For help with #6 and #7, refer to Example 1 on page 323.

6. Solve and check.

a) $0.5x = 1.6 + 0.25x$

b) $\frac{1}{3}y - \frac{1}{2} = \frac{1}{6}y$

c) $7.52 + 3.2a = -6.2a$

d) $-g = 2\frac{1}{2}g - 3$

7. Solve.

a) $\frac{1}{2}n = \frac{2}{5} + \frac{1}{5}n$

b) $-0.2w - 1.1 = 0.3w$

c) $5.1 - 3.5p = -2.3p$

d) $\frac{1}{2}(1 - e) = 1\frac{1}{6}e$

e) $\frac{3}{4}(d + 2) = \frac{2}{3}d$

For help with #8 and #9, refer to Example 2 on page 324.

8. Solve and check.

a) $2.6 + 2.1k = 1.5 + 4.3k$

b) $\frac{1}{6}p - 5 = \frac{1}{2}p + 2$

c) $4.9 - 6.1u = -3.2u - 3.8$

d) $4 + \frac{3}{5}h = -1\frac{2}{5}h - 1$

9. Solve.

a) $0.25r - 0.32 = 0.45r + 0.19$

b) $15.3c + 4.3 = 16.9 - 16.2c$

c) $-\frac{7}{8}k + 2 = 1 - \frac{3}{4}k$

d) $1\frac{1}{2}p + \frac{1}{4} = 2\frac{1}{4}p - \frac{5}{2}$

For help with #10 to #12, refer to Example 3 on page 325.

10. Solve and check.

a) $2(q - 0.1) = 3(0.3 - q)$

b) $\frac{1}{2}(x + 1) = \frac{1}{3}(x - 1)$

c) $0.2(4y + 3) = 0.6(4y - 1)$

d) $\frac{2x - 1}{2} = \frac{2x + 1}{3}$

11. Solve.

a) $4(s + 1.6) = -3(s - 1.2)$

b) $6.2(2g - 3) = 4.2(2g + 3)$

c) $\frac{3}{4}(x + 2) = \frac{2}{3}(x + 3)$

d) $\frac{6m - 3}{5} = \frac{4m - 1}{3}$

12. Solve. Express each answer to the nearest hundredth.

a) $1.2c - 7.4 = 3.4c$

b) $0.59n = 3.2(4 - n)$

c) $4.38 - 0.15x = 1.15x + 2.57$

d) $-0.11(3a + 5) = 0.37(2a - 1)$

Apply

13. A jar contains 76 more pennies than nickels. The total value of the pennies equals the total value of the nickels.

a) How many nickels are there?

b) What is the total value of all the coins in the jar?

14. Atu now has \$28.50 and is saving \$8.75/week. Beth now has \$104.75 and is spending \$6.50/week from her savings. In how many weeks from now will they have the same amount of money?

**15.** The two rectangles have equal perimeters. What are the dimensions of each rectangle?

Rectangle A $1.5d - 2$

$0.7d + 1$

Rectangle B $4 - 1.3d$

$2.5 + d$
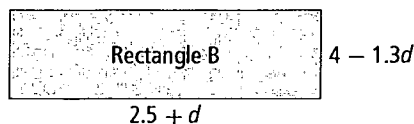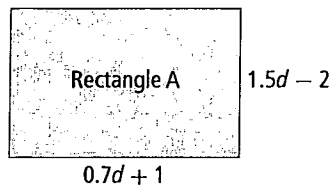
16. a) Determine the value of x so that the two triangles have equal perimeters.

$8.5 - 2x$

$7x - 0.3$

$5x + 1.1$

$6x - 0.6$

$5x + 0.2$

$9 - 0.5x$
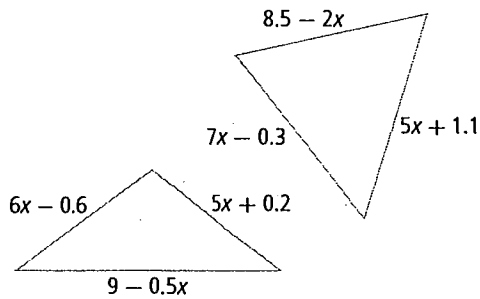
b) Check your solution by evaluating the perimeter of each triangle.

17. Sarah and Rachel are sisters. They leave a park at the same time on their bicycles and ride home along the same bicycle path. Sarah is in a hurry, so she cycles at 15 km/h. Rachel has time to spare, so she cycles at 11 km/h. Sarah gets home 12 min before Rachel. How long did Sarah take to ride home from the park?

18. The two rectangles have equal areas. Determine the area of each rectangle.

$2p + 3$

3.8

2.4

$6 - p$
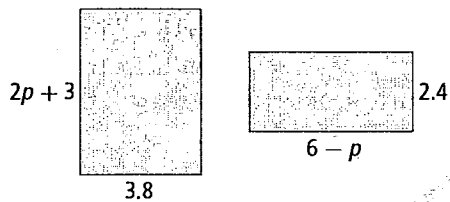
19. Elda walked from her home to her friend Niabi's house at 4.5 km/h. When Elda returned home along the same route, she strolled at 3.5 km/h. Elda took a total of 40 min to walk to Niabi's house and back again.

a) How many minutes did Elda take to walk from her home to Niabi's house?

b) How far is it from Elda's home to Niabi's house?

20. Alan's height is $\frac{4}{5}$ of his father's height. Alan's older brother, Ben, is 6 cm taller than Alan. Ben's height is $\frac{5}{6}$ of their father's height. How tall is their father?

21. Members of a cinema club pay $10 to see a movie instead of paying the regular price of $12.50. Annual membership in the club costs $30. What is the least number of movies you would need to see in a year in order to save money by buying a membership?

22. In still water, Jana's motorboat cruises at 16.5 km/h. On the river, the boat travels faster downstream than upstream, because of the current. The boat takes 5 h for a trip upstream, but only 2 h to cover the same distance on the return trip downstream. Determine the speed of the current.

7. Choose which equations are equivalent to $2(x + 3) = 8x$. Justify your choices.
   a) $x + 3 = 6x$
   b) $x + 3 = 16x$
   c) $x + 3 = 4x$
   d) $-6x = -6$
   e) $2x + 6 = 8x$
   f) $x = 1$

8. A square has sides of length $2k - 1$ units. An equilateral triangle has sides of length $k + 2$ units. The square and the triangle have the same perimeter. What is the value of k?

9. Solve each equation. Verify each solution.
   a) $3(x - 5) = 6$
   b) $-5 = 5(3 + 2d)$
   c) $-3(5 - 6m) = 39$
   d) $2(x - 0.2) = 3x - 1.4$
   e) $0.3(c + 5) = 0.4(1 - 2c)$
   f) $0.04(x - 0.2) = -0.03(2x + 0.6)$

10. **Multiple choice.** A number, n, after being decreased by 5, is equal to 3 times the number plus another 1. Determine the number.
    A. 4.5
    B. -4
    C. 3.5
    D. -3

11. **Multiple choice.** The perimeter of a rectangle is 36 cm. The width is 5 cm less than the length. Determine the dimensions of the rectangle.
    A. 11.5 cm by 6.5 cm
    B. 12 cm by 6 cm
    C. 10.25 cm by 5.25 cm
    D. 20.5 cm by 15.5 cm

12. **Multiple choice.** George is three times as old as Sam. Five years from now, the sum of their ages will be 46. How old is George now?
    A. 20
    B. 30
    C. 9
    D. 27

13. Express each equation with integer coefficients and constants.
    a) $\frac{3x}{4} + \frac{2}{3} = 2$
    b) $\frac{1}{2} - \frac{x}{3} = \frac{1}{3}$
    c) $\frac{2}{3} = 5 + x$
    d) $\frac{x - 5}{4} + 1 = \frac{1}{2}$
    e) $-16 = \frac{x}{5} + \frac{x}{3}$
    f) $\frac{-2}{5}(x - 8) = 4$

14. Solve each equation. Verify each solution.
    a) $\frac{x}{3} = 2$
    b) $\frac{d}{4} + 3 = 2$
    c) $\frac{x}{2} + \frac{x}{3} = 10$
    d) $\frac{c}{3} - \frac{c}{4} = 3$
    e) $\frac{3k}{5} - 6 = \frac{k}{3}$
    f) $\frac{2x + 1}{3} = 5$

15. True or false? $q + 5 = 6$ is an equivalent equation to

$\frac{1}{3}\left(q + \frac{3}{5}\right) = \frac{8}{15}$. Justify your choice.

16. Write and solve an equation for each situation.
    a) Eli takes 4 h to paint a room, while Mia takes 3 h to paint a room. How long would it take them to paint the room together?
    b) Amir can put together a puzzle in 30 min, while Bob takes twice that long. How long will it take them to do it together?
    c) A jet leaves Toronto for Vancouver, travelling at 600 km/h. At the same time, a jet leaves Vancouver for Toronto, travelling at 800 km/h. It is 3500 km from Toronto to Vancouver. How long after their departure will the jets pass each other?

17. a) Verify that $x = 2$ is a solution to
    $$\frac{10 - 6x}{2} = 5 - 3x$$

    b) Verify that $x = -5$ is a solution to
    $$\frac{10 - 6x}{2} = 5 - 3x$$

    c) Graph $y = \frac{10 - 6x}{2}$
    and $y = 5 - 3x$
    on the same axes. What do you notice?

    d) What is the solution to the equation?

Closing

18. How can you convince someone that there are several ways to solve $\frac{1}{2}x + \frac{3}{4} = x - \frac{1}{2}$.

Extending

19. Solve each equation for the variable shown in red.
    a) $x + y = 100$
    b) $P = 2l + 2w$
    c) $I = prt$
    d) $ax + by = c$
    e) $A(Bx - C) = D$
    f) $s = 2\pi rh + 2\pi r^2$

20. Explain how to solve $A = \frac{1}{2}(b_1 + b_2)h$ for h.

21. Solve.
    a) $\frac{3}{2x} + 1 = \frac{2}{x}$
    b) $\frac{3}{4x} = \frac{1}{x + 1}$

Reading Strategy

Evaluating

Prepare your arguments for every possible solution.