14. -80, -79, 2, 81 -47, -39, 47, 93

Lesson 4.4, page 66

- | | a | b | c |
|----|------------|-------------|-------------|
| 1. | $92 > 35$ | $-56 > -57$ | $-77 < 37$ |
| 2. | $78 > -96$ | $-99 < -94$ | $34 > -60$ |
| 3. | $-1 > -37$ | $6 > -78$ | $34 > -43$ |
| 4. | $4 > -4$ | $-66 < -13$ | $-66 < -45$ |
| 5. | $-10 < 51$ | $76 > 13$ | $-69 > -79$ |
| 6. | $18 < 80$ | $-12 > -81$ | $-61 < 57$ |
| 7. | $33 > -64$ | $17 > 13$ | $-21 < 19$ |
| 8. | $18 < 80$ | $-12 > -81$ | $-61 < 57$ |

- | | a | b |
|-----|------------------|--------------------|
| 9. | -67, -65, 10, 20 | -97, -78, -57, 11 |
| 10. | -39, -37, 48, 81 | -96, -9, 19, 95 |
| 11. | 9, 47, 51, 61 | -49, 15, 22, 90 |
| 12. | -65, 10, 20, 55 | -97, -78, -68, -57 |
| 13. | -34, -16, 0, 14 | -12, -7, 67, 72 |
| 14. | -46, -2, 46, 52 | -92, -52, -28, -3 |

Lesson 4.5, page 67

- | | | | |
|-------------|-------------|------|-------|
| 1. (-7, 8) | 4. (2, -2) | 7. I | 10. D |
| 2. (3, 9) | 5. (-9, -6) | 8. K | |
| 3. (-4, -4) | 6. J | 9. F | |

Lesson 4.5, page 68

- | | | | |
|-------------|-------------|-------|-------|
| 1. (0, 4) | 5. (-3, -3) | 9. S | 13. R |
| 2. (-8, 3) | 6. (5, 7) | 10. Q | 14. W |
| 3. (-6, -6) | 7. (-2, 7) | 11. V | 15. T |
| 4. (7, 0) | 8. (4, -5) | 12. X | 16. U |

Lesson 4.6, page 69

1. 11 2. 15 3. 15 4. 12 5. 4

Posttest, page 70

- | | a | b |
|----|-----|-----|
| 1. | 9 | -17 |
| 2. | -22 | 41 |
| 3. | 5 | -76 |
-
- | | a | b | c |
|----|-------------|-------------|-------------|
| 4. | 3 | -10 | 45 |
| 5. | -29 | 12 | 8 |
| 6. | 26 | 2 | -18 |
| 7. | $92 > 79$ | $50 > -76$ | $-74 < -35$ |
| 8. | $-77 < 15$ | $-11 > -49$ | $-14 > -73$ |
| 9. | $-18 > -76$ | $44 < 72$ | $-45 < -12$ |

- | | a | b |
|-----|-------------------|-------------------|
| 10. | -70, -28, 60, 86 | -54, -38, -17, 45 |
| 11. | -97, -71, -63, 36 | -36, 26, 60, 63 |
| 12. | 38, 48, 56, 89 | -47, 49, 78, 97 |

Posttest, page 71

- | | | | |
|--------------|-------------|---------------------|--------|
| 13. (-9, -5) | 16. (-7, 5) | 19. N | 25. 17 |
| 14. (3, -6) | 17. P | 20. R | 26. 14 |
| 15. (1, 7) | 18. T | 21-24. Check graph. | |

Mid-Test

Mid-test, page 72

- | | a | b | c | d | e |
|----|-------|--------|--------|-----------|-----------|
| 1. | 5,593 | 93,993 | 24,624 | 1,802,340 | 2,562,648 |

- | | | | | | |
|----|---------------|-----------------|-----------------|-----------------|----------------|
| 2. | 12 r8 | 7,809 | 137 r43 | 2,581 r10 | 428 |
| 3. | 55.68 | 0.32226 | \$1350.40 | \$114.4836 | 165.78 |
| 4. | 75 | 665 | 75.6 | 2476 | 392 |
| 5. | $\frac{1}{2}$ | $\frac{35}{48}$ | $3\frac{3}{4}$ | $9\frac{1}{3}$ | 14 |
| 6. | 30 | $\frac{3}{20}$ | $1\frac{5}{16}$ | $\frac{13}{15}$ | $1\frac{7}{8}$ |

Mid-test, page 73

- | | a | b | c | | |
|-----|---------------|---------------|----------------|-----|---------------|
| 7. | 4 | 35 | 15 | | |
| 8. | 28 | 18 | 24 | | |
| 9. | 11 | 2 | 8 | | |
| 10. | 42 | 11. | 213 | 12. | Shop and Save |
| 13. | 15% | 80% | 28% | | |
| 14. | 0.3 | 0.7225 | 3.46 | | |
| 15. | $\frac{3}{4}$ | $\frac{1}{5}$ | $1\frac{2}{5}$ | | |

Mid-test, page 74

- | | a | b | c |
|-----|-------------|-------------|------------|
| 16. | 2.7 | 1.2 | 19.8 |
| 17. | 82 | 3 | 80 |
| 18. | 25 | 4 | 95 |
| 19. | 7 | 71 | -68 |
| 20. | 100 | -25 | 95 |
| 21. | -37 | 68 | -25 |
| 22. | $-32 > -35$ | $-68 < -41$ | $40 > 27$ |
| 23. | $96 > 17$ | $20 < 36$ | $20 < 48$ |
| 24. | $72 > -15$ | $-29 < 62$ | $14 > -77$ |
-
- | | a | b |
|-----|------------------|------------------|
| 25. | -85, -56, -6, 6 | -82, -47, -3, 80 |
| 26. | -60, 5, 10, 99 | 37, 66, 73, 76 |
| 27. | -47, -37, -7, 16 | -56, 61, 75, 97 |

