SKILL 58

Are You Ready?

Connect Words and Algebra

Teaching Skill 58

Objective Connect words and algebra.

Point out to students that an algebraic expression (or equation) is simply a mathematical way of writing a phrase or sentence.

Ask: **What is the difference between an expression and an equation?** (An expression does not have an equal sign while an equation does.)

Tell students that associating key words with the correct operation is critical to being able to make the connection between words and algebra.

Review with students the table of key words. Provide some real life examples. Start with the following two: **(1)If your age is 10 years more than your sister's, and your sister is 12, how do you find your age?** (Add 12 plus 10.) **If you receive $10 per week allowance for 8 weeks, how do you find the total amount you received?** (Multiply 10 times 8.) Have students provide additional examples.

Review the lawn cutting example with students and then have them complete the exercises.

PRACTICE ON YOUR OWN

In exercises 1–6, students write algebraic expressions and equations.

CHECK

Determine that students know how to write algebraic expressions and equations.

Students who successfully complete the **Practice on Your Own** and **Check** are ready to move on to the next skill.

COMMON ERRORS

Students may not know the key words associated with operations, and as a result may use the wrong operation.

Students who made more than 1 error in the **Practice on Your Own,** or who were not successful in the **Check** section, may benefit from the **Alternative Teaching Strategy.**

Alternative Teaching Strategy

Objective Connect words and algebra.

Materials needed: multiple copies of the flashcards shown below (index cards work nicely), blank index cards

Have students work in pairs. Distribute copies of the flashcards and have students shuffle the cards and divide them in half so that each student has six cards.

$3x + 1$	$n - 5$	$x + 7$
$\frac{1}{2}n - 2$	$C = 3(25)$	$t = 6(2)$
$C = 12 + 2.50$	$P = 2(8) + 2w$	$A = \frac{1}{2}(6)(h)$
$I = (500)(2)r$	$A = 50 + 10w$	$S = 600 - 50w$

Review with students key words and the operations with which the words are associated.

Tell students they are going to make up phrases or situations that match the algebraic expressions and equations on the cards. Give the following example: $5n + 3$. Ask: **How would you verbalize $5n$?** (5 times a number) **And + 3?** (increased by 3) Write the phrase on the board: "5 times a number increased by 3." Point out that variations of this phrase are also correct, such as 3 more than 5 times a number.

Next, write the equation $C = 40 - 5(d)$ on the board. Remind students that variables typically represent something that makes sense. For example, C might represent cost and d number of days. Or, provide the following scenario: There are 40 cookies in a bag and Tom eats 5 cookies per day. $C = 40 - 5(d)$ could be the number of cookies remaining at the end of any given day.

Instruct students to take turns making up situations to match the cards they have. As an extension of the exercise, have students make flashcards and continue.

Name _____ Date _____ Class _____

SKILL 58

Are You Ready?

Connect Words and Algebra

To connect words and algebra, you must understand the operations involved and how to represent them. Key words are helpful in determining the operations.

Key Words	Operation or Representation
a number; an unknown quantity	any variable, such as x or n
Twice, three times, etc.	multiplication ($2n$, $3n$, etc.)
sum; more than; increased by	addition ($+$)
difference; less than; decreased by	subtraction ($-$)
each; per	multiplication
is; equals	$=$

Example: Jared must cut 6 lawns over the weekend. Each of the lawns takes 2 hours to cut. Write an equation representing the total time t to cut all 6 lawns.

Answer: Since each lawn takes 2 hours, multiply 2 times the number of lawns to get the total time: $t = 6(2)$.

