PRACTICE & PROBLEM SOLVING

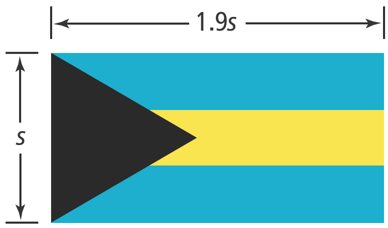
UNDERSTAND

9. **Mathematical Connections** Some two-step equations can be written in the form $ax + b = c$, where a, b, and c are constants and x is the variable.

a. Write the equation $ax + b = c$ in terms of x.

b. Use the formula to solve $3x + 7 = 19$ and $\frac{1}{2}x - 1 = 5$.

10. **Make Sense and Persevere** The flag of the Bahamas includes an equilateral triangle. The perimeter of the triangle is $P = 3s$, where s is the side length. Solve for s. Use your formula to find the dimensions of the flag in feet and the area in square feet when the perimeter of the triangle is 126 inches.



11. **Error Analysis** Describe and correct the error a student made when solving $kx + 3x = 4$ for x.

$$kx + 3x = 4$$
$$kx + 3x - 3x = 4 - 3x$$
$$kx = 4 - 3x$$
$$\frac{kx}{k} = \frac{4 - 3x}{k}$$
$$x = \frac{4 - 3x}{k}$$

12. **Higher Order Thinking** Given the equation $ax + b = c$, solve for x. Describe each statement as *always*, *sometimes*, or *never* true. Explain your answer.

a. If a, b, c, are whole numbers, x is a whole number.

b. If a, b, c, are integers, x is an integer.

c. If a, b, c, are rational numbers, x is a rational number.

PRACTICE

Solve each equation for the indicated variable.

SEE EXAMPLES 1 AND 2

13. $\frac{b}{c} = a;\ c$

14. $k = a - y;\ y$

15. $dfg = h;\ f$

16. $w = \frac{x}{a - b};\ x$

17. $2x + 3y = 12;\ y$

18. $2n = 4x + 2y;\ n$

19. $abc = \frac{1}{2};\ b$

20. $y = \frac{3}{5u} + 5;\ u$

21. $8(x - a) = 2(2a - x);\ x$

22. $12(m + 3x) = 18(x - 3m);\ m$

23. $V = \frac{1}{3}\pi r^2 h;\ h$

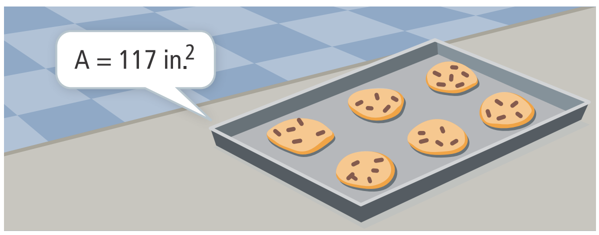
24. $V = \frac{1}{3}\pi r^2 (h - 1);\ h$

25. $y(a - b) = c(y + a);\ y$

26. $x = \frac{3(y - b)}{m};\ y$

27. $F = -\frac{Gm}{r^2};\ G$

28. Use the area formula $A = \ell w$ to write a formula for the length ℓ of the baking sheet shown.
SEE EXAMPLE 3



29. You can determine the approximate temperature in degrees Fahrenheit by counting the number of times a cricket chirps in one minute. Then multiply that by 7, divide by 30, and add 40. SEE EXAMPLE 4

a. Write a formula for estimating the temperature based on the number of cricket chirps.

b. Write a new formula for the number of chirps you would expect in one minute at a given Fahrenheit temperature.

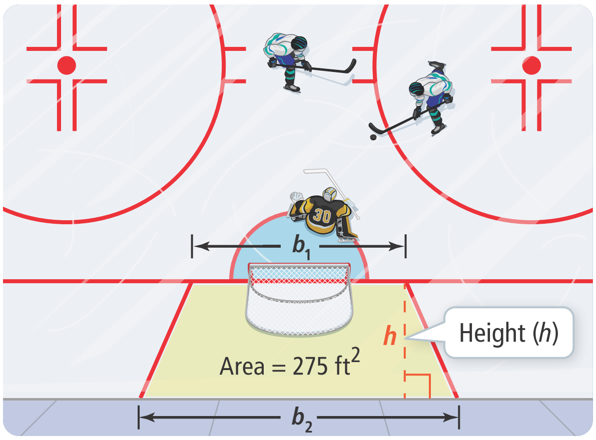
c. Use the formula to find the number of chirps in one minute when the temperature is 89°F.

PRACTICE & PROBLEM SOLVING

APPLY

30. Model With Mathematics Water boils at different temperatures at different elevations. The boiling temperature of water is 212°F at sea level (0 ft) but drops about 1.72°F for every 1,000 feet of elevation. Write a formula for the boiling point at a given elevation. Then solve the formula for the elevation when the boiling point for water is 190°F.

31. Reason In the National Hockey League, the goalie may not play the puck outside the isosceles trapezoid behind the net. The formula for the area of a trapezoid is $A = \frac{1}{2}(b_1 + b_2)h$.



a. Solve the formula for either base, b_1 or b_2.

b. Use the formula to find the length of the base next to the goal given that the height of the trapezoid is 11 ft and the base farthest from the goal is 28 ft.

c. How can you find the distance d of each side of the base that extends from the goal given that the goal is 6 ft long? What is the distance?

32. Use Appropriate Tools The formula for cell D2 is shown in the spreadsheet. Use the data shown in row 3 to write a formula for cell A3.

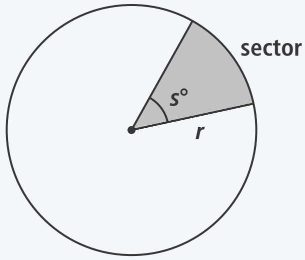
= A2*B2*C2

	A	B	C	D
1	length	width	height	volume
2	3	4	5	60
3	■	10	12	600
4	6	12	13	936

ASSESSMENT PRACTICE

33. Given the proportion $\frac{a}{b} = \frac{c}{d}$, solve for c.

34. SAT/ACT The formula for the area of a sector of a circle is $A = \frac{\pi r^2 s}{360}$. Which formula shows s expressed in terms of the other variables?



Ⓐ $s = \frac{\pi r^2 A}{360}$

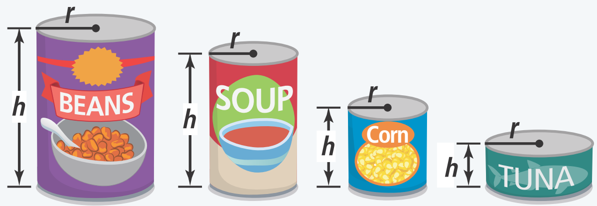
Ⓑ $s = \frac{360}{\pi r^2 A}$

Ⓒ $s = 360\pi r^2 A$

Ⓓ $s = \frac{360A}{\pi r^2}$

Ⓔ $s = \frac{A}{360\pi r^2}$

35. Performance Task A manufacturer can save money by making a can that maximizes volume and minimizes the amount of metal used. For a can with radius r and height h, this goal is reached when $2\pi r^3 = \pi r^2 h$.



Part A Solve the equation for h. How is the height related to the radius for a can that meets the manufacturer's goal?

Part B The area of a label for a can is $A = 2\pi rh$. Use your result from Part A to write a formula giving the area of a label for a can that meets the manufacturer's goals.