Mid-test, page 75

- | | | | |
|-------------|-------------|---------------------|--------|
| 28. (3, 9) | 31. (-3, 2) | 34. D | 40. 21 |
| 29. (2, -3) | 32. H | 35. B | 41. 16 |
| 30. (-1, 7) | 33. F | 36-39. Check graph. | |

Chapter 5

Pretest, page 76

- | | a | b | c |
|-----|--------------------------------|--------------------------------|------------------------|
| 1. | $2 \times 2 \times 2 \times 2$ | 9×9 | $5 \times 5 \times 5$ |
| 2. | 4×4 | $8 \times 8 \times 8 \times 8$ | $7 \times 7 \times 7$ |
| 3. | 4^4 | 2^3 | 6^5 |
| 4. | 3^8 | 9^3 | 8^6 |
| 5. | expression | equation | expression |
| 6. | equation | expression | expression |
| 7. | $C = 5, V = y$ | $C = 2, V = x$ | $C = 1, V = n$ |
| 8. | $C = 12, V = z$ | $C = 4, V = m$ | $C = 9, V = d$ |
| 9. | $4 \times (8 - 3)$ | 13. | $6 \times (2 - 1)$ |
| 10. | $4 + 5 \times 3$ | 14. | $3 \times (40 \div 8)$ |
| 11. | $16 - (4 \times 2)$ | 15. | $7 - (4 \times 2)$ |
| 12. | $25 \div (5 + 3)$ | | |

Pretest, page 77

- | | a | b | c |
|-----|----|----|----|
| 16. | 8 | 2 | 2 |
| 17. | 11 | 0 | 0 |
| 18. | 7 | 16 | 10 |

Grade 6 Answers

19. 16 1 25
 20. $1\frac{1}{2}$ 36 3
 21. 100 5 9
 22. $3s=48$; \$16; \$16, \$32
 23. the number of men; $23 - n = 5$ or $n + 5 = 23$; 18; 18

Lesson 5.1, page 78

- | | a | b | c |
|-----|--------------------------------|---|--|
| 1. | 3×10^1 | 4×10^3 | 5×10^4 |
| 2. | 6×10^5 | 7×10^2 | 9×10^1 |
| 3. | 4×10^4 | 1×10^5 | 4×10^2 |
| 4. | $3 \times 3 \times 3$ | $5 \times 5 \times 5 \times 5 \times 5$ | $1 \times 1 \times 1 \times 1 \times 1 \times 1$ |
| 5. | 12×12 | $8 \times 8 \times 8$ | $6 \times 6 \times 6$ |
| 6. | $7 \times 7 \times 7 \times 7$ | $4 \times 4 \times 4 \times 4$ | $11 \times 11 \times 11 \times 11$ |
| 7. | 3^3 | 8^2 | 7^5 |
| 8. | 24^2 | 4^3 | 6^6 |
| 9. | 2^4 | 38^3 | 5^5 |
| 10. | 16 | 64 | 1 |
| 11. | 64 | 81 | 125 |
| 12. | 243 | 216 | 121 |

Lesson 5.1, page 79

- | | a | b | c |
|-----|---|--------------------------------|---|
| 1. | $3 \times 3 \times 3 \times 3 \times 3$ | $9 \times 9 \times 9$ | $2 \times 2 \times 2 \times 2 \times 2 \times 2$ |
| 2. | 10×10 | $3 \times 3 \times 3 \times 3$ | $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$ |
| 3. | $7 \times 7 \times 7$ | 4×4 | 7×7 |
| 4. | $9 \times 9 \times 9$ | 8 | 12×12 |
| 5. | $5 \times 5 \times 5 \times 5$ | $11 \times 11 \times 11$ | $6 \times 6 \times 6 \times 6 \times 6$ |
| 6. | $4 \times 4 \times 4 \times 4$ | $10 \times 10 \times 10$ | $8 \times 8 \times 8 \times 8 \times 8 \times 8$ |
| 7. | 3^3 | 5^5 | 2^6 |
| 8. | 9^3 | 4^7 | 21^2 |
| 9. | 10^4 | 8^5 | 7^4 |
| 10. | 32,768 | 256 | 81 |
| 11. | 36 | 9 | 10,000 |
| 12. | 256 | 2,401 | 144 |

Lesson 5.2, page 80

- | | a | b | c |
|-----|-------------------|--------------------|------------|
| 1. | expression | equation | expression |
| 2. | equation | expression | equation |
| 3. | $3; x$ | $4; y$ | |
| 4. | $1; z$ | $5; n$ | |
| 5. | $7; b$ | $1; m$ | |
| 6. | $1; r$ | $6; d$ | |
| 7. | $n + 5$ | $8 - x$ | |
| 8. | $x + 7$ | $n \times 11$ | |
| 9. | $6n = 18$ | $70 - n = 29$ | |
| 10. | $\frac{8}{n} = 2$ | $7 \times 12 = 84$ | |

11. six decreased by a number is equal to three
 12. the product of five and thirteen is equal to 65

Lesson 5.2, page 81

- | | a | b | c |
|----|----------------|----------------|------------|
| 1. | expression | equation | equation |
| 2. | expression | equation | expression |
| 3. | expression | equation | expression |
| 4. | equation | expression | expression |
| 5. | $C = 6, V = g$ | $C = 1, V = p$ | |
| 6. | $C = 5, V = r$ | $C = 9, V = t$ | |
| 7. | $C = 2, V = x$ | $C = 4, V = n$ | |