Practice on Your Own

1. Write an expression that represents the quantity 5 more than a number. _____
2. Write a phrase that could be modeled by the expression $x - 15$. _____
3. John bought 3 CDs and 2 DVDs. Each CD costs $9.95, and each DVD costs $14.98. Write an equation representing the total cost C. _____
4. A triangle has sides of length 7, 10, and s. Write an equation representing the perimeter P of the triangle. _____
5. The value of a painting begins at $12,000 and increases by $500 per year. Write an equation representing the value V of the painting at the end of any given year y. _____
6. David has 56 baseball cards of which he sells 3 cards per week. Write an equation representing the number of cards n he has left at the end of any given week w. _____

Check

7. Write an expression that represents a number decreased by 6. _____
8. Tina bought 6 plates and 2 glasses. Each plate costs $6.99, and each glass costs $22.98. Write an equation representing the total cost C. _____
9. Joseph opens a checking account with $400. Each month he adds $150 to the account. Write an equation representing the total amount A in the account at the end of any given month m. _____

SKILL 68

Are You Ready?

Solve One-Step Equations

Teaching Skill 68

Objective Solve one-step equations.

Explain to students that inverse operations are operations that undo each other.

Direction students' attention to the first example. Ask a volunteer to read the addition equation $x + 5 = 15$. Ask: **What operation is being done to the variable?** (5 is being added to it.) **How can you undo this?** (Subtract 5.) **So, what is the inverse operation of addition?** (subtraction)

Work through the next example. Stress that since subtraction is the inverse operation of addition, addition is the inverse operation of subtraction.

Go through a similar process to explain the multiplication and division examples. Remind students that they should be careful when working with negatives.

Ask: **If a multiplication equation contains $-2x$, what do you divide by?** (-2) **Does that mean the answer is negative?** (not necessarily) Give examples if time permits.

Have students complete the practice exercises.

PRACTICE ON YOUR OWN

In exercises 1–12, students solve one-step equations that require addition, subtraction, multiplication, or division.

CHECK

Determine that students know how to solve one-step equations.

Students who successfully complete the **Practice on Your Own** and **Check** are ready to move on to the next skill.

COMMON ERRORS

Students may forget to use an inverse operation when solving equations.

Students who made more than 2 errors in the **Practice on Your Own,** or who were not successful in the **Check** section, may benefit from the **Alternative Teaching Strategy.**

Alternative Teaching Strategy

Objective Solve one-step equations.

Materials needed: multiple copies of the flashcards shown below (index cards work nicely)

$n + 3 = 9$	$n + 12 = 4$	$n + 6 = -2$
$n - 8 = 12$	$n - 1 = -5$	$n - 15 = -11$
$5n = 50$	$-7n = 42$	$-9n = -45$
$\frac{n}{6} = 4$	$\frac{n}{15} = -2$	$\frac{n}{-5} = -100$

Tell students they are going to practice identifying inverse operations and then solving one-step equations. Remind students that inverse operations undo each other.

Have students work in pairs. Give each pair of students one set of equation cards. Instruct students to mix the cards up and leave them face down.

Students should take turns drawing one card at a time. The student who draws the card should face it toward their partner. The partner should read the equation aloud, identify the operation being done to the variable, and then identify how to undo the operation. The partner does not need to solve the equation. The student holding the card should then turn the card around and read it, confirm their partner's answers, and then solve the equation.

Students should repeat the exercise until all the cards have been drawn and all the equations solved.

An extension of this exercise is to have students make their own index cards which should include addition, subtraction, multiplication and division equations.

Name _____ Date _____ Class _____

SKILL 68

Are You Ready?

Solve One-Step Equations

To solve a one-step equation, do the inverse of whatever operation is being done to the variable. Remember, because it is an equation, what is done to one side of the equation must also be done to the other side.

Solve an addition equation using subtraction.	**Solve a subtraction equation using addition.**
$x + 5 = 15$ $-5 \quad -5$ $x \quad = 10$	$x - 8 = -3$ $+8 \quad +8$ $x \quad = \quad 5$
Solve a multiplication equation using division.	**Solve a division equation using multiplication.**
$7x = 42$ $\frac{7x}{7} = \frac{42}{7}$ $x = 6$	$\frac{x}{12} = -3$ $12 \cdot \frac{x}{12} = -3 \cdot 12$ $x = -36$

Practice on Your Own

Solve.

