

Module 6 Algebraic ReasoningSection 6.1 Simplifying and Evaluating ExpressionsLooking Back 6.1

For Problem 1-4, tell whether the statement is true or false.

1. The integer -3 is greater than -2 .
2. The sum of a negative integer and a positive integer could be negative, positive, or zero.
3. The product of two integers is always greater than either integer.
4. The quotient of two integers is always less than either integer.

For Problem 5 and 6, complete the sentence.

5. The distance between -5 and an unknown number on the number line is 7 units. The two possible numbers are _____ and _____.
6. If the sum of two integers is zero, they are called _____ or _____.

For Problem 7-10, simplify the expression given.

7. $2x + 5y + 6x - 2y$
8. $(5 + 2) - 14 + 3(8 - 5)$
9. $23 - 8 \cdot 4 + 5^2$
10. $-3 + 8.2 - \frac{6}{2}$

For Problem 11-14, evaluate the expression given $c = 10$ and $d = -2$.

11. $(cd)^2$
12. c^2d

13. cd^2

14. $2(c + d) - \left(\frac{c}{d}\right) 4$

For Problem 15, use the given information to solve the problem.

Below is the formula for the cost of an item:

$$C = p + r \cdot p$$

C = original price + (rate of sales tax) · (original price)

15. The price of a used car is \$7,092.00 and the sales tax is $7\frac{1}{2}\%$. What is the total cost of the car with tax?

Section 6.2 Algebraic PropertiesPractice Problems 6.2

For Problem 1-9, fill in the blank and name the property.

1. $7 + 3x = 3x + \underline{\hspace{2cm}}$

2. $7(3)(-4) = (-4)(3)(\underline{\hspace{2cm}})$

3. $3x + (4 - 2y) = (4 - 2y) + \underline{\hspace{2cm}}$

4. $(3x + 4) - 2y = 3x + (\underline{\hspace{2cm}} - 2y)$

5. $6(2x - 4y) = 12(\underline{\hspace{2cm}}) - 24(\underline{\hspace{2cm}})$

6. $12xy - 6y^2 = \underline{\hspace{2cm}}(2x - y)$

7. $\underline{\hspace{2cm}} \cdot 1 = -\frac{31}{2}$

8. $-\frac{1}{8} + \frac{1}{8} = \underline{\hspace{2cm}}$

9. $\frac{1}{3} \cdot (\underline{\hspace{2cm}}) = -\frac{1}{3}$

For Problem 10-15, use problem-solving strategies to solve the problem given.

10. Two friends left a reunion at the same time. Tony traveled east at 50 mph and Trent traveled west at 60 mph. How far apart are they after 3 hours? Draw a diagram to solve the problem. Use distance = rate \times time.

11. Joanna, Spencer, Kane, Ryan, and Willis created graphic art posters to be hung in a gallery using two push pins at the right and two at the left side of each poster with the posters being overlapped. What is the minimum number of push pins needed?

12. Karim has a display of chemical compounds for the science fair. Each row has three more than the row before it. Karim starts out with one chemical compound. How many will be displayed after five rows? Look for a pattern.

13. Casey lives on a farm and has a dog, a horse, a bird, and a cat. Their names are Olivia, Mykal, Cire, and Autumn. Olivia and Cire do not fly and cannot be ridden. The cat meows at Olivia. Autumn runs from the horse. What is the name of each pet? Set up a table and use the process of elimination to solve the problem.

14. Julia hands out lollipops to her friends. She gave out 7 in the morning, 9 at lunch, and 13 after lunch. Before bed, Julia had 24 still left on her nightstand. How many did she start out with? Work backwards to solve the problem.

15. Christopher works at Jerry's Jungle and is making a display of grapefruit in the shape of a pyramid. There are 25 in the base in the shape of a square. How many will be needed to build the whole pyramid?

Section 6.3 Solving One Variable EquationsPractice Problems 6.3

For Problem 1-8, solve for the variable in the equation given and check your solution.