- | | | |
|-----|--------------------|--------------------|
| 8. | $C = 3, V = a$ | $C = 7, V = d$ |
| 9. | $C = 20, V = s$ | $C = 1, V = j$ |
| 10. | $3 + b$ | $8 \times (f + 7)$ |
| 11. | $8 \times d$ | $p + 4 = 9$ |
| 12. | $(4 \times m) - 3$ | $r - 2 = 8$ |
| 13. | $4 \times (5 + x)$ | 10×2 |
| 14. | $12 \times r - 7$ | $9 + k$ |

Lesson 5.3, page 82

- | | a | b |
|----|----------------------|--------------------------------------|
| 1. | $x + 5$ | $12 \div n$ |
| 2. | $7n$ or $7 \times n$ | $7 - c$ |
| 3. | $n + 15 = 23$ | $x \div 4$ or $\frac{1}{4}x$ |
| 4. | $6 + p$ | $15m$ or $15 \times m$ |
| 5. | $11 - n = 7$ | 8. a number decreased by 5 |
| 6. | $8n + 4 = 84$ | 9. three times a number divided by 6 |
| 7. | $n \div 5 = 6$ | |

Lesson 5.3, page 83

- | | a | b |
|-----|---|----------------------|
| 1. | $(3 \times d) - 8$ | $x - 3$ |
| 2. | $g - 2 = 14$ | $z + 8$ |
| 3. | $7 + z$ | $(4 \times d) - 2$ |
| 4. | $\frac{2}{5} \times (6 + s)$ | $9 - c$ |
| 5. | $10 - x$ | $4f - 9$ |
| 6. | $5a - 3$ | $y - 3 = 15$ |
| 7. | $9 + s$ | $8 + t$ |
| 8. | $h - 9$ | $\frac{1}{3}(7 + k)$ |
| 9. | 9 divided by x | |
| 10. | the product of 3 and a number is 27 | |
| 11. | the product of 6 and a number decreased by 4 | |
| 12. | half of a number increased by 9 is 11 | |
| 13. | 14 divided a number | |
| 14. | the product of 6 and a number is 42 | |
| 15. | the product of 9 and a number decreased by 10 | |
| 16. | one-fourth a number increased by 8 is 16 | |

Lesson 5.4, page 84

- | | | | |
|----|----------------|-----|----------------------|
| 1. | $28z + 56b$ | 9. | $30a + 54b$ |
| 2. | $16x + 72$ | 10. | $27x + 5,625$ |
| 3. | $4 \times 4r$ | 11. | $7(3c)$ |
| 4. | $27 + 72x$ | 12. | $18 + 63f$ |
| 5. | $48 + 96t$ | 13. | $67,228g - 134,456d$ |
| 6. | $\frac{3f}{4}$ | 14. | $\frac{3e}{5}$ |
| 7. | $8s^3 + 4$ | 15. | $15z^6 + 15$ |
| 8. | $90x + 120$ | 16. | $10y + 20$ |

Lesson 5.4, page 85

- | | | | |
|----|--------------------------------------|-----|--|
| 1. | $4a + 4b$ | 9. | $6c - 6f$ |
| 2. | $27a + 24b$ | 10. | $40b - 40c$ |
| 3. | $9x + 18y$ | 11. | $8g - 24d$ |
| 4. | $18x + 18$ | 12. | $21h + 48$ |
| 5. | $250 + 500c$ | 13. | $3,072 + 5,120t$ |
| 6. | $\frac{2x}{3}$ | 14. | $\frac{2d}{10}$ or $\frac{d}{5}$ |
| 7. | $192 + 80c$ | 15. | $32,400 + 1,296t$ |
| 8. | $238r + 459 - 7r$
or $231r + 459$ | 16. | $(380f - 19w^4) + 3f$
or $383f - 19w^4$ |

Grade 6 Answers

Lesson 5.5, page 86

	a	b	c
1.	addition	subtraction	
2.	subtraction	addition	
3.	6	4	17
4.	11	12	0
5.	12	10	0
6.	3	21	9
7.	0	20	4
8.	30	15	10
9.	$x + \$6 = \20 ; $x = \$14$		
10.	$g + 12 = 27$; $g = 15$		

Lesson 5.5, page 87

	a	b	c
1.	7	6	15
2.	14	2	22
3.	33	13	0
4.	23	0	15
5.	14	24	1
6.	6	6	24
7.	$21 + n = 37$; 16		
8.	$n - 9 = 33$; 42		
9.	$2 + 5 + n = 25$; 18		

Lesson 5.6, page 88

	a	b	c
1.	divide	multiply	
2.	multiply	divide	
3.	3	25	12
4.	9	1	8
5.	2	16	5
6.	3	$2\frac{1}{2}$	10
7.	$\frac{1}{4}$	20	81
8.	2	40	3
9.	36	6	10
10.	40	16	1
11.	6	150	3
12.	4	4	8

Lesson 5.6, page 89

	a	b	c
1.	9	5	6
2.	12	27	15
3.	8	1	6
4.	50	36	48
5.	5	0	16
6.	19	28	63
7.	$6 \times n = 12$ or $12 \div 6 = n$; 2		
8.	$48 \div n = 12$ or $48 \div 12 = n$; 4		
9.	$25 \times n = 150$ or $150 \div 25 = n$; 6		

Lesson 5.7, page 90

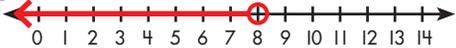
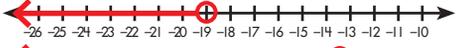
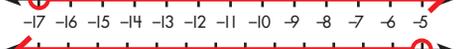
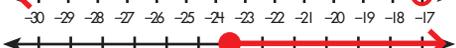
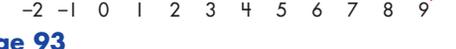
- the number of Jaden's cards; $n - 35 = 52$; 87
- the number of tickets; $\$6.95 \times n = \55.60 ; 8
- the width of the room; $1.5 \times n = 18$; 12
- the Grizzlies' score; $n + 11 = 92$; 81