1. $m - 5 = 9$ _____

2. $\frac{h}{6} = -3$ _____

3. $6x = 54$ _____

4. $b + 15 = 25$ _____

5. $4y = -12$ _____

6. $k + 9 = -3$ _____

7. $p - 7 = -2$ _____

8. $\frac{t}{3} = 7$ _____

9. $\frac{x}{4} = -1$ _____

10. $5 + h = 16$ _____

11. $-12x = -24$ _____

12. $r - 2 = -9$ _____

Check

Solve.

13. $3x = 15$ _____

14. $c - 11 = 1$ _____

15. $d + 9 = 5$ _____

16. $\frac{s}{6} = -5$ _____

17. $z - 2 = -17$ _____

18. $\frac{w}{4} = 12$ _____

19. $-10b = 120$ _____

20. $x + 99 = 100$ _____

SKILL 49

Are You Ready?

Percent Problems

Teaching Skill 49

Objective Find the percent of a number.

Review with students how to change a percent to a decimal. Point out that if the percent is a one digit number (e.g. 7%), they will need to add a zero as a placeholder (e.g. 7% = 0.07).

Ask: **What do you have to remember when multiplying by a decimal?** (The number of decimal places in the final product must equal the number of decimal places in the factors.)

Tell students that percent problems can easily be converted into equations. Review the translation chart with students. Ask: **How can you represent an unknown quantity?** (You can use any variable, such as n or x.)

Work through the example with students. Point out that the percent must be converted to a decimal before multiplying.

Have students complete the exercises. Encourage the students to estimate the products before multiplying so they will know if their answers make sense.

PRACTICE ON YOUR OWN

In exercises 1–4, students find the product of a decimal and a whole number.

In exercises 5–10, students find the percent of a number.

CHECK

Determine that students know how to find the percent of a number.

Students who successfully complete the **Practice on Your Own** and **Check** are ready to move on to the next skill.

COMMON ERRORS

Students may forget to change the percent to a decimal before multiplying.

Students who made more than 2 errors in the **Practice on Your Own,** or who were not successful in the **Check** section, may benefit from the **Alternative Teaching Strategy.**

Alternative Teaching Strategy

Objective Find the percent of a number.

Explain to students that they can find percents using proportions.

Write the following words on the board: cents, century, centipede, and centimeter. Ask: **What does "cent" mean?** (100) Ask: **What does percent mean?** (per 100)

Ask: **Is 25% the same as $\frac{25}{100}$?** (Yes)

Remind students that a proportion is two ratios that are equal to each other. Write on the board this proportion: $\frac{\text{is}}{\text{of}} = \frac{\%}{100}$. Tell students that they can use this proportion to solve percent problems. For example, have students consider the following question: What is 25% of 200? Have students underline "what is" once, "25%" twice, and "200" three times.

$$\underline{\text{What is}} \quad \underline{\underline{25\%}} \quad \text{of} \quad \underline{\underline{\underline{200}}}?$$

Explain that "what" (or n since "what" is an unknown quantity) should be substituted for "is"; 200 should be substituted for "of"; and 25 should be substituted for %.

$$\frac{n}{200} = \frac{25}{100}$$

Ask: **How do you solve a proportion?** (Find the cross products.) **What are the cross products?** ($100n$ and 5000).

Write the equation $100n = 5000$ on the board. Ask: **How do you solve for the variable?** (Divide both sides of the equation by 100.) Solve the equation:

$\frac{100n}{100} = \frac{5000}{100}$; $n = 50$. So, 50 is 25% of 200.

Have students use this strategy to answer the following questions:

What is 80% of 50? (40);
What is 15% of 400? (60);
What is 35% of 120? (42); and
What is 90% of 440? (396)

Name _____ Date _____ Class _____

SKILL 49

Are You Ready?

Percent Problems

Multiplying by percents:

Step 1: Change the percent to a decimal by dropping the % symbol and moving the decimal point two places to the left.
Step 2: Multiply using rules for decimal multiplication.

Translating a percent problem into an equation:

Rewrite the percent as a decimal and then use the translations at the right to rewrite the problem as an equation.

Word	Mathematical Translation
what	an unknown quantity, such as n or x
is	equals or $=$
of	multiplication or $\cdot$ or $\times$ or ( )

Example: What is 30% of 90?