1. $p + 17 = 24$

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

3. $b - 23 = -5$

4. $20x = -80$

5. $4m + 13 = 26$

6. $q - 8 = 20$

7. $\frac{3}{5}x = 18$

8. $3p + 3 = 15$

For Problem 9-12, use the given information to solve the problem.

Below are the numbers on a calendar for September.

9. Have a friend draw a square around four numbers and tell you the sum of the numbers. You will be able to tell them the four numbers that are in the square.

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

a) If the number in the upper left-hand corner is n , what is the number right next to it?

b) What is the number right below the number from a) in terms of n ?

c) How much more is the number in the bottom right-hand corner than n ?

d) What is the sum of all four days from a)-c)?

e) Set the equation you have equal to the sum.

f) Why can you take the sum and subtract 16 and divide by 4 to get the first day?

g) Once you know the first number, how can you find the other three numbers in the square?

10. The equation for the four numbers in the September square is $4n + 16 = 32$. Use the distributive property to solve the problem.

11. If the number in the upper left-hand corner is 16, what are the other three numbers in the square?

12. If the sum of the numbers is 96, what are the four numbers in the square?

For Problem 13-15, use the given information to solve the problem.

In 1987, Lorenzo Amato of Florida set the Guinness Book World Record for largest round pizza with a diameter of 100 feet. Amato later broke the Guinness Book World Record for largest square pizza with a side length of 100 feet.

13. What was the area of each pizza?

14. What is the difference between the perimeter of the square pizza and the circumference of the round pizza?

15. If a piece of pizza is 2 inches by 2 inches, how many pieces are in the square pizza?

Section 6.4 Solving Equations with Variables on Both Sides

Practice Problems 6.4

For Problem 1-8, solve for the variable in the equation given and check your solution.

1. $3n^3 + 16 = 2n^3 + 24$

2. $5m - 8 = 2m + 7$

3. $2n^3 + 2 = n^3 + 29$

4. $-4m - 3 = -2m - 15$

5. $4n + 6.2 - 2n = 11.2 - 3n$

6. $\frac{1}{2}n - 3 + \frac{1}{2}n = 3n - 15$

7. $m + m + m = 6m - 21$

8. $n - 3n - 4 = n + 5$

For Problem 9 and 10, solve the problem given.

9. Look at the pattern below.

$$6n^2 + 14 = 2n^2 + 22 \quad \text{a) Is } +1 \text{ and/or } -1 \text{ a solution to } 6n^2 + 14 = 2n^2 + 22?$$

$$+2n^2 \quad +2n^2$$

$$8n^2 + 14 = 22$$

$$-14 \quad -14$$

$$8n^2 = 8$$

$$n^2 = 1$$

$$\sqrt{n^2} = \sqrt{1}$$

$$n = \pm 1$$

b) If $+1$ and/or -1 is not a solution, where is the error in the problem?

c) Find the correct solution to $6n^2 + 14 = 2n^2 + 22$.

d) Substitute your solution for c) into the equation $6n^2 + 14 = 2n^2 + 22$ for n to see if it works.

10. Fill in the blanks.

a) $\frac{1}{4}x$ is the same as dividing x by _____

b) $\frac{m}{2}$ is the same as multiplying m by _____

c) The reciprocal of $-\frac{3}{8}$ is _____.

d) When you multiply any number by its reciprocal you get _____.





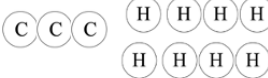
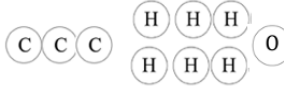
e) Multiplying a number by its reciprocal gives you the _____

_____ of multiplication.

Section 6.5 Reasoning with RatiosPractice Problems 6.5

For Problem 1 and 2, solve the problem given.

1. Complete the table below for the atomic ratio and chemical formula of different elements. The second one, from Example 3 of the Lesson Notes, has been done for you. Remember, a chemical formula shows the ratio of atoms in a compound.