Lesson 5.7, page 91

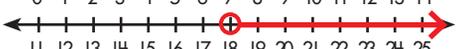
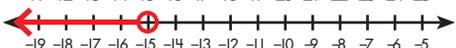
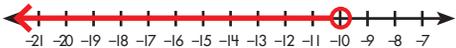
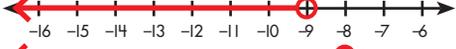
- the cost of candy bars; $\$3 + (\$4 \times c) = \$11$; $\$2$
- the number of students on each bus; $(6 \times s) + 8 = 248$; 40

- the number of comic books Todd had; $c \div 2 + 6 = 16$; 20
- how many hours Mike had the bike; $\$12 + (\$6 \times h) = \$48$; 6
- Susan's weekly allowance; $a - \$8 + \$5 = \$20$; $\$23$

Lesson 5.8, page 92

- $8 > z$ 
- $g < -19$ 
- $d < 12$ 
- $13 > k$ 
- $x > -17$ 
- $y < -17$ 
- $0 \leq r$ 
- $w \geq 3$ 

Lesson 5.8, page 93

- $x < 14$ 
- $y > 18$ 
- $p < -15$ 
- $v < -10$ 
- $s \geq -12$ 
- $f \geq 6$ 
- $w < -9$ 
- $g \leq 12$ 

Lesson 5.9, page 94

- total cost = $\$1.25 \times \text{weight}$

Dependent Variable	Cost (Dollars)	\$1.25	\$2.50	\$3.75
Independent Variable	Weight (Pounds)	1	2	3

- height = $6 + (2 \times \text{time})$

Dependent Variable	Height (Feet)	12	18	54
Independent Variable	Time (Months)	3	6	24

Lesson 5.9, page 95

- time = $150 \div \text{reading speed}$

Dependent Variable	Time	10	7.5	5
Independent Variable	Speed (pgs./day)	15	20	30

- height = $12 - (\text{time} \times 2)$

Dependent Variable	Height (Inches)	10	8	6
Independent Variable	Time (Hours)	1	2	3

- height = $1 + 1.5(\text{time})$

Dependent Variable	Height (Inches)	2.5	4	5.5
--------------------	-----------------	-----	---	-----

Grade 6 Answers

Independent Variable	Time (Days)	1	2	3
----------------------	-------------	---	---	---

4. temperature = $250^\circ + (8^\circ \times \text{time})$

Dependent Variable	Temperature ($^\circ\text{F}$)	258	266	274
Independent Variable	Time (Minutes)	1	2	3

Posttest, page 96

- | a | b | c |
|--|---|--|
| 1. $3 \times 3 \times 3 \times 3 \times 3$ | 12×12 | $6 \times 6 \times 6 \times 6$ |
| 2. $5 \times 5 \times 5 \times 5$ | $7 \times 7 \times 7$ | $8 \times 8 \times 8 \times 8 \times 8 \times 8$ |
| 3. $4 \times 4 \times 4 \times 4 \times 4$ | $2 \times 2 \times 2$ | $9 \times 9 \times 9$ |
| 4. 2^5 | 8^3 | 25^2 |
| 5. 4^3 | 5^8 | 15^3 |
| 6. expression | equation | expression |
| 7. equation | expression | expression |
| 8. $C = 9, V = y$ | $C = 4, V = b$ | $C = 1, V = m$ |
| 9. $2 \times (7 - 3)$ | 13. $(7 \times 2) \div 3$ | |
| 10. $3 + (4 \times 2)$ | 14. $2 \times (45 \div 9)$ | |
| 11. $12 - (4 \times 3)$ | 15. $15 - (4 \times 2)$ | |
| 12. $(20 \div 5) + 16$ | 16. $(16 + 9) \times 3$ | |

Posttest, page 97

- | a | b | c |
|---|----|----------------|
| 17. 8 | 3 | 4 |
| 18. 27 | 16 | 0 |
| 19. 7 | 0 | 6 |
| 20. 9 | 1 | 2 |
| 21. $1\frac{1}{2}$ | 9 | $1\frac{1}{2}$ |
| 22. 16 | 1 | 6 |
| 23. the number of video games; $\$72.60 \div \$24.20 = g$; 3 | | |
| 24. $2n - 4 = 130$; 67; 63 | | |

Chapter 6

Prefest, page 98

- | a | b | c |
|-----------------|--------------------------|------------------------|
| 1. 240 sq. in. | $187\frac{1}{2}$ sq. ft. | 77 sq. cm |
| 2. 6.12 sq. m | 1,376 sq. m | 235.45 sq. cm |
| 3. 1,200 cu. cm | 960 cu. ft. | $\frac{16}{125}$ cu. m |

Prefest, page 99

- | a | b |
|----------------|-----------------------------------|
| 4. $(-3, -3)$ | $(-5, -3)$ or $(4, 2)$ |
| 5. 165 sq. ft. | 6. 300 cu. in. 7. 54 sq. ft. |

Lesson 6.1, page 100

- | a | b |
|----------------------------|-------------------------|
| 1. 40 sq. in. | $27\frac{1}{2}$ sq. ft. |
| 2. $12\frac{1}{2}$ sq. ft. | 36 sq. yd. |

Lesson 6.1, page 101

- | a | b | c |
|-----------------|---------------|---------------|
| 1. 27.5 sq. ft. | 48 sq. yd. | 104.5 sq. in. |
| 2. 10 sq. ft. | 123.25 sq. cm | 32 sq. m |

Lesson 6.2, page 102

- | | a | b | c |
|----|------------|-------------|------------|
| 1. | 18 sq. yd. | 324 sq. m | 276 sq. cm |
| 2. | 216 sq. km | 529 sq. in. | 48 sq. ft. |
| 3. | 9 in. | 13 ft. | 9 m |

Lesson 6.2, page 103

- | | a | b | c |
|----|-----|-------|-------|
| 1. | 624 | 450 | 651 |
| 2. | 306 | 157.5 | 137.5 |

Lesson 6.3, page 104

- | | a | b | c |
|----|----|----|----|
| 1. | 80 | 56 | 26 |
| 2. | 57 | 20 | 28 |

Lesson 6.3, page 105

- | | a | b | c |
|----|-------------|-----------|------------|
| 1. | 52 sq. ft. | 48 sq. m | 24 sq. cm |
| 2. | 185 sq. yd. | 9 sq. mi. | 20 sq. in. |

Lesson 6.4, page 106

- | | a | b | c |
|----|-------------|-------------|----------------|
| 1. | 420 cu. yd. | 512 cu. in. | 12,000 cu. ft. |
| 2. | 336 cu. ft. | 100 cu. in. | 648 cu. in. |

Lesson 6.4, page 107

- | | a | b | c |
|----|--------------|---------------|--------------|
| 1. | 576 cu. cm | 1,728 cu. cm | 2,112 cu. m |
| 2. | 144 cu. mm | 1,620 cu. mm | 3,600 cu. cm |
| 3. | 1,280 cu. mm | 12,000 cu. cm | 7,800 cu. mm |

Lesson 6.4, page 108

- | | a | b | a | b |
|----|--------------------------|-------------------------|-----------------------------|---------------------------|
| 1. | $\frac{30}{343}$ cu. in. | $\frac{4}{243}$ cu. ft. | 2. $\frac{160}{729}$ cu. cm | $\frac{40}{1331}$ cu. ft. |

Lesson 6.5, page 109

- | | | |
|------------------|----------------|------------------|
| 1. 54 cu. in. | 3. 480 sq. yd. | 5. 375 sq. in. |
| 2. 1,440 cu. in. | 4. 36 cu. in. | 6. 3,600 sq. yd. |

Lesson 6.5, page 110

- | | | |
|----------------|-----------------|-----------------|
| 1. 500 sq. m | 3. 1,260 sq. cm | 5. 3,000 cu. cm |
| 2. 0.102 cu. m | 4. 87.72 sq. m | 6. 168 sq. cm |

Lesson 6.6, page 111

- | | a | b | c |
|----|-----|-------|-------|
| 1. | 862 | 144 | 1,720 |
| 2. | 90 | 1,710 | 1,270 |

Lesson 6.6, page 112

- | | a | b | c |
|----|--------------|--------------|--------------|
| 1. | 62 sq. in. | 48.7 sq. ft. | 172 sq. yd. |
| 2. | 856 sq. cm | 104 sq. m | 248 sq. in. |
| 3. | 85.5 sq. ft. | 2970 sq. mm | 81.44 sq. cm |

Lesson 6.7, page 113

- | | a | b | c |
|----|-----|-----|------|
| 1. | 240 | 540 | 217 |
| 2. | 459 | 260 | 1254 |

Lesson 6.8, page 114

- | | |
|-----------|-------------|
| 1. (0, 4) | 2. (-2, -4) |
|-----------|-------------|

Lesson 6.9, page 115

- | | |
|----------------------|-----------------------|
| 1. (3, 6) or (-5, 2) | 2. (-4, 2) or (5, -6) |
|----------------------|-----------------------|

Grade 6 Answers

Posttest, page 116

- | | | | |
|----|---------------|-------------|--------------|
| | a | b | c |
| 1. | 392 sq. cm | 315 sq. in. | 72 sq. in. |
| 2. | 65.55 sq. in. | 334 sq. m | 644 sq. m |
| 3. | 3,360 cu. m | 192 cu. mm | 1,200 cu. cm |

Posttest, page 117

- | | | |
|----|----------|---|
| | a | b |
| 4. | (-2, -4) | Answers may vary but could include (-1, 5) or (2, -3) |
| 5. | 216 | 6. 2,400 |
| | | 7. 5,040 cu. in.; 3.125 cu. ft. |

Chapter 7

Pretest, page 118

- | | | | | | |
|----|----------|----------|-------------|------|---------------|
| 1. | a | b | | | |
| 2. | yes | no | | | |
| 3. | no | yes | | | |
| 4. | 10 | | 5. Angelica | | |
| 5. | week 5 | | 6. 5 miles | | |
| 7. | Stem | Leaves | 8. | Stem | Leaves |
| | 1 | 8 | | 1 | 5, 6 |
| | 2 | 4, 5 | | 2 | 1, 3, 3, 6, 6 |
| | 3 | 1, 6 | | 3 | 0, 2 |
| | 5 | 6 | | 4 | 1 |
| | 7 | 2 | | | |

Pretest, page 119

9. mean-80; median-82; mode-66; range-32
 10. mean-12; median-12; mode-12, range-14
 11. 60-80 13. 11 15. 51
 12. 0-20 14. 29 16. more

Lesson 7.1, page 120

- | | | | | | |
|----|-------------|-------------|----|----------|-------------|
| | a | b | | a | b |
| 1. | statistical | not | 4. | not | statistical |
| 2. | statistical | statistical | 5. | not | statistical |
| 3. | not | not | | | |

Lesson 7.1, page 121

Answers may vary.

- How tall are the students in my school?
- What scores did students score on the last spelling test?
- How many pages are in the typical 6th grade novel?
- How many students are in PE classes at my school?
- How much do average apples cost?
- What is the most popular car in the U.S.?
- How many minutes do children exercise per week?

Lesson 7.2, page 122

Answers may vary.

- 1a. The data spreads over 7 points.
 1b. The center value of the data is 67.
 1c. The lowest value in the data is 62.
 2a. Some values in the data set are equal to 0.
 2b. The highest value in the data set is 100.
 2c. 0 appears the most in the data set.
 3a. The data spreads across 92 points.
 3b. 45 appears the most frequently in the data set.
 3c. 45 is the middle value in the data set.