$n = 0.30 \times 90$

$n = 27$

Practice on Your Own

Multiply.

1. 0.25×72 _____

2. 0.15×60 _____

3. 0.20×1400 _____

4. 0.06×500 _____

Answer each question.

5. What is 12% of 50? _____

6. What is 70% of 30? _____

7. What is 22% of 150? _____

8. What is 10% of 450? _____

9. What is 50% of 168? _____

10. What is 65% of 4000? _____

Check

Multiply.

11. 0.08×250 _____

12. 0.35×60 _____

13. 0.40×600 _____

14. 0.75×480 _____

Answer each question.

15. What is 3% of 200? _____

16. What is 20% of 115? _____

17. What is 45% of 180? _____

18. What is 95% of 300? _____

SKILL 21

Are You Ready?

Convert Units of Measure

Teaching Skill 21

Objective Convert units of measure.

Point out to students that converting between units of measure always involves either multiplication or division. Ask: **Is it sometimes difficult to remember when to multiply and when to divide?** (Most students will probably say yes.)

Introduce the concept and review the definition of a conversion factor. Emphasize that you do not have to remember whether to multiply or divide if you use a conversion fact; it depends on the numerator and denominator of the fraction.

Have students look at the common conversion factors. Ask: **Why does a conversion factor equal 1?** (Because the measure in the numerator is equal to the measure in the denominator even though the units are different)

Instruct students to consider the example. Explain that the correct conversion factor is $\frac{1\text{ yd}}{3\text{ ft}}$ (not $\frac{3\text{ ft}}{1\text{ yd}}$) because you need feet in the denominator to cancel with the feet in the problem. Work through the example.

PRACTICE ON YOUR OWN

In exercises 1–9, students convert from one unit of measure to another.

CHECK

Determine that students know how to convert units of measure.

Students who successfully complete the **Practice on Your Own** and **Check** are ready to move on to the next skill.

COMMON ERRORS

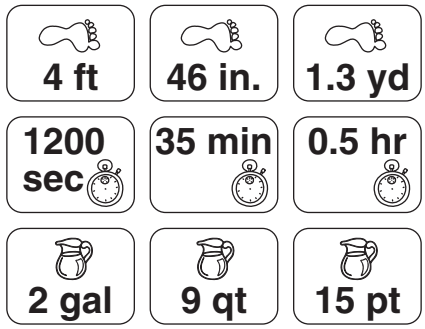
Students may multiply when they should divide, or divide when they should multiply.

Students who made more than 2 errors in the **Practice on Your Own**, or who were not successful in the **Check** section, may benefit from the **Alternative Teaching Strategy**.

Alternative Teaching Strategy

Objective Convert units of measure.

Materials needed: multiple copies of the game cards shown below; copy of page 2 of this lesson (Common Conversion Factors)



Have students review the chart of common conversion factors. Review with students how conversion factors are used when converting from one unit of measure to another.

Give each student a set of game cards. Have students briefly look at the cards and take note of the symbols on the cards. Explain that the footprint represent length; the clock represents time; and the pitcher represents capacity.

Have students shuffle their cards (face down). Tell students they are going to play "Speed."

Explain to students that when you say "Go," they are to flip their cards over, separate them into categories (length, time, and capacity), and put the cards in each category in order from least to greatest. Students should use scratch paper to convert to whichever units they believe will help them the most.

The student who correctly puts all the cards in order wins.

Answers: Length: 46 in., 1.3 yd, 4 ft; Time: 1200 sec, 0.5 hr, 35 min; and Capacity: 15 pt, 2 gal, 9 qt

An extension of this exercise is to have students create their own cards, using different units than the ones provided.

Name _____ Date _____ Class _____

SKILL 21

Are You Ready?

Convert Units of Measure

To convert from one unit of measure to another, you can use a conversion factor and multiply.

Definition: a conversion factor is a fraction equal to 1 whose numerator and denominator have different units.