Compound Name	Atoms	Atomic Ratio	Chemical Formula
Hydrogen Chloride			
Water		2:1	H_2O
Ammonia			
Methane			
Propane			
Acetone			

2. The chemical formula for water is H_2O . Hydrogen peroxide also has the elements of hydrogen and oxygen linked together in a 2:2 ratio. What is the chemical formula for hydrogen peroxide?

Both compounds are clear, but you can drink water; hydrogen peroxide is used to kill bacteria on skin, so you definitely do not want to drink that! If you put a drop of water and a drop of hydrogen peroxide on a potato, there will be no reaction to the drop of water, but the potato will bubble when touched by the drop of hydrogen peroxide. One more element makes a lot of difference. God knew what He was doing when He combined elements to form compounds for the substances of our universe.

For Problem 3-8, simplify the ratio. Expand them and cancel the like terms with the same exponents top to bottom or use the rules of exponents from the previous section.

3. $m:m^3$

4. $nm^2:n^2m$

5. $x^2y^3:xy^2$

6. $\frac{3p^2q}{6p}$

7. $\frac{-14t^3r^3s^3}{7t^2r^2s^2}$

8. $\frac{4.2x^3y^2z}{2.1x^2y}$

9. What is the difference between $x^2y^3:xy$ and $xy:x^2y^3$?

10. Debbie picked a number between 1 and 20 and added 4 to it. She then multiplied it by 5, and after that added 10. Finally, she divided by 5. She subtracted the number she started with from her number now and got 6. When Jennifer did the same process using a different starting number, she also got 6. The same thing happened when Hope and Faith tried it. They each got 6 for a solution but started with two different numbers. Let s be the starting number and demonstrate algebraically why the final number is always 6.

Section 6.6 Unit Rates and ConversionsLooking Back 6.6

For Problem 1-4, find the unit rate in the situation given.

1. \$94.00 for 7 hours of work (The unit rate is per hour/for 1 hour of work)
2. 327 calories burned in 2.5 hours (The unit rate is calories burned per hour/calories burned in one hour)
3. A 14.2 fluid ounce bottle of shampoo costs \$3.98 (The unit rate is the cost per ounce/cost for one ounce)
4. 14 ears of corn cost \$2.99. (The unit rate is per 1 ear of corn)

For Problem 5-8, circle the correct ratio to convert from one unit to another.

5. Inches to Feet:

$$\frac{12 \text{ in}}{1 \text{ ft}} \text{ Or } \frac{1 \text{ ft}}{12 \text{ in}}$$

6. Pounds to Ounces:

$$\frac{1 \text{ lb}}{16 \text{ oz}} \text{ Or } \frac{16 \text{ oz}}{1 \text{ lb}}$$

7. Minutes to Seconds:

$$\frac{1 \text{ min}}{60 \text{ s}} \text{ Or } \frac{60 \text{ s}}{1 \text{ min}}$$

8. If a fingernail grows 2.5 mm in 1 month, how many millimeters will it grow in one day? One month may be 30 or 31 days so use 30.5 days for one month.

For Problem 9 and 10, use a stopwatch to solve the problem.

9. While sitting down, use two fingers to find your pulse on either your neck or wrist. Start the stopwatch and start counting the number of heartbeats you feel for 30, 45, and 60 seconds. Find the number of heartbeats per second for each.

a) 30 seconds

b) 45 seconds

c) 60 seconds

Calculate the beat per second each time (for 30, 45, and 60 seconds). Did you get close to the same number each time? Why or why not?

10. Open a tape measure for 100 feet. Start at the beginning of the tape, start the stopwatch, and walk at a constant rate. When you get to the 100 feet mark, stop the stopwatch. What is your walking rate in feet per second? Now, start at the 80 feet mark of the tape, start the stopwatch, and walk at a constant rate. When you get to the 100 feet mark, stop the stopwatch. What is your walking rate in feet per second? Now, start at the 40 feet mark of the tape, start the stopwatch, and walk at a constant rate. When you get to the 100 feet mark, stop the stopwatch. What is your walking rate in feet per second? Now, start at the 20 feet mark of the tape, start the stopwatch, and walk at a constant rate. When you get to the 100 feet mark, stop the stopwatch. What is your walking rate in feet per second?

i. 80 feet

ii. 40 feet

iii. 20 feet

Calculate your walking rate in feet per second each time. Did you get close to the same rate each time? Why or why not?