Lesson 7.2, page 123

Answers may vary.

- 1a. The data spreads over 1.9 points.
 1b. The center value of the data is 6.4.
 1c. The lowest value in the data is 5.4.
 2a. Some values in the data set are greater than 0.
 2b. The highest value in the data set is 9.
 2c. 5 appears the most frequently in the data set.
 3a. The data spreads across 7 points.
 3b. 3 appears the most frequently in the data set.
 3c. 4 is the middle value in the data set.

Lesson 7.3, page 124

- | | | | | | |
|----|----------|----------|----|----------|----------|
| | a | b | | a | b |
| 1. | 60 | 78 | 4. | 62 | 78 |
| 2. | 106 | 98 | 5. | 108 | 83 |
| 3. | 111 | 92 | 6. | 70.5 | 49.5 |

Lesson 7.4, page 125

- | | | | | | |
|----|----------|----------|----|----------|----------|
| | a | b | | a | b |
| 1. | 34 | 19 | 4. | 32 | 19 |
| 2. | 19 | 2 | 5. | 5 | 77 |
| 3. | 34 | 6 | 6. | 78 | 36 |

Lesson 7.5, page 126

- | | | | | | |
|----|----------|----------|----|-----------|----------|
| | a | b | | a | b |
| 1. | 4 | 40 | 4. | 277 | 21 |
| 2. | 28 | 108 | 5. | 73 | 4 |
| 3. | 26 | 24 | 6. | 14 and 93 | 32 |

Lesson 7.6, page 127

- | | | | | | |
|----|-----------------|-----------------|----|----------|----------|
| | a | b | | a | b |
| 1. | $35\frac{3}{5}$ | 14 | 3. | 68 | 51 |
| | 35 | 12 | | 71 | 49 |
| | 43 | 12 | | 79 | 37 |
| 2. | 13 | $20\frac{1}{6}$ | | | |
| | 12 | $18\frac{1}{2}$ | | | |
| | 12 | 15 | | | |

Lesson 7.7, page 128

- | | | | | | |
|----|----------|----------|----|----------|----------|
| | a | b | | a | b |
| 1. | median | mean | 3. | median | mean |
| 2. | mean | mode | 4. | median | mode |

Lesson 7.7, page 129

- | | | |
|----|----------|----------------------|
| | a | b |
| 1. | mean | 84; 84; 80 |
| 2. | median | 72.75; 78; 77.5 |
| 3. | mean | 114.57; 115; no mode |
| 4. | median | \$23.57; \$21; \$21 |

Lesson 7.8, page 130

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

Lesson 7.9, page 131

- | | | |
|----|--------------------|--------------------|
| | a | b |
| 1. | 5; 2; 7; 5 | 85; 75; 92.5; 17.5 |
| 2. | 90; 72.5; 97.5; 25 | 12; 5; 43; 38 |

Grade 6 Answers

3. 16.5; 4; 39; 35 29; 16; 64; 48

Lesson 7.10, page 132

- 1a. 15.29; 5.29, 5.29, 0.29, 0.29, 0.71, 2.71, 7.71; 3.18
 1b. 48.29; 10.29, 7.29, 3.29, 2.71, 3.71, 6.71, 7.71; 5.96
 2a. 17.57; 7.57, 6.57, 5.57, 0.43, 4.43, 7.43, 7.43; 5.63
 2b. 45.1; 34.1, 23.1, 23.1, 12.1, 1.1, 9.9, 9.9, 9.9, 20.9, 42.9; 18.7

Lesson 7.11, page 133

1. 37; 16.5; 9 3. 76; 37; 19.1 5. 62; 16; 13.08
 2. 35; 14; 8 4. 8; 4; 2.04 6. 42; 23; 12

Lesson 7.12, page 134

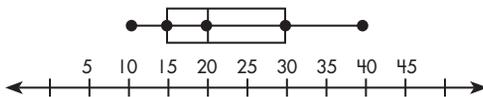
a		b	
Stem	Leaves	Stem	Leaves
1	3 4	3	8 9
2	1 8	4	9
3	1 3 4	5	0 4 7
		6	3 4
		7	2 9

Stem	Leaves	Stem	Leaves
2	5 7	7	3 5
3	4 7 8	8	1 4 7 8
4	8 9	9	1 3 6 9

Stem	Leaves	Stem	Leaves
1	3 7 9	2	3 5 6 7
2	4 5	3	3 5 7
3	3 8	4	1 5 6

Lesson 7.13, page 135

1. 75 3. 50 5. 15
 2. 9 4. 20 6. 30
 7.



Lesson 7.14, page 136

1. Lopez 5. 55 9. 105
 2. 30 6. Wed. 10. 195
 3. Wed. 7. Thurs.
 4. Martin 8. Tues.

Lesson 7.15, page 137

1. 1,800 7. 35
 2. 25-30 8. Answers will vary but may include 300 to 400 trees.
 3. 0-5 9. Answers will vary.
 4. 34.7% 10. Students should draw a star above the 20-25 feet bar.
 5. 65.3%
 6. 50

Lesson 7.16, page 138

1. mode-85; median-84; mean-82.44; range-66; IQR-15; MAD-9.79

Stem	Leaves
3	4
6	3
7	2 8 9
8	1 2 3 3 5 5 5 8
9	4 6 7 9
10	0

85 is the value that appears most frequently in the data set. 34 is the lowest value in the set and makes the mean lower. Therefore, the best measure of center to describe the data set is the median, 84.