Common Conversion Factors

Length	Capacity	Weight
$\frac{1\text{ ft}}{12\text{ in.}}$ or $\frac{12\text{ in.}}{1\text{ ft}}$	$\frac{1\text{ pt}}{2\text{ c}}$ or $\frac{2\text{ c}}{1\text{ pt}}$	$\frac{1\text{ lb}}{16\text{ oz}}$ or $\frac{16\text{ oz}}{1\text{ lb}}$
$\frac{1\text{ yd}}{3\text{ ft}}$ or $\frac{3\text{ ft}}{1\text{ yd}}$	$\frac{1\text{ qt}}{2\text{ pt}}$ or $\frac{2\text{ pt}}{1\text{ qt}}$	$\frac{1\text{ T}}{2000\text{ lb}}$ or $\frac{2000\text{ lb}}{1\text{ T}}$
$\frac{1\text{ mi}}{5280\text{ ft}}$ or $\frac{5280\text{ ft}}{1\text{ mi}}$	$\frac{1\text{ gal}}{4\text{ qt}}$ or $\frac{4\text{ qt}}{1\text{ gal}}$	

Time	Metric
$\frac{1\text{ min}}{60\text{ sec}}$ or $\frac{60\text{ sec}}{1\text{ min}}$ $\quad$ $\frac{1\text{ hr}}{60\text{ min}}$ or $\frac{60\text{ min}}{1\text{ hr}}$	$\frac{1\text{ m}}{100\text{ cm}}$ or $\frac{100\text{ cm}}{1\text{ m}}$ $\quad$ $\frac{1\text{ m}}{1000\text{ mm}}$ or $\frac{1000\text{ mm}}{1\text{ m}}$
$\frac{1\text{ day}}{24\text{ hr}}$ or $\frac{24\text{ hr}}{1\text{ day}}$ $\quad$ $\frac{1\text{ wk}}{7\text{ days}}$ of $\frac{7\text{ days}}{1\text{ wk}}$	$\frac{1\text{ km}}{1000\text{ m}}$ or $\frac{1000\text{ m}}{1\text{ km}}$
$\frac{1\text{ yr}}{12\text{ mo}}$ or $\frac{12\text{ mo}}{1\text{ yr}}$	Note: All metric units have the same conversion factors based on the prefix.

Example: Convert 12 feet to yards. $12\ \cancel{\text{ft}} \cdot \frac{1\text{ yd}}{3\ \cancel{\text{ft}}} = \frac{12\text{ yd}}{3} = 4\text{ yd}$

Practice on Your Own

Convert each unit of measure.

1. 30 months to years _____

2. 48 inches to feet _____

3. 3 pounds to ounces _____

4. 650 centimeters to meters _____

5. 1.5 days to hours _____

6. 16 quarts to gallons _____

7. 7000 pounds to tons _____

8. 2.2 liters to milliliters _____

9. 7 yards to feet _____

Check

Convert each unit of measure.

10. 9.2 meters to centimeters _____

11. 2.5 hours to minutes _____

12. 22 pints to quarts _____

13. 4500 milligrams to grams _____

14. 56 ounces to pounds _____

15. 4.5 years to months _____

SKILL 54

Are You Ready?

Absolute Value

Teaching Skill 54

Objective Find the absolute value of numbers and expressions.

Review with students the definition of absolute value at the top of the page.

Have students read the statement that begins with $|6|$. Ask: **What other number is 6 units from 0?** (-6) **Does that mean that $|-6|$ is also 6?** (Yes)

Review the general rule with students. Ask: **Can the statement $|n| = -2$ ever be true?** (No) **Why not?** (The general rule tells us that the absolute value of any nonzero number is always a positive value.) Point out that this makes sense, since distance is always positive as well.

Review with students the steps for evaluating an absolute value expression. Point out that the expression inside the absolute value symbols should be evaluated first, then find the distance from zero.

Review each of the examples with students and have them complete the practice exercises.

PRACTICE ON YOUR OWN

In exercises 1–12, students find the absolute value of numbers and expressions.

CHECK

Determine that students know how to find absolute value.

Students who successfully complete the **Practice on Your Own** and **Check** are ready to move on to the next skill.

COMMON ERRORS

Students may change negative numbers to positive numbers inside the absolute value symbols before performing the indicated operation.