Section 6.7 Properties of ProportionsPractice Problems 6.7

For Problem 1-5, use the cross-products property to determine whether or not the given equations are equivalent fractions or proportions.

1. $\frac{5}{6} = \frac{25}{30}$

2. $\frac{0.3}{24} = \frac{0.02}{30}$

3. $\frac{9}{13} = \frac{54}{78}$

4. $\frac{5}{9x} = \frac{5}{3x}$

5. $\frac{2}{11.4} = \frac{6.2}{33.4}$

For Problem 6-12, Use algebra and the properties of proportions to solve the problem given. Check your solution given using equivalent ratios.

6. $\frac{m}{15} = \frac{4}{9}$

7. $-\frac{4}{7} = \frac{3}{n}$

8. $\frac{t}{10} = \frac{7}{8}$

9. $\frac{2}{s} = \frac{s}{8}$

10. $\frac{21}{p} = \frac{3}{4}$

11. $\frac{88}{35} = \frac{q}{7}$

12. Substitute the solution for q in Problem 11 and check it using cross-products.

Section 6.8 Reasoning Mathematically with ProportionsPractice Problems 6.8

For Problem 1-3, use the chemical compound formulas below from Section 5 of this module to solve the problem.

Ammonia: NH_3

Propane: C_3H_8

Acetone: $\text{C}_3\text{H}_6\text{O}$

1.
 - a) How many of each atom are in one molecule of ammonia?

 - b) How many atoms of hydrogen must combine with 301 atoms of nitrogen to form ammonia molecules?

2.
 - a) How many of each atom are in one molecule of propane?

 - b) How many atoms of carbon must combine with 64 atoms of hydrogen to form propane molecules?

3.
 - a) How many of each atom are in one molecule of acetone?

 - b) How many atoms of carbon must combine with 100 atoms of oxygen to form acetone molecules?

 - c) How many atoms of hydrogen are required with 100 atoms of oxygen to form acetone molecules?

For Problem 4-9, use Example 2 from the Lesson Notes with Howard's annual income being \$65,000 to solve the problem.

4. What percent of Howard's income is left for savings?

5. Check to see if your solution to Problem 4 is correct. Is that percent of his salary the amount Howard saved?

6. Howard's annual income increased by 4% the following year to account for the rise in his cost-of-living expenses. What was his new salary?

7. What is Howard's giving if it is 23% of his new salary?

8. Check to see if the amount in Problem 7 results in a 4% increase of the giving of \$14,950 from his previous salary.

9. Fran, Howard's wife, had been reading about John Wesley and challenged Howard to increase their giving of 23%. by 7%. After prayer, and with talking to their children, they agreed. How much will they be giving God using the new salary? How much income will be left to meet their needs?

For Problem 10, solve the word problem given.

10. When John Wesley died, he lived off 30 pounds of the 1,400 he earned. What percentage did he give away?

Section 6.9 Proportions and Similar FiguresPractice Problems 6.9

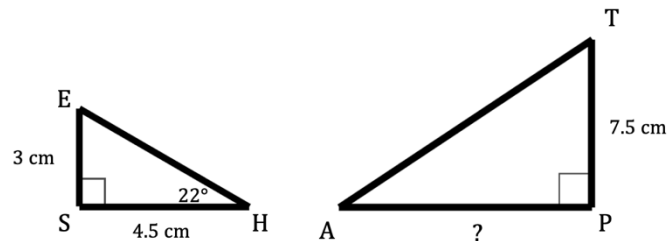
For Problem 1-3, use the given information to solve the problem.

On a scale drawing, an architect has the blueprint marked 1 in. = 11 ft. On the scale drawing, a room has a width of 2.5 inches and a length of 5 inches.

1. What are the actual width and length of the room?
2. What is the actual area of the room?
3. What is the actual perimeter of the room?

For Problem 4-7, use the given information and diagram to solve the problem.

The two triangles below are similar.



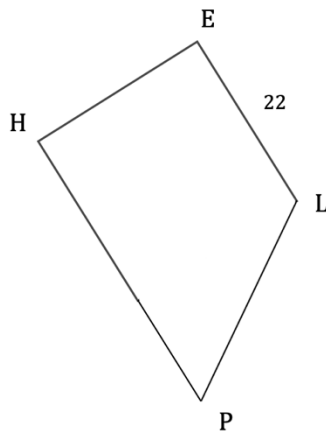
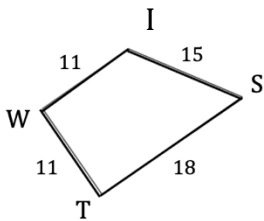
4. What angle is congruent to $\angle T$?
5. What is the measure of $\angle E$ and what other angle has the same measure?
6. What side is proportional to side SH ?
7. Find the length of side PA ?

For Problem 8-11, solve the word problem given.

8. Blythe paints a picture that is 44 cm by 22 cm. She wants to have a Christmas postcard made on 14 cm by 12 cm card stock. Will it be similar and look like her painting or will it be distorted?

9. The two trapezoids below are similar. Delrico tried to find the missing side by using the proportion below in order to find the length of side LP.

$$\frac{WI}{EL} = \frac{WT}{LP}$$



a) What error did Delrico make?

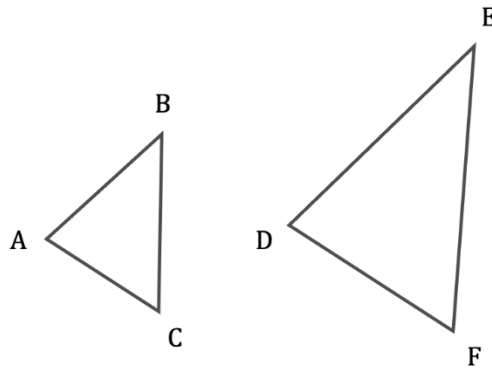
b) Give an example of two proportions that would be correct.

10. A child that is 2.5 ft tall has a shadow that is 50 in long. If the child is standing next to a building that has a 40 ft shadow, how tall is the building? Draw a diagram using similar triangles. Convert feet to inches first.

11.

$$\triangle ABC \sim \triangle DEF$$

All the proportions below are correct except for one. Find which one it is and explain why.



a) $\frac{AB}{DE} = \frac{BC}{EF}$

b) $\frac{AB}{AC} = \frac{DE}{EF}$

c) $\frac{BC}{CA} = \frac{EF}{FD}$

d) $\frac{AC}{DF} = \frac{AB}{DE}$

Section 6.10 Thinking Proportionally to Problem-SolvePractice Problems 6.10

For Problem 1-10, follow the instructions to solve the problem.

1. The sales tax on an item priced at \$23 is \$1.61. Which of the following proportions below could be used to find the sales tax rate?

a) $\frac{23}{1.61} = \frac{r}{100}$

b) $\frac{1.61}{100} = \frac{r}{23}$

c) $\frac{1.61}{23} = \frac{r}{100}$

d) $\frac{23}{r} = \frac{100}{1.61}$

2. What is the rate of sales for the item in Problem 1?

3. If a nutrition label on a box of cookies states there are 8 grams of fat in 1 serving and a serving size is 3 cookies, how many grams of fat are in 7 cookies?

4. If you eat 15 grams of fat, how many cookies did you eat?

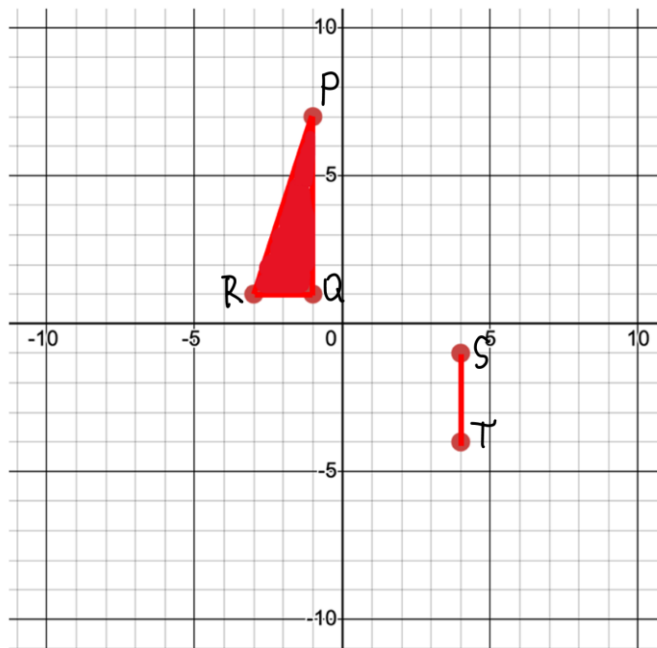
5. Thirty minutes of canoeing burns approximately 143 calories whereas hiking burns 215 calories in the same amount of time. At summer camp, 7 hours are spent hiking and 5.5 hours are spent canoeing. How many calories are burned at summer camp?

6. True or False:

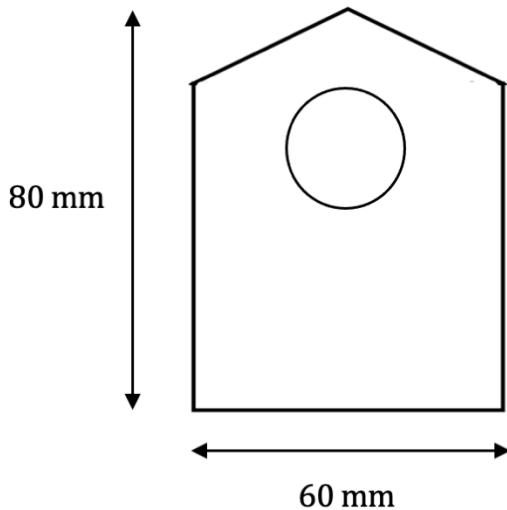
- a) All squares are similar.
- b) All triangles are similar.
- c) All quadrilaterals are similar.
- d) All parallelograms are similar.
- e) All rectangles are similar.
- f) All pentagons are similar.
- g) All regular hexagons are similar.

7. The width of a rectangle is 4 cm. and has a length of 10 cm. If a similar rectangle has a width of 10 cm., what is its length?

8. Al draws a triangle, PQR, on the coordinate grid and puts two more points, S and T, on the grid. Al asks Marcia to find the one other point that will make these two triangles similar. Marcia says she know four places to put point U to make that work. What are they?



9. Antonio wants to build a birdhouse. He draws a scale model of the front with a width of 60 mm and a height of 80 mm. If the actual height will be 138 cm, what will the actual width be? Remember that 10 mm is equal to 1 cm.



10. Here is another activity to try:
- Measure your height.
 - Measure your arm span. Hold your arms straight out on each side parallel to the ground. Measure from the end of your left middle finger across your body to the end of your right middle finger.
 - Write the ratio of height:arm span as $\frac{\text{height}}{\text{arm span}}$.
 - Determine what your arm span will be if you grow 3 inches. Use the ratio and set up a proportion. Your new height for the second ratio will be 3 inches added to your present height. The length your arm span will be is the variable you are trying to find in the second ratio. Make sure all measurements are in inches.

6. In 2013, those that were sickened by the cholera but did not die represented 7% of the Haitian population. What was the population of Haiti in 2013?

For Problem 7-9, use the given information to solve the problem.

In 2010, Haiti experienced an earthquake. The population was 9,650,000 at the time.

According to official estimates:

- 316,000 were killed
- 300,000 people were injured
- 1,300,000 were displaced because their homes were damaged or destroyed

What percent of the population of Haiti...

7. died in the earthquake?
8. were injured in the earthquake?
9. were displaced by the earthquake?
10. If the population of Haiti had grown by 14% over the following year, what would the population have been?

Section 6.12 Interest Rate ProblemsPractice Problems 6.12

For Problem 1-4, write the new percent with the increase or decrease of 100% and the decimal number for the phrase given.

1. Sales tax is $7\frac{1}{2}\%$
2. A pair of jeans is 20% off
3. The stock market dropped by 12%
4. The interest rate on a college loan is 3%

For Problem 5 and 6, solve the problem given indirectly.

5. The sales tax on a \$20 purse is $7\frac{1}{2}\%$. What is the cost of the purse after sales tax?
6. A \$44 pair of jeans is 20% off. What is the cost of the jeans after the sale?

For Problem 7 and 8, solve the problem given directly.

7. Fiberoptics stock is \$108 per share. If it drops by 12%, how much is each share?
8. A student is repaying a college loan of \$27,000.00 at 3% interest annually. How much will the student pay for the loan if they pay it off in one year?

For Problem 9 and 10, solve the problem given either indirectly or directly.

9. If you purchase an ant farm with 30 ants and the number of ants increases by 50% each week, how many ants will you have at the end of one month (four weeks)?

10. Suppose you deposit \$290.00 in a bank account that earns 1.5% interest annually. How much money will you have after three years?

Section 6.13 Solving for One Variable in Terms of AnotherPractice Problems 6.13

For Problem 1 and 2, follow the instructions given to solve the word problem(s).

1. If you start with a number and...

- a) Add 4
- b) Subtract 3
- d) Multiply by 3

... and get a solution of 24, how can you find the number you started with?

2. The equation $\frac{9}{5}C^{\circ} + 32^{\circ} = F^{\circ}$ is the formula used to convert temperatures in Celsius to Fahrenheit degrees. If you know the degrees Celsius...

- a) What is the first step you do to convert it to Fahrenheit?

- b) What is the second step you do to convert it to Fahrenheit?

Working backwards and converting the formula so that Fahrenheit can be changed to Celsius degrees...

- c) What is the first step you do to “undo” Celsius to find the Fahrenheit equation?

- d) What is the second step you do to “undo” Celsius to find the Fahrenheit equation?

- e) What is the equation used to convert Celsius degrees to Fahrenheit degrees?

For Problem 3-8, solve for the terms in the equation given.

3. Solve for m in terms of n :

$$\left(\frac{m-8}{4}\right) = n - 6$$

4. Solve for c in terms of d :

$$5(c + 7) = 2d - 5$$

5. Solve for s in terms of t :

$$5s + 3 = t - 1$$

6. Solve for x in terms of y :

$$y = 3x + 2$$

(Hint: Presently, the equation is solved for y in terms of x .)

7. Solve for a in terms of b :

$$\frac{5}{3}(a + 1) = b$$

8. Solve for g in terms of h :

$$g^2 + 4 = h + 3$$

For Problem 9 and 10, solve for w in the equation given.

9. $p = 2w + 2l$

10. $V = l \cdot w \cdot h$

Section 6.14 Module Review

For Problem 1 and 2, simplify the expression given.

1. $3m^2 - 4m^2 + 2n - n$

2. $c(d + e) + 2cd - 3ce$

For Problem 3 and 4, use the expressions from Problem 1 and 2 to solve the problem.

3. Evaluate the expression in Problem 1 when $m = 0$ and $n = 2.5$.4. Evaluate the expression in Problem 2 when $c = -2$, $d = -4$, and $e = 1$.

5. When Shelby was born, her parents deposited \$1,000 in an account that compounded annually (once a year) and paid 1.75% interest. When Shelby turned 18 and went to college, her parents gave her the money from the account.

$$A = p(1 + r)^t$$

Let A be the total amountLet p be the initial depositLet r be the interest rateLet t be the time in yearsConvert the percent of interest to a decimal by moving the point two places left in order to add it to 1. Find A .

(In a later module, we will derive this formula and learn what it means and where it comes from.)

For Problem 6-11, follow the instructions given to solve the problem.

