

Practice 2-5

Equations and Problem Solving

Write and solve an equation for each situation.

- A passenger train's speed is 60 mi/h, and a freight train's speed is 40 mi/h. The passenger train travels the same distance in 1.5 h less time than the freight train. How long does each train take to make the trip?
- Lois rode her bike to visit a friend. She traveled at 10 mi/h. While she was there, it began to rain. Her friend drove her home in a car traveling at 25 mi/h. Lois took 1.5 h longer to go to her friend's than to return home. How many hours did it take Lois to ride to her friend's house?
- May rides her bike the same distance that Leah walks. May rides her bike 10 km/h faster than Leah walks. If it takes May 1 h and Leah 3 h to travel that distance, how fast does each travel?
- The length of a rectangle is 4 in. greater than the width. The perimeter of the rectangle is 24 in. Find the dimensions of the rectangle.
- The length of a rectangle is twice the width. The perimeter is 48 in. Find the dimensions of the rectangle.
- At 10:00 A.M., a car leaves a house at a rate of 60 mi/h. At the same time, another car leaves the same house at a rate of 50 mi/h in the opposite direction. At what time will the cars be 330 miles apart?
- Maria begins walking at 3 mi/h toward the library. Her friend meets her at the halfway point and drives her the rest of the way to the library. The distance to the library is 4 miles. How many hours did Maria walk?
- Fred begins walking toward John's house at 3 mi/h. John leaves his house at the same time and walks toward Fred's house on the same path at a rate of 2 mi/h. How long will it be before they meet if the distance between the houses is 4 miles?
- A train leaves the station at 6:00 P.M., traveling west at 80 mi/h. On a parallel track, a second train leaves the station 3 hours later traveling west at 100 mi/h. At what time will the second train catch up with the first?
- It takes 1 hour longer to fly to St. Paul at 200 mi/h than it does to return at 250 mi/h. How far away is St. Paul?
- Find three consecutive integers whose sum is 126.
- The sum of four consecutive odd integers is 216. Find the four integers.
- A rectangular picture frame is to be 8 in. longer than it is wide. Dennis uses 84 in. of oak to frame the picture. What is the width of the frame?
- Each of two congruent sides of an isosceles triangle is 8 in. less than twice the base. The perimeter of the triangle is 74 in. What is the length of the base?

Practice 2-6

Formulas

Solve each formula in terms of the given variable.

- $ad = f; a$
 - $n + 3 = q; n$
 - $2(j + k) = m; k$
 - $2s + t = r; t$
 - $m + 2n = p; n$
 - $\frac{7}{9}w = \frac{5}{3}; w$
 - $5a - b = 7; a$
 - $h = \frac{P}{R}; P$
 - $5d - 2g = 9; g$
 - $x + 3y = 2; x$
 - $y = mx + b; x$
 - $Y = \ell wh; \ell$
- The formula $A = 2h(\ell + w)$ gives the lateral area A of a rectangular solid with length ℓ , width w , and height h .
- Solve this formula for h .
 - Solve this formula for ℓ .
 - Solve this formula for w .
 - Find h if $A = 37.4 \text{ ft}^2$, $\ell = 4.3 \text{ ft}$, and $w = 6.7 \text{ ft}$.
 - Find ℓ if $A = 9338 \text{ m}^2$, $h = 29 \text{ m}$, and $w = 52 \text{ m}$.
- The formula $P = \frac{F}{A}$ gives the pressure P for a force F and an area A .
- Solve this formula for A .
 - Find A if $P = 14.8 \text{ lb/in.}^2$ and $F = 2960 \text{ lb}$.
 - Solve this formula for F .
 - Find F if $P = 240 \text{ lb/in.}^2$ and $A = 20 \text{ in.}^2$.
 - Find A if $P = 46.8 \text{ lb/in.}^2$ and $F = 2340 \text{ lb}$.
 - Find F if $P = 24.5 \text{ lb/in.}^2$ and $A = 33.8 \text{ in.}^2$.
- Solve each formula in terms of the given variable.
- $3n - t = s; t$
 - $\frac{b + 3}{\ell} = \frac{f}{e}; e$
 - $27. w = 2xyz; y$
 - $28. k = 3mh + 3; h$
 - $ab = 6 + cd; a$
 - $2a + 4b = d; b$
 - $31. 4xy + 3 = 5z; y$
 - $32. -2(3a - b) = c; b$
 - Solve this formula for w .
 - Find w if $V = 64 \text{ m}^3$, $\ell = 6 \text{ m}$, and $h = 4 \text{ m}$.
 - Solve this formula for h .
 - Find h if $V = 30.45 \text{ ft}^3$, $\ell = 6.3 \text{ ft}$, and $w = 2.5 \text{ ft}$.
 - Find w if $V = 2346 \text{ in.}^3$, $\ell = 17 \text{ in.}$, and $h = 18 \text{ in.}$
 - Find h if $V = 7 \text{ ft}^3$, $\ell = \frac{7}{4} \text{ ft}$, and $w = \frac{3}{4} \text{ ft}$.
- Solve each formula in terms of the given variable.
- $2m - 3p = 1; p$
 - $40. a = b + cd; b$
 - $41. a + b = 2xz; z$
 - $42. x = 2y + 3z; y$
 - $\frac{a}{b} = \frac{c}{d}; d$
 - $44. 2ab + 4 = d; a$
 - $45. \frac{2}{3} = \frac{1}{2}(b - c); b$
 - $46. d(a - b) = c; a$

Practice 1-8

Properties of Real Numbers

Name the property that each equation illustrates.

- $83 + 6 = 6 + 83$
- $8 + x = x + 8$
- $1 \cdot 4y = 4y$
- $15x + 15y = 15(x + y)$
- $(8 \cdot 7) \cdot 6 = 8 \cdot (7 \cdot 6)$
- $\frac{2}{3}(\frac{3}{2}) = 1$
- $3(a + 2b) = 3a + 6b$
- $7x + 2y = 2y + 7x$
- $7 + (8 + 15) = (7 + 8) + 15$
- $x + y = y + x$
- $x + (-x) = 0$
- $16 + 0 = 16$
- $7(3 + 4y) = 21 + 28y$
- $3w + 5y = 5y + 3w$
- $4a + (5b + 6c) = (4a + 5b) + 6c$
- $wr = rw$
- $16 \cdot 0 = 30 \cdot 0$
- $ab + c = ba + c$
- $20(a + b) = 20(b + a)$

Give a reason to justify each step.

- $4c + 3(2 + c) = 4c + 6 + 3c$
 - $= 4c + 3c + 6$
 - $= (4c + 3c) + 6$
 - $= (4 + 3)c + 6$
 - $= 7c + 6$
- $8w - 4(7 - w) = 8w - 28 + 4w$
 - $= 8w + (-28) + 4w$
 - $= 8w + 4w + (-28)$
 - $= (8 + 4)w + (-28)$
 - $= 12w + (-28)$
 - $= 12w - 28$

Use mental math to simplify each expression.

- $48 + 27 + 2 + 3$
- $10 \cdot 8 \cdot 3 \cdot 10$
- $10 \cdot 72 \cdot 5 \cdot 2$
- $8\frac{1}{2} + 4\frac{1}{3} + 2\frac{1}{2} + 2\frac{2}{3}$
- Henry bought an apple for \$0.75, some apricots for \$1.50, some cherries for \$3.25, and three bananas for \$1.50. Find the total cost of the fruit.
- Suppose you buy some camping supplies. You purchase waterproof matches for \$3.95, a compass for \$18.25, flashlight batteries for \$3.75, and a map for \$2.05. Find the total cost of the supplies.
- You go to the video store and rent some DVDs for \$8.50 and a video game for \$3.69. While there, you buy a box of popcorn for \$2.31 and a candy bar for \$1.50. Find the total cost of the items.

© Pearson Education, Inc. All rights reserved.

Practice 2-4

Equations with Variables on Both Sides

Solve each equation. Check your answer. If appropriate, write identity or no solution.

- $7 - 2n = n - 14$
- $2(4 - 2x) = -2(x + 5)$
- $3d + 8 = 2d - 7$
- $6t = 3(t + 4) - t$
- $8z - 7 = 3z - 7 + 5z$
- $7x - 8 = 3x + 12$
- $3(n - 1) = 5n + 3 - 2n$
- $2(6 - 4d) = 25 - 9d$
- $9 \cdot 4s - