Unit Practice
Writing Equations

Translate each sentence into an equation.
1. Fifty-three plus four times c is as much as 21.
2. The sum of five times h and twice g is equal to 23.
3. One fourth the sum of r and ten is identical to r minus 4.
4. Three plus the sum of the squares of w and x is 32.

Translate each sentence into a formula.
5. Degrees Kelvin K equals 273 plus degrees Celsius C.
6. The total cost C of gas is the price p per gallon times the number of gallons g.
7. The sum S of the measures of the angles of a polygon is equal to 180 times the difference of the number of sides n and 2.

Translate each equation into a verbal sentence.
8. \( q - (4 + p) = \frac{1}{3}q \)
9. \( \frac{3}{5}t + 2 = t \)
10. \( 9(y^2 + x) = 18 \)
11. \( 2(m - n) = v + 7 \)

Write a problem based on the given information.
12. \( a = \text{cost of one adult's ticket to zoo} \)
\( a - 4 = \text{cost of one children's ticket to zoo} \)
\( 2a + 4(a - 4) = 38 \)
13. \( c = \text{regular cost of one airline ticket} \)
\( 0.20c = \text{amount of 20\% promotional discount} \)
\( 3(c - 0.20c) = 330 \)

14. GEOGRAPHY About 15\% of all federally-owned land in the 48 contiguous states of the United States is in Nevada. If \( F \) represents the area of federally-owned land in these states, and \( N \) represents the portion in Nevada, write an equation for this situation.

FITNESS For Exercises 15-17, use the following information.
Deanna and Pietra each go for walks around a lake a few times per week. Last week, Deanna walked 7 miles more than Pietra.
15. If \( p \) represents the number of miles Pietra walked, write an equation that represents the total number of miles \( T \) the two girls walked.
16. If Pietra walked 9 miles during the week, how many miles did Deanna walk?
17. If Pietra walked 11 miles during the week, how many miles did the two girls walk together?
2-1 Word Problem Practice

Writing Equations

1. HOUSES The area of the Hartstein's kitchen is 182 square feet. This is 20% of the area of the first floor of their house. Let $F$ represent the area of the first floor. Write an equation to represent the situation.

2. FAMILY Katie is twice as old as her sister Mara. The sum of their ages is 24. Write a one-variable equation to represent the situation.

3. GEOMETRY The formula $F + V = E + 2$ shows the relationship between the number of faces $F$, edges $E$, and vertices $V$ of a polyhedron, such as a pyramid. Write the formula in words.

4. WIRELESS PHONE Spinfrog wireless phone company bills on a monthly basis. Each bill includes a $29.95 service fee for 1000 minutes plus a $2.95 federal communication tax. Additionally, there is a charge of $0.05 for each minute used over 1000. Let $m$ represent the number of minutes over 1000 used during the month. Write an equation to describe the cost $c$ of the wireless phone service per month.

TEMPERATURE For Exercises 5 and 6, use the table showing degrees Fahrenheit and degrees Celsius temperatures.

<table>
<thead>
<tr>
<th>Celsius</th>
<th>Fahrenheit</th>
</tr>
</thead>
<tbody>
<tr>
<td>-20°</td>
<td>-4°</td>
</tr>
<tr>
<td>-10°</td>
<td>14°</td>
</tr>
<tr>
<td>0°</td>
<td>32°</td>
</tr>
<tr>
<td>10°</td>
<td>50°</td>
</tr>
<tr>
<td>20°</td>
<td>68°</td>
</tr>
<tr>
<td>30°</td>
<td>86°</td>
</tr>
</tbody>
</table>

5. Write a formula for converting Celsius temperatures to Fahrenheit temperatures.

6. Find the Fahrenheit equivalents for 25°C and 35°C.
2-2 Practice

Solving Equations by Using Addition and Subtraction

Solve each equation. Then check your solution.

1. \( d - 8 = 17 \)
2. \( u + 12 = -5 \)
3. \( b - 2 = -11 \)
4. \( -16 = s + 71 \)
5. \( 29 = a - 76 \)
6. \( -14 + y = -2 \)
7. \( 8 - (-c) = 1 \)
8. \( 78 + r = -15 \)
9. \( f + (-3) = -9 \)
10. \( 4.2 = n + 7.3 \)
11. \( w + 1.9 = -2.5 \)
12. \( 4.6 - (-b) = -0.4 \)
13. \( y - (-1.5) = 0.5 \)
14. \( a - 0.13 = -0.58 \)
15. \( h + (-4.21) = -19 \)
16. \( r + \frac{1}{5} = \frac{9}{10} \)
17. \( \frac{5}{9} + q = \frac{2}{3} \)
18. \( \frac{1}{3} = h + \frac{2}{5} \)
19. \( \frac{1}{4} + x = -\frac{7}{12} \)
20. \( y + \frac{4}{5} = \frac{3}{4} \)
21. \( -\frac{7}{8} - (-n) = -\frac{7}{12} \)

Write an equation for each problem. Then solve the equation and check your solution.

22. What number minus 9 is equal to \(-18\)?

23. A number plus 15 equals \(-12\). What is the number?

24. The sum of a number and \(-3\) is equal to \(-91\). Find the number.

25. Negative seventeen equals 63 plus a number. What is the number?

26. The sum of negative 14, a number, and 6 is \(-5\). What is the number?

27. What number plus one half is equal to three eighths?

HISTORY For Exercises 28 and 29, use the following information.

Galileo Galilei was born in 1564. Many years later, in 1642, Sir Isaac Newton was born.

28. Write an addition equation to represent the situation.

29. How many years after Galileo was born was Isaac Newton born?

HURRICANES For Exercises 30 and 31, use the following information.

The day after a hurricane, the barometric pressure in a coastal town has risen to 29.7 inches of mercury, which is 2.9 inches of mercury higher than the pressure when the eye of the hurricane passed over.

30. Write an addition equation to represent the situation.

31. What was the barometric pressure when the eye passed over?
Word Problem Practice

Solving Equations by Using Addition and Subtraction

1. SUPREME COURT  Chief Justice William Rehnquist served on the Supreme Court for 33 years until his death in 2005. Write and solve an equation to determine the year he was confirmed as a justice on the Supreme Court.

2. SALARY  In 2004, the annual salary of the Governor of New Jersey was $157,000. During the same year, the annual salary of the Governor of Tennessee was $72,000 less. Write and solve an equation to find the annual salary of the Governor of Tennessee in 2004.

3. WEATHER  On a cold January day, Mavis noticed that the temperature dropped 21 degrees over the course of the day to $-9^\circ$C. Write and solve an equation to determine what the temperature was at the beginning of the day.

4. SEA LEVEL  Many parts of the city of Bangkok, Thailand, sit below sea level and the city continues to sink every year. The water is held back by a system of dikes so that the city will remain dry. The base of a building in the center of Bangkok sits at an altitude of $-6$ feet, meaning that it is 6 feet below sea level. The top of the building is 45 feet above sea level. Write and solve an equation to find the height of the building.

Savings  For Exercises 5 and 6, use the following information.

Ophace is saving $144 to buy three concert tickets. He has already saved $65.

5. Write and solve an equation to find the amount of money he still needs to save.

6. Of the three tickets he plans to buy, two are for adults and one is for a child. The adult tickets together cost $120. Write and solve an equation to find the cost of the child ticket.
2-3 Practice

Solving Equations by Using Multiplication and Division

Solve each equation. Then check your solution.

1. \(8j = 96\)  
2. \(-13z = -39\)  
3. \(-180 = 15m\)

4. \(243 = 27c\)  
5. \(\frac{y}{9} = -8\)  
6. \(-\frac{j}{12} = -8\)

7. \(\frac{a}{15} = \frac{4}{5}\)  
8. \(\frac{k}{27} = \frac{2}{9}\)  
9. \(\frac{g}{24} = \frac{1}{6}\)

10. \(-1 = -\frac{4}{7}t\)  
11. \(-\frac{3}{8}w = -9\)  
12. \(-\frac{3}{15}g = 4\)

13. \(-3x = \frac{3}{2}\)  
14. \(\frac{5}{5}a = \frac{4}{3}\)  
15. \(\frac{5}{5}h = \frac{11}{6}\)

16. \(5n = \frac{11}{4}\)  
17. \(2.5k = 20\)  
18. \(-3.4e = -3.74\)

19. \(-1.7b = 2.21\)  
20. \(0.26p = 0.104\)  
21. \(4.2q = -3.36\)

Write an equation for each problem. Then solve the equation.

22. Negative nine times a number equals -117. Find the number.

23. Negative one eighth of a number is \(-\frac{3}{4}\). What is the number?

24. Five sixths of a number is \(-\frac{5}{9}\). Find the number.

25. 2.7 times a number equals 8.37. What is the number?

26. One and one fourth times a number is one and one third. What is the number?

27. PUBLISHING Two units of measure used in publishing are the pica and the point. A pica is one sixth of an inch. There are 12 points in a pica, so Points = 12 · Picas. How many picas are equivalent to 108 points?

ROLLEROASTERS For Exercises 28 and 29, use the following information.

Kingda Ka in New Jersey is the tallest and fastest roller coaster in the world. Riders travel at an average speed of 61 feet per second for 3118 feet. They reach a maximum speed of 187 feet per second.

28. If \(x\) represents the total time that the roller coaster is in motion for each ride, write an expression to represent the situation. (Hint: Use the distance formula \(d = rt\).)

29. How long is the roller coaster in motion?
1. HEART RATE According to the American Heart Association, the target heart rate during exercise for a healthy 20-year-old person is 150 beats per minute. The target heart rate during exercise for a 70-year-old person is one half of that rate. Write and solve an equation to find the target exercise heart rate for a 70-year-old.

4. FARMING Mr. Hill's farm is 126 acres. Mr. Hill's farm is \( \frac{1}{4} \) the size of Mr. Miller's farm. How many acres is Mr. Miller's farm?

2. TREES A redwood tree can grow to be about six times as tall as a pine tree. Suppose a common pine tree measures about 56 feet tall. Write and solve an equation to find the approximate height of a redwood tree.

5. If a boat travels 16 knots in 1 hour, how far will it have traveled in feet? Write and solve an equation.

3. SHOPPING Raul bought fudge at the candy shop. After he gave his sister \( \frac{1}{2} \) of the fudge he bought, he still had \( \frac{3}{4} \) of a pound. How much fudge did Raul originally buy?

6. About how fast was the boat traveling in miles per hour? Round your answer to the nearest hundredth.

NAUTICAL For Exercises 5 and 6, use the following information.

On the sea, distances are measured in nautical miles rather than miles.

- 1 nautical mile = 6080 feet
- 1 knot = \( \frac{1 \text{ nautical mile}}{1 \text{ hour}} \)
Practice

Solving Multi-Step Equations

Solve each problem by working backward.

1. Three is added to a number, and then the sum is multiplied by 4. The result is 16. Find the number.

2. A number is divided by 4, and the quotient is added to 3. The result is 24. What is the number?

3. Two is subtracted from a number, and then the difference is multiplied by 5. The result is 30. Find the number.

4. **BIRD WATCHING** While Michelle sat observing birds at a bird feeder, one fourth of the birds flew away when they were startled by a noise. Two birds left the feeder to go to another stationed a few feet away. Three more birds flew into the branches of a nearby tree. Four birds remained at the feeder. How many birds were at the feeder initially?

Solve each equation. Then check your solution.

5. \(-12n - 19 = 77\)

6. \(17 + 3f = 14\)

7. \(15t + 4 = 49\)

8. \(\frac{u}{5} + 6 = 2\)

9. \(\frac{d}{-4} + 3 = 15\)

10. \(\frac{b}{3} - 6 = -2\)

11. \(\frac{1}{2}y - \frac{1}{8} = \frac{7}{8}\)

12. \(-32 - \frac{3}{5}f = -17\)

13. \(8 - \frac{3}{8}k = -4\)

14. \(\frac{r + 13}{12} = 1\)

15. \(\frac{15 - a}{3} = -9\)

16. \(\frac{3k - 7}{5} = 16\)

17. \(\frac{x}{7} - 0.5 = 2.5\)

18. \(2.5g + 0.45 = 0.95\)

19. \(0.4m - 0.7 = 0.22\)

Write an equation and solve each problem.

20. Seven less than four times a number equals 13. What is the number?

21. Find two consecutive odd integers whose sum is 116.

22. Find two consecutive even integers whose sum is 126.

23. Find three consecutive odd integers whose sum is 117.

24. **COIN COLLECTING** Jung has a total of 92 coins in his coin collection. This is 8 more than three times the number of quarters in the collection. How many quarters does Jung have in his collection?
Word Problem Practice
Solving Multi-Step Equations

1. TEMPERATURE The formula for converting a Fahrenheit temperature to a Celsius temperature is \( C = \frac{F - 32}{1.8} \).
Find the equivalent Celsius temperature for 68°F.

2. HUMAN HEIGHT It is a commonly used guideline that for the average American child, their maximum adult height will be about twice their height at age 2. Suppose that Micah's adult height fits the following equation \( a = 2c - 1 \), where \( a \) represents his adult height and \( c \) represents his height at age 2. At age 2 Micah was 35 inches tall. What is Micah's adult height? Write and solve an equation.

3. CHEMISTRY The half-life of a radioactive substance is the time required for half of a sample to undergo radioactive decay, or for the quantity to fall to half its original amount. Carbon-14 has a half-life of 5730 years. Suppose given samples of Carbon-14 weigh \( \frac{5}{8} \) of a pound and \( \frac{7}{8} \) of a pound. What was the total weight of the samples 11,460 years ago?

4. NUMBER THEORY Write and solve an equation to find three consecutive odd integers whose sum is 3.

GEOMETRY For Exercises 5–7, use the following information.

A rectangular swimming pool is surrounded by a concrete sidewalk that is 3 feet wide. The dimensions of the rectangle created by the sidewalk are 21 feet by 31 feet.

5. Find the length and width of the pool.

6. Find the area of the pool.

7. Write and solve an equation to find the area of the sidewalk in square feet.
2-5 Practice
Solving Equations with the Variable on Each Side

Solve each equation. Then check your solution.

1. \(5x - 3 = 13 - 3x\)
2. \(-4c - 11 = 4c + 21\)
3. \(1 - s = 6 - 6s\)
4. \(14 + 5n = -4n + 17\)
5. \(\frac{1}{2}k - 3 = 2 - \frac{3}{4}k\)
6. \(\frac{1}{2}(6 - z) = z\)
7. \(3(-2 - 3x) = -9x - 4\)
8. \(4(4 - w) = 3(2w + 2)\)
9. \(9(4b - 1) = 2(9b + 3)\)
10. \(3(6 + 5y) = 2(-5 + 4y)\)
11. \(-5x - 10 = 2 - (x + 4)\)
12. \(6 + 2(3j - 2) = 4(1 + j)\)
13. \(\frac{5}{2}t - t = 3 + \frac{3}{2}t\)
14. \(1.4f + 1.1 = 8.3 - f\)
15. \(\frac{2}{3}x - \frac{1}{6} = \frac{1}{2}x + \frac{5}{6}\)
16. \(2 - \frac{3}{4}z = \frac{1}{8}z + 9\)
17. \(\frac{1}{2}(3g - 2) = \frac{g}{6}\)
18. \(\frac{1}{3}(c + 1) = \frac{1}{6}(3c - 5)\)
19. \(\frac{1}{4}(5 - 2h) = \frac{h}{2}\)
20. \(\frac{1}{9}(2m - 16) = \frac{1}{3}(2m + 4)\)
21. \(3(d - 8) - 5 = 9(d + 2) + 1\)
22. \(2(a - 8) + 7 = 5(a + 2) - 3a - 19\)

23. Two thirds of a number reduced by 11 is equal to 4 more than the number. Find the number.

24. Five times the sum of a number and 3 is the same as 3 multiplied by 1 less than twice the number. What is the number?

25. NUMBER THEORY Tripling the greater of two consecutive even integers gives the same result as subtracting 10 from the lesser even integer. What are the integers?

26. GEOMETRY The formula for the perimeter of a rectangle is \(P = 2\ell + 2w\), where \(\ell\) is the length and \(w\) is the width. A rectangle has a perimeter of 24 inches. Find its dimensions if its length is 3 inches greater than its width.
2-5 Word Problem Practice

Solving Equations with the Variable on Each Side

1. OLYMPICS In the 2004 Summer Olympic Games in Athens, Greece, the United States athletes won 2 more than 3 times the number of gold metals won by the French athletes. The United States won 24 more gold metals than the French. Solve the equation $24 + F = 3F + 2$ to find the number of gold metals won by the French athletes.

4. NATURE The table shows the current heights and average growth rates of two different species of trees. How long will it take for the two trees to be the same height?

<table>
<thead>
<tr>
<th>Tree Species</th>
<th>Current Height</th>
<th>Annual Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>38 inches</td>
<td>4 inches</td>
</tr>
<tr>
<td>B</td>
<td>45.5 inches</td>
<td>2.5 inches</td>
</tr>
</tbody>
</table>

2. AGE Diego's mother is twice as old as he is. She is also as old as the sum of the ages of Diego and both of his younger twin brothers. The twins are 11 years old. Solve the equation $2d = d + 11 + 11$ to find the age of Diego.

3. GEOMETRY Supplementary angles are angles whose measures have a sum of 180°. Complementary angles are angles whose measures have a sum of 90°. Find the measure of an angle whose supplement is 10° more than twice its complement. Let $90 - x$ equal the degree measure of its complement and $180 - x$ equal the degree measure of its supplement. Write and solve an equation.

5. Write and solve an equation to find the integers.

6. Does the equation have one solution, no solutions, or is it an identity? Explain.
2-6 Practice

Ratios and Proportions

Use cross products to determine whether each pair of ratios forms a proportion. Write yes or no.

1. \( \frac{7}{6}, \frac{52}{48} \)
2. \( \frac{3}{11}, \frac{15}{66} \)
3. \( \frac{18}{24}, \frac{36}{48} \)

4. \( \frac{12}{11}, \frac{108}{99} \)
5. \( \frac{8}{9}, \frac{72}{81} \)
6. \( \frac{1.5}{9}, \frac{1}{6} \)

7. \( \frac{3.4}{5.2}, \frac{7.14}{10.92} \)
8. \( \frac{1.7}{1.2}, \frac{2.9}{2.4} \)
9. \( \frac{7.6}{1.8}, \frac{3.9}{0.9} \)

Solve each proportion. If necessary, round to the nearest hundredth.

10. \( \frac{5}{a} = \frac{30}{54} \)
11. \( \frac{v}{46} = \frac{34}{23} \)
12. \( \frac{40}{56} = \frac{k}{7} \)

13. \( \frac{28}{49} = \frac{4}{w} \)
14. \( \frac{3}{y} = \frac{27}{162} \)
15. \( \frac{y}{3} = \frac{48}{9} \)

16. \( \frac{2}{y} = \frac{10}{60} \)
17. \( \frac{5}{11} = \frac{35}{x} \)
18. \( \frac{3}{51} = \frac{z}{17} \)

19. \( \frac{6}{61} = \frac{12}{h} \)
20. \( \frac{k}{16} = \frac{6}{4} \)
21. \( \frac{14}{49} = \frac{2}{a} \)

22. \( \frac{7}{9} = \frac{8}{c} \)
23. \( \frac{3}{q} = \frac{5}{6} \)
24. \( \frac{m}{6} = \frac{5}{8} \)

25. \( \frac{v}{0.23} = \frac{7}{1.61} \)
26. \( \frac{3}{0.72} = \frac{12}{b} \)
27. \( \frac{6}{n} = \frac{3}{0.51} \)

28. \( \frac{7}{a - 4} = \frac{14}{6} \)
29. \( \frac{3}{12} = \frac{2}{y + 6} \)
30. \( \frac{m - 1}{8} = \frac{2}{4} \)

31. \( \frac{5}{12} = \frac{x + 1}{4} \)
32. \( \frac{r + 2}{7} = \frac{5}{7} \)
33. \( \frac{3}{7} = \frac{x - 2}{6} \)

34. PAINTING Ysidra paints a room that has 400 square feet of wall space in \( 2\frac{1}{2} \) hours. At this rate, how long will it take her to paint a room that has 720 square feet of wall space?

35. VACATION PLANS Walker is planning a summer vacation. He wants to visit Petrified National Forest and Meteor Crater, Arizona, the 50,000-year-old impact site of a large meteor. On a map with a scale where 2 inches equals 75 miles, the two areas are about \( 1\frac{1}{2} \) inches apart. What is the distance between Petrified National Forest and Meteor Crater?
1. **WATER** A dripping faucet wastes 3 cups of water every 24 hours. How much water is wasted in a week?

2. **GASOLINE** In mid-2005 the average price of 5 gallons of regular unleaded gasoline in the United States was $12.95. What was the price for 16 gallons of gas?

3. **SHOPPING** Stevenson's Market is selling 3 packs of toothpicks for $0.87. How much will 10 packs of toothpicks cost at this price? Round your answer to the nearest cent.

4. **BUILDINGS** The Sears Tower in Chicago is 1450 feet tall. The John Hancock Center in Chicago is 1127 feet tall. Suppose you are asked to build a small-scale replica of each. If you make the Sears Tower 3 meters tall, what would be the approximate height of the John Hancock replica? Round your answer to the nearest hundredth.

5. Use a metric ruler to measure the distances between Robinson and Neale on the map.

6. Using the scale of the map, find the approximate actual distance by air (not by roads), between Robinson and Neale.

7. Approximately how many square miles are shown on this map?
Practice
Percent of Change

State whether each percent of change is a percent of increase or a percent of decrease. Then find each percent of change. Round to the nearest whole percent.

1. original: 18
   new: 10

2. original: 140
   new: 160

3. original: 200
   new: 320

4. original: 10
   new: 25

5. original: 76
   new: 60

6. original: 128
   new: 120

7. original: 15
   new: 35.5

8. original: 98.6
   new: 64

9. original: 58.8
   new: 65.7

Find the total price of each item.

10. concrete blocks: $95.00
tax: 6%

11. crib: $240.00
tax: 6.5%

12. jacket: $125.00
tax: 5.5%

13. class ring: $325.00
tax: 6%

14. blanket: $24.99
tax: 7%

15. kite: $18.90
tax: 5%

Find the discounted price of each item.

16. dry cleaning: $25.00
discount: 15%

17. computer game: $49.99
discount: 25%

18. luggage: $185.00
discount: 30%

19. stationery: $12.95
discount: 10%

20. prescription glasses: $149
discount: 20%

21. pair of shorts: $24.99
discount: 45%

Find the final price of each item.

22. television: $375.00
discount: 25%
tax: 6%

23. DVD player: $269.00
discount: 20%
tax: 7%

24. printer: $255.00
discount: 30%
tax: 5.5%

25. INVESTMENTS The price per share of a stock decreased from $90 per share to $36 per share early in 2006. By what percent did the price of the stock decrease?

26. HEATING COSTS Customers of a utility company received notices in their monthly bills that heating costs for the average customer had increased 125% over last year because of an unusually severe winter. In January of last year, the Garcia's paid $120 for heating. What should they expect to pay this January if their bill increased by 125%?
1. **SPORTS** A regulation girls’ fast pitch softball diamond has bases that are 60 feet apart. A regulation professional baseball diamond has bases that are 50% farther apart. Label the distance between the bases on the regulation baseball diamond diagram.

2. **SALES TAX** Olivia purchases a DVD movie priced at $21.99. The sales tax is 6.5%. What is the total price of the movie, including tax?

3. **EDUCATION** The ACT is a college entrance exam taken by high school students. The maximum score that can be earned is 36. The average score in the United States was 20.9 during the 2005 school year. The average score for Vermont students was 8.1% higher than the national average. What was the average ACT score for Vermont students? Round your answer to the nearest tenth.

4. **CARS** Mr. Thompson plans to purchase a used car priced at $8,400. He will receive a 15% employee discount and then will have to pay a 5.5% sales tax. What will be the final price of the car?