6. Solve for the variable. Simplify first.

$$3z - 2z + 6 = -2(9 + 8)$$

7. Solve for the variable. Simplify first.

$$(32 - 7) + 3t^2 = -t^2 + 5t^2$$

8. Solve for the variable. Simplify first.

$$-18 + 4n = 10$$

9. Write a ratio to change one yard to its equivalent in feet.

10. Use the ratio you wrote in Problem 9 to convert 5 yards to feet.

11. Convert 22 feet to yards.

For Problem 12-17, solve the word problem given.

12. One serving (2 tablespoons) of peanut butter is about 32 grams, which is enough to make one sandwich. If there are 1.13 kg. of peanut butter in a jar, how many sandwiches can be made with one jar?

13. If there are 2.5 g. of saturated fat in a serving of peanut butter, how many grams of saturated fat are in the entire jar (using the jar from Problem 12)?
14. Three-dozen cookies call for 1 cup of butter. How much butter is needed to make $\frac{1}{2}$ -dozen cookies?
15. A 4-pack of grape juice is \$3.98; how much is each container of grape juice?
16. What is the cost of five 4-packs of grape juice?
17. A birthday cake is 20% off the price of \$14.98. If a dozen cookies are purchased at the price of \$5.99, what is the total cost of the cake and cookies?

Section 6.15 Module Test

For Problem 1 and 2, simplify the expression given.

1. $-4a^3 + b^2 - 2a^3b^2 + 5b^2$

2. $3r(-4r + 3s) - 2(3r^2 - 5)$

For Problem 3 and 4, use the expressions from Problem 1 and 2 to solve the problem.

3. Evaluate the expression in Problem 1 when $a = -1$ and $b = 2$.4. Evaluate the expression in Problem 2 when $r = -5$ and $s = 1$.

5. Benjamin took out a loan for college in the amount of \$10,000.00 for one year. The interest rate was 4.5% at the end of the year. How much will he owe the bank with interest included? Use the equation below to solve the problem.

$$A = p(1 + r)^t$$

Let A be the total amountLet p be the initial amount borrowedLet r be the interest rateLet t be the number of interest periodsConvert the percent of interest to a decimal by moving the point two places left in order to add it to 1. Find A .

For Problem 6-8, solve for the variable in the expression given. Simplify first.

6. $-2m + 14 = -m - 32$

7. $y^2 + (14-3)^2 = 170$

8. $-3m + 5 = -16$

For Problem 9-20, use proportional reasoning to solve the problem given.

9. Find the number of feet in 2 miles given there are 5,280 feet in 1 mile.

10. Find how many miles are in 5,000 feet.

11. Find the number of feet in 3.5 miles.

12. If a runner runs 100 m. in 12.4 seconds, how long will it take them to run 40 meters at the same rate?
13. Football players often get timed in the 40-yd. dash before the season begins. A fast time is 4.4 seconds. What would a 4.4 second 40-yd. dash time be for 100 meters given 100 m. is equal to 110 yards?
14. A 28 oz. jar of peanut butter is about 1 lb. 12 oz. or 793 g. We know 32 grams (2 tablespoons) is equal to 1 serving. One serving makes 1 sandwich. How many sandwiches can be made from a 28 oz. jar of peanut butter?
15. A CD that costs \$14.95 is on sale for 30% off. How much does the CD cost if the sales tax is 7.5%?
16. The chemical compound for one molecule of sulfuric acid is H_2SO_4 . How many atoms of hydrogen, sulfur, and oxygen would need to be combined to make 100 molecules of sulfuric acid?

17. Suppose you deposit \$763.00 in your savings account on your birthday. If the account earns 1.75% interest annually, how much money will you have on your next birthday?

18. Suppose you deposit \$763.00 in a money market for your next birthday. If the market falls 3.2%, how much will you have in the market a year later?

19. If an athlete weighs 190 lbs. and has a body fat percentage of 8%, how many pounds of their weight is body fat?

20. Solve for a in terms of b in the equation below.

$$\left(\frac{a + 4}{3}\right) = 2b - 5$$