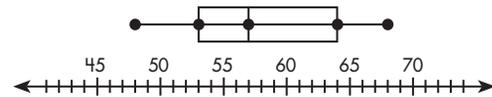
2. mode-3; median-3; mean-3.2; range-4; IQR-2; MAD-1.04

Stem	Leaves
0	1 2 3 3 3 4 4 5 5

All of the values in this data set are single digits. The range is only 5, so the mean, 3.2, is the best measure of center to describe this data set.

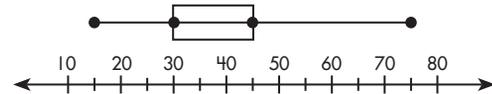
Lesson 7.16, page 139

1. mode-64; median-57; mean-57.83; range-20; IQR-11; MAD-5.17



This data set has a range of 20 and is evenly distributed. The mean, 57.83, is the best measure of center to describe the set.

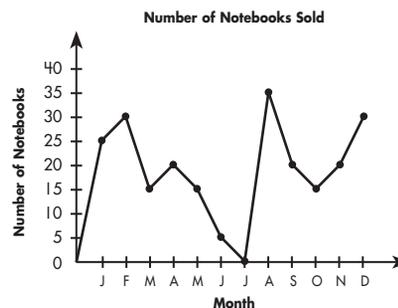
2. mode-45; median-45; mean-40; range-60; IQR-15; MAD-14



The median and mode of this data set, 45, greatly affects the way the distribution looks. Most of the data points fall either below or along the median.

Lesson 7.16, page 140

- mode-15 & 20; median-20; mean-19.17;
 range-35; IQR-12.5; MAD-7.64



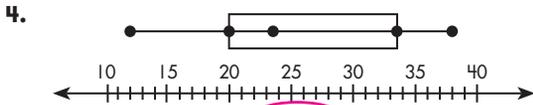
This data set has is evenly distributed in the middle, but has outliers on the low end. Therefore, the median, 20, is the best measure of center to use to describe the data set.

Grade 6 Answers

Posttest, page 141

1. What is the age of teachers in my school?
2. How much money from their allowances do my classmates save?

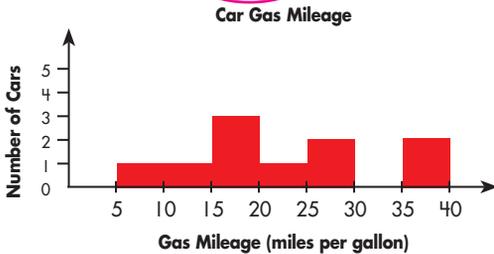
Stem	Leaves
1	2 8
2	2 2 5
3	1 6 8



5. mode-13; median-13; mean-13; range-14; IQR-6; MAD-2.86

Posttest, page 142

6. mode-47; median-45; mean-44; range-21; IQR-11; MAD-5.56
- 7.



8. 5 9. 5 10. 15-20

Final Test

Final Test, page 143

- | | a | b | c | d |
|----|-------------------------------|---------------------------------|-------------------------------|------------------|
| 1. | 7,936 | 94,176 | 6.052 | 24.6015 |
| 2. | 228 r10 | 2695 r5 | 4.31 | 2.72 |
| 3. | $\frac{3}{40}$ | $\frac{2}{7}$ | $1\frac{27}{28}$ | $3\frac{19}{24}$ |
| 4. | $1\frac{5}{7}$ | $\frac{6}{7}$ | $1\frac{7}{8}$ | $2\frac{7}{9}$ |
| 5. | .25 | $\frac{1}{4}$ | 44% | $\frac{11}{25}$ |
| 6. | 1.1 | $1\frac{1}{10}$ | 98% | $\frac{49}{50}$ |
| 7. | .73 | $\frac{73}{100}$ | 65% | $\frac{13}{20}$ |
| 8. | $\frac{3}{5} = \frac{12}{20}$ | $\frac{4}{6} = \frac{12}{18}$ | $\frac{4}{8} = \frac{10}{20}$ | |
| 9. | $\frac{5}{8} = \frac{15}{24}$ | $\frac{8}{25} = \frac{32}{100}$ | $\frac{12}{36} = \frac{1}{3}$ | |

Final Test, page 144

- 10a. $-12 > 30$ 10d. $-29 > -45$
 10b. $82 > 17$ 10e. $-57 < 15$
 10c. $-21 > -57$ 10f. $15 > -69$
11. $4 \times 4 = 15 \times 15 \times 15 = 2 \times 2 \times 2 \times 2 \times 2 =$
 12. 5^3 6^5 12^4
13. $24 \div (8 - 4)$ 14. $6 + (4 \times 7)$ 15-19. Check graph.
 20. 9 units 21. 14 units 22. 25 units

Final Test, page 145

- | | a | b | c |
|-----|-------------------------------|-------------------------------|----------|
| 23. | $(3 \times 4) + (3 \times 2)$ | $2 \times (5 - 3)$ | |
| 24. | $6 \times (8 + 4)$ | $(8 \times 7) - (8 \times 4)$ | |
| 25. | $17 < c$ | $d > 4$ | $19 = a$ |
| 26. | $b = 6$ | $p = 18$ | $n = 40$ |
| 27. | $time = \frac{10}{speed}$ | | |

Dependent Variable	Time (Hours)	2.5	1	.25
Independent Variable	Speed (mph)	4	10	40

28. (4, 1) 29. (4, -4) or (10, 0)

Final Test, page 146

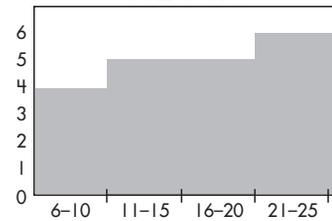
- | | a | b | c |
|-----|-------------|----------------|----------------|
| 30. | 494 sq. cm | 405 sq. in. | 10,800 cu. ft. |
| 31. | 126 sq. cm | 324 sq. mm | 176 sq. ft. |
| 32. | 812 sq. in. | 60 cu. m | 182 sq. cm |
| 33. | 80 sq. mm | 198.75 sq. ft. | 25 sq. ft. |

Final Test, page 147

34.

Stem	Leaves
0	8 9 9
1	0 1 2 3 4 5 6 7 7 8
2	0 1 2 2 2 3 3

35. Quiz Scores



36. mean = 16.1; median = 16.5; mode = 22;
 range = 15; IQR = 10; MAD = 4.4
37. 25% 38. 23 39. 8 40. 30%

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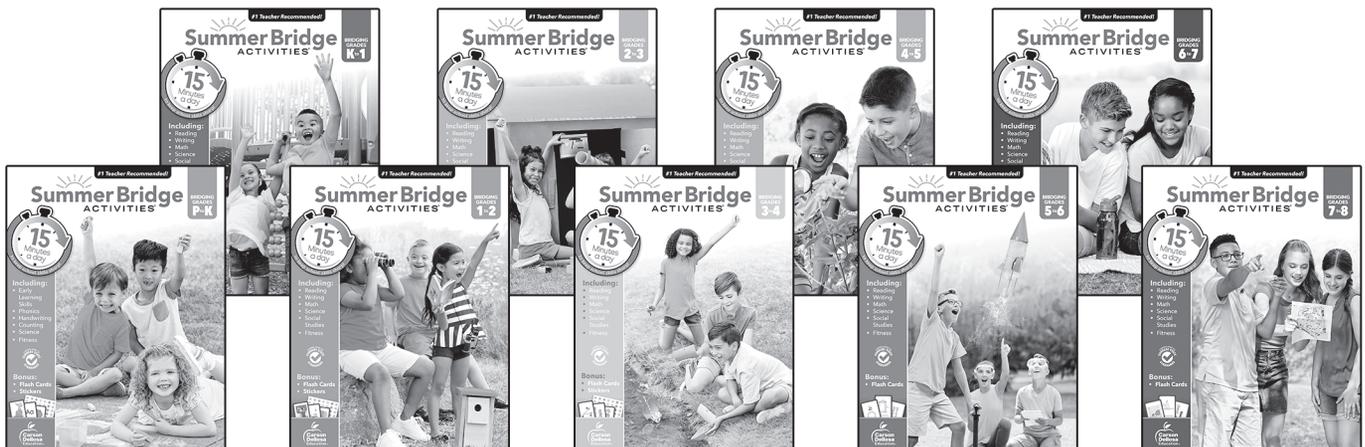
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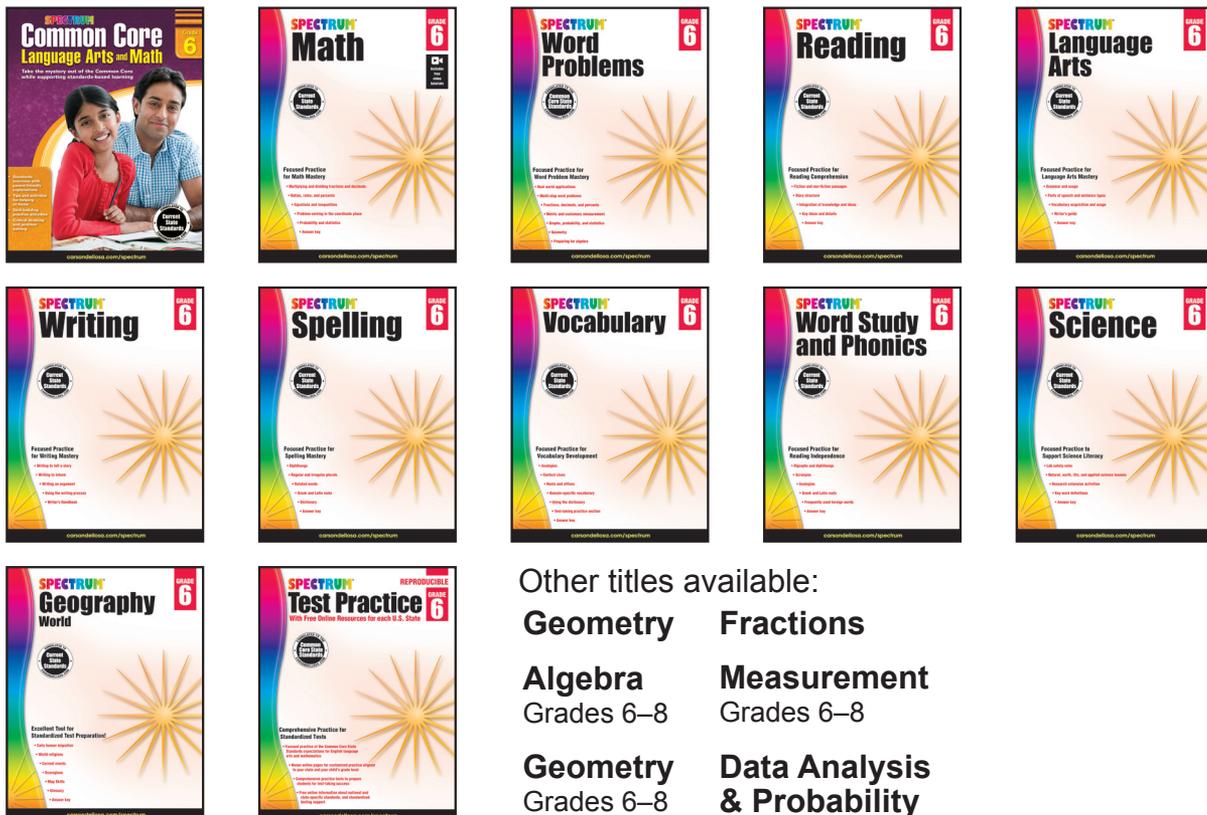
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