Students who made more than 2 errors in the **Practice on Your Own,** or who were not successful in the **Check** section, may benefit from the **Alternative Teaching Strategy.**

Alternative Teaching Strategy

Objective Find the absolute value of numbers and expressions.

Draw the table below on the board and instruct the students to duplicate it on their paper.

Negative Value	Distance from 0	Positive Value
-1	(1)	1
-2	(2)	2
-3	(3)	3
-4	(4)	4
-5	(5)	5

Remind students that the absolute value of a number is the distance between that number and zero.

Tell students they are going to complete the center column by using a number line. Instruct students to draw a number line and label it from -5 to 5. For each of the values in the table, instruct students to count the number of jumps (the distance) between that value and zero. Encourage students to make conjectures about the relationship between $|-n|$ and $|n|$. (They are equal.)

Draw the table below on the board and instruct students to duplicate it.

Expression	Simplified	Distance from 0
$\|7 - 4\|$	($\|3\|$)	(3)
$\|5 - 12\|$	($\|-7\|$)	(7)
$\|-10 + 6\|$	($\|-4\|$)	(4)
	$\|-1\|$	(1)
	$\|12\|$	(12)
	$\|-15\|$	(15)

For the first three rows, instruct students to complete the second column for each of the expressions. Then they should use number lines to find the distance to zero and complete the third column. For the last three rows, have students make up expressions that would result in column 2, and then complete column 3. (Answers may vary in column 1.)

Name _____ Date _____ Class _____

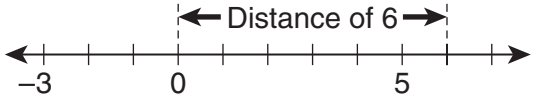
SKILL 54

Are You Ready?

Absolute Value

Definition: The *absolute value* of a number is the distance between that number and zero on a number line.

$|6|$ is read as "the absolute value of 6" and means the distance between 6 and 0 on a number line.



$|6| = 6$

General rule: The absolute value of any nonzero number is always a positive value.

To evaluate an expression that contains an absolute value:

- Step 1: Evaluate the expression inside the absolute value symbols (as if they were parentheses).
- Step 2: Take the absolute value of the final result (make it positive).

Example 1: $|-7| = 7$ Example 2: $|-14 + 9| = |-5| = 5$

Example 3: $|0.5| = 0.5$ Example 4: $|20 - 23| = |-3| = 3$

Practice on Your Own

Find the absolute value of each expression.

1. $|-15|$ _____

2. $|8|$ _____

3. $|0.4|$ _____

4. $|-1.19|$ _____

5. $|25 - 15|$ _____

6. $|18 - 22|$ _____

7. $|0.25 - 1|$ _____

8. $|4.6 - 3.9|$ _____

9. $|-8 + 14|$ _____

10. $|-9 + 2|$ _____

11. $|5 - 12 + 7|$ _____

12. $|23 + 7 - 42|$ _____

Check

Find the absolute value of each expression.

13. $|-11|$ _____

14. $|2.3|$ _____

15. $|-50 + 40|$ _____

16. $|100 - 75|$ _____

17. $|80 - 93|$ _____

18. $|-2.5 + 2.5|$ _____

19. $|-5.2 + 4.1|$ _____

20. $|11 - 14 + 2|$ _____

SKILL 56 ANSWERS:

Practice on Your Own

1. $5x + 30$

2. $5z - 35$

3. $2n - 4$

4. $12 + 4k$

5. $48 - 8y$

6. $6m + 18$

7. $10p + 10$

8. $60 - 3c$

9. $7q - 7$

10. $55 + 11t$

11. $14 + 2b$

12. $36 - 9w$

Check

13. $12c + 24$

14. $15 - 5a$

15. $25 + 25d$

16. $50 - 10j$

17. $4x + 12$

18. $30 + 15y$

19. $3g - 75$

20. $9m - 9$

SKILL 57 ANSWERS:

Practice on Your Own

1. $12x$

2. $4m$

3. $7a^2$

4. $-7t$

5. $-3b$

6. $8d^2$

7. $-x$

8. 0

9. $11h$

10. $-9y - 9$

11. $10 + 10x$

12. $5 - 5u$

13. $13y + 6x$

14. 4

Check

15. $10x$

16. $-3c$

17. $-3a^2$

18. $8.4z$

19. $10m + 11$

20. $8q - 5r$

SKILL 58 ANSWERS:

Practice on Your Own

1. $5 + n$

2. a number decreased by 15; 15 less than a number; the difference between a number and 15; etc.

3. $C = 3(9.95) + 2(14.98)$

4. $P = 7 + 10 + s$

5. $V = 12{,}000 + 500y$

6. $n = 56 - 3w$

Check

7. $n - 6$

8. $C = 6(6.99) + 2(22.98)$

9. $A = 400 + 150m$

SKILL 59 ANSWERS:

Practice on Your Own

1. $10x^2$

2. $-21a^4$

3. $-16mn$

SKILL 68 ANSWERS:

Practice on Your Own

1. $m = 14$
2. $h = -18$
3. $x = 9$
4. $b = 10$
5. $y = -3$
6. $k = -12$
7. $p = 5$
8. $t = 21$
9. $x = -4$
10. $h = 11$
11. $x = 2$
12. $r = -7$

Check

13. $x = 5$
14. $c = 12$
15. $d = -4$
16. $s = -30$
17. $z = -15$
18. $w = 48$
19. $b = -12$
20. $x = 1$

SKILL 69 ANSWERS:

Practice on Your Own

1. $x = 4$
2. $m = 6$
3. $t = 15$
4. $p = -8$
5. $y = \frac{8}{9}$
6. $c = 6$
7. $x = -15$
8. $n = 0$
9. $h = -\frac{9}{7}$

Check

10. $x = 2$
11. $d = -20$
12. $g = \frac{13}{3}$
13. $t = 6$
14. $x = -\frac{7}{3}$
15. $z = 3$

SKILL 70 ANSWERS:

Practice on Your Own

1. $y = 3$
2. $m = -\frac{5}{4}$
3. $x = -1$
4. $t = 2$
5. $x = -\frac{1}{2}$
6. $b = 0$
7. $k = \frac{1}{4}$
8. $x = 3$
9. $a = -1$

Check

10. $x = 8$
11. $t = \frac{5}{3}$
12. $y = -6$
13. $p = 2$
14. $b = -4$
15. $x = -\frac{1}{2}$

SKILL 71 ANSWERS:

Practice on Your Own

1. $x = 18$
2. $x = -42$
3. $y = 1$

SKILL 47 ANSWERS:

Practice on Your Own

1. $\frac{4}{15}$
2. 3
3. $\frac{1}{9}$
4. $1\frac{1}{2}$
5. $\frac{1}{7}$
6. $\frac{1}{11}$
7. $4\frac{1}{2}$
8. 6

Check

9. $\frac{1}{18}$
10. $\frac{2}{3}$
11. $\frac{5}{14}$
12. 9
13. $\frac{1}{12}$
14. $\frac{1}{7}$
15. $1\frac{1}{2}$
16. 15

SKILL 48 ANSWERS:

Practice on Your Own

1. $\frac{3}{5}$
2. $\frac{3}{7}$
3. $\frac{1}{2}$
4. $\frac{1}{9}$
5. $1\frac{1}{3}$
6. $1\frac{5}{8}$
7. $\frac{5}{6}$
8. $1\frac{1}{4}$

Check

9. $\frac{9}{11}$
10. $\frac{2}{3}$
11. $\frac{5}{14}$
12. $\frac{1}{3}$
13. $1\frac{1}{2}$
14. $1\frac{3}{10}$
15. $\frac{3}{8}$
16. $\frac{23}{30}$

SKILL 49 ANSWERS:

Practice on Your Own

1. 18
2. 9
3. 280
4. 30
5. 6
6. 21
7. 33
8. 45
9. 84
10. 2600

Check

11. 20
12. 21
13. 240
14. 360
15. 6
16. 23
17. 81
18. 285

6. 2.5 ft

7. 15 in.