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**MUSIC** For Exercises 5–7, use the table below that shows the total number of CDs, cassettes, and DVD music videos sold from 2002 to 2004.

<table>
<thead>
<tr>
<th>Sales of Recorded Music and Music Videos (millions of units)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Format</strong></td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>CD</td>
</tr>
<tr>
<td>Cassette</td>
</tr>
<tr>
<td>DVD video</td>
</tr>
</tbody>
</table>

*Source: Recording Industry Association of America*

5. Find the percent of change in the number of units sold between 2002 and 2003 and between 2003 and 2004 for each format. Round to the nearest tenth.

6. Tell whether each percent of change in Exercise 5 is a percent of increase or a percent of decrease.

2-8 Practice

Solving Equations and Formulas

Solve each equation or formula for the variable specified.

1. \( d = \frac{r}{t} \), for \( r \)

2. \( 6w - y = 2x \), for \( w \)

3. \( mx + 4y = 3c \), for \( x \)

4. \( 9s - 5g = -4u \), for \( s \)

5. \( ab + 3c = 2d \), for \( b \)

6. \( 2p = hx - q \), for \( x \)

7. \( \frac{2}{3}m + a = a + c \), for \( m \)

8. \( \frac{2}{5}h + g = d \), for \( h \)

9. \( \frac{2}{3}y + v = s \), for \( y \)

10. \( \frac{3}{4}a - q = k \), for \( a \)

11. \( \frac{rx + 9}{5} = h \), for \( x \)

12. \( \frac{3b - 4}{2} = c \), for \( b \)

13. \( 2w - y = 7w - 2 \), for \( w \)

14. \( 3\ell + y = 5 + 5\ell \), for \( \ell \)

Write an equation and solve for the variable specified.

15. Three times a number \( s \) plus 4 times a number \( y \) is 1 more than 6 times the number \( s \). Solve for \( s \).

16. Five times a number \( k \) minus 9 is two thirds of a number \( j \). Solve for \( j \).

ELECTRICITY For Exercises 17 and 18, use the following information.

The formula for Ohm’s Law is \( E = IR \), where \( E \) represents voltage measured in volts, \( I \) represents current measured in amperes, and \( R \) represents resistance measured in ohms.

17. Solve the formula for \( R \).

18. Suppose a current of 0.25 ampere flows through a resistor connected to a 12-volt battery. What is the resistance in the circuit?

MOTION For Exercises 19 and 20, use the following information.

In uniform circular motion, the speed \( v \) of a point on the edge of a spinning disk is \( v = \frac{2\pi}{T}r \), where \( r \) is the radius of the disk and \( T \) is the time it takes the point to travel once around the circle.

19. Solve the formula for \( r \).

20. Suppose a merry-go-round is spinning once every 3 seconds. If a point on the outside edge has a speed of 12.56 feet per second, what is the radius of the merry-go-round? (Use 3.14 for \( \pi \).)
2-8

Word Problem Practice

Solving Equations and Formulas

1. INTEREST Simple interest that you may earn on money in a savings account can be calculated with the formula \( I = prt \). \( I \) is the amount of interest earned, \( p \) is the principal or initial amount invested, \( r \) is the interest rate, and \( t \) is the amount of time the money is invested for. Solve the formula for \( p \).

2. DISTANCE The distance \( d \) a car can travel is found by multiplying its rate of speed \( r \) by the amount of time \( t \) that it took to travel the distance. If a car has already traveled 5 miles, the total distance \( d \) is found by the formula \( d = rt + 5 \). Solve the formula for \( r \).

3. GEOMETRY The volume of a rectangular prism is given by the formula \( V = l \times w \times h \). Suppose a cereal company wants to package 270 cubic inches of cereal in a full box. The width of the box must be 9 inches and the height of the box must be 12 inches to fit on store shelves. Solve the equation for \( l \) and find the length of the box.

4. PHYSICS The pressure exerted on an object is calculated by the formula \( P = \frac{F}{A} \), where \( P \) is the pressure, \( F \) is the force, and \( A \) is the surface area of the object. Water shooting from a hose has a pressure of 75 pounds per square inch (psi). Suppose the surface area covered by the direct hose spray is 0.442 square inches. Solve the equation for \( F \) and find the force of the spray.

GEOMETRY
For Exercises 5-7, use the following information.

The regular octagon is divided into 8 congruent triangles. Each triangle has an area of 21.7 square centimeters. The perimeter of the octagon is 48 centimeters.

5. What is the length of each side of the octagon?

6. Solve the area of a triangle formula for \( h \).

7. What is the height of each triangle? Round to the nearest tenth.
2-9 Practice

Weighted Averages

GRASS SEED For Exercises 1-4, use the following information.

A nursery sells Kentucky Blue Grass seed for $5.75 per pound and Tall Fescue seed for $4.50 per pound. The nursery sells a mixture of the two kinds of seed for $5.25 per pound. Let k represent the amount of Kentucky Blue Grass seed the nursery uses in 5 pounds of the mixture.

1. Complete the table representing the problem.

<table>
<thead>
<tr>
<th></th>
<th>Number of Pounds</th>
<th>Price per Pound</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kentucky Blue Grass</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tall Fescue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixture</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Write an equation to represent the problem.

3. How much Kentucky Blue Grass does the nursery use in 5 pounds of the mixture?

4. How much Tall Fescue does the nursery use in 5 pounds of the mixture?

TRAVEL For Exercises 5-7, use the following information.

Two commuter trains carry passengers between two cities, one traveling east, and the other west, on different tracks. Their respective stations are 150 miles apart. Both trains leave at the same time, one traveling at an average speed of 55 miles per hour and the other at an average speed of 65 miles per hour. Let t represent the time until the trains pass each other.

5. Copy and complete the table representing the problem.

<table>
<thead>
<tr>
<th></th>
<th>r</th>
<th>t</th>
<th>d = rt</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Train</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second Train</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Write an equation using t that describes the distances traveled.

7. How long after departing will the trains pass each other?

8. TRAVEL Two trains leave Raleigh at the same time, one traveling north, and the other south. The first train travels at 50 miles per hour and the second at 60 miles per hour. In how many hours will the trains be 275 miles apart?

9. JUICE A pineapple drink contains 15% pineapple juice. How much pure pineapple juice should be added to 8 quarts of the drink to obtain a mixture containing 50% pineapple juice?
Word Problem Practice

Weighted Averages

1. DRIVING The drive from New York City to Boston is about 240 miles. It took Samir 5 hours to drive one way, but due to severe weather it took him 6.5 hours for the return trip. What was his average speed round trip? Round the answer to the nearest hundredth.

2. GRADES In math classes at Gorbine High School, all tests are given double the weight of a quiz or homework score when calculating grades. Use Donna's grade record sheet to determine her average grade so far this term.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework chapter 1</td>
<td>95</td>
</tr>
<tr>
<td>Quiz chapter 1</td>
<td>80</td>
</tr>
<tr>
<td>Test chapter 1</td>
<td>92</td>
</tr>
<tr>
<td>Homework chapter 2</td>
<td>93</td>
</tr>
<tr>
<td>Quiz chapter 2</td>
<td>96</td>
</tr>
<tr>
<td>Test chapter 2</td>
<td>81</td>
</tr>
</tbody>
</table>

3. MIXTURE Keith wants to create a drink that is 40% juice. How much of a 10% juice solution should he add to 100 milliliters of 100% grape juice to obtain the 40% mixture?

4. BUSINESS Mrs. Winship sells chocolate fudge for $7.50 per pound and peanut butter fudge for $7.00 per pound. The total number of pounds sold on Saturday was 146 and the total amount of money collected was $1065. How many pounds of each type of fudge were sold?

5. TRAINS For Exercises 5–7, use the following information.

Two trains are 5000 feet apart, heading toward each other, but on separate parallel straight tracks, Train A is traveling at 45 miles per hour and Train B is traveling at 24 miles per hour.

5. Change 45 miles per hour and 24 miles per hour into feet per second.

6. About how far will each train travel before they meet? Round your answers to the nearest hundredth.

7. In how many seconds will the trains meet?