8. 8 oz

Check

9. 6 in.

10. 6 in.

11. 25 cm

12. 5 ft

13. 2 cm

14. 30 lbs

15. 50,000 gal

16. 26 mi

SKILL 20 ANSWERS:

Practice on Your Own

1. $1\frac{1}{4}$ in.; 3 cm

2. $\frac{5}{8}$ in.; 1.5 cm

3. $\frac{7}{8}$ in.; 2.5 cm

4. $1\frac{7}{8}$ in.; 5 cm

5. 4 in.; 10 cm

6. $2\frac{5}{8}$ in.; 6.5 cm

7. 6 in.; 15 cm

Check

8. $1\frac{1}{2}$ in.; 4 cm

9. $\frac{3}{8}$ in.; 1 cm

10. $\frac{3}{4}$ in.; 2 cm

11. $\frac{5}{8}$ in.; 1.5 cm

12. $5\frac{1}{8}$ in.; 13 cm

SKILL 21 ANSWERS:

Practice on Your Own

1. 2.5 yr

2. 4 ft

3. 48 oz

4. 6.5 m

5. 36 hr

6. 4 gal

7. 3.5 T

8. 2200 ml

9. 21 ft

Check

10. 920 cm

11. 150 min

12. 11 qt

13. 4.5 g

14. 3.5 lb

15. 54 mo

SKILL 22 ANSWERS:

Practice on Your Own

1. *M, N, O, P,* or Q

2. Sample answer: $\overleftrightarrow{MP}$, $\overleftrightarrow{PM}$, $\overleftrightarrow{NO}$, or $\overleftrightarrow{ON}$

3. $\overline{MN}$, $\overline{NM}$, $\overline{NP}$, $\overline{PN}$, $\overline{NO}$, $\overline{ON}$, $\overline{MP}$, or $\overline{PM}$

4. Sample answer: $\overrightarrow{MP}$, $\overrightarrow{PM}$, $\overrightarrow{NM}$, $\overrightarrow{NP}$, $\overrightarrow{NO}$, or $\overrightarrow{ON}$

5. $\mathcal{T}$ or $\mathcal{W}$

6. $\overrightarrow{ON}$

7. Sample answer: $\overleftrightarrow{MP}$ or $\overleftrightarrow{PM}$

8. $\mathcal{T}$

9. $\overline{NO}$ or $\overline{ON}$

10. *N*

Check

11. Sample answer: *A, B, C, D,* or *E*

12. Sample answer: $\overline{CD}$, $\overline{DC}$, $\overline{CE}$, $\overline{EC}$, $\overline{CB}$, $\overline{BC}$, $\overline{BE}$, or $\overline{EB}$

13. Sample answer: $\overrightarrow{CB}$, $\overrightarrow{CD}$, $\overrightarrow{CE}$, $\overrightarrow{EB}$, or $\overrightarrow{BE}$

14. Sample answer: $\overleftrightarrow{BE}$, $\overleftrightarrow{EB}$, $\overleftrightarrow{CD}$, or $\overleftrightarrow{DC}$

SKILL 53 ANSWERS:

Practice on Your Own

1. 5

2. 18

3. $\frac{9}{11}$

4. -9

5. 20

6. 8

7. 13

8. $-\frac{1}{25}$

Check

9. 4

10. 72

11. -7

12. $\frac{2}{5}$

13. 10

14. -12

15. -6

16. $\frac{1}{2}$

SKILL 54 ANSWERS:

Practice on Your Own

1. 15

2. 8

3. 0.4

4. 1.19

5. 10

6. 4

7. 0.75

8. 0.7

9. 6

10. 7

11. 0

12. 12

Check

13. 11

14. 2.3

15. 10

16. 25

17. 13

18. 0

19. 1.1

20. 1

SKILL 55 ANSWERS:

Practice on Your Own

1. 3

2. 4

3. 31

4. 3

5. 6

6. 14

7. 50

8. 9

9. 26

10. 43

11. 0

12. 4

Check

13. 4

14. 0

15. 25

16. 22

17. 2

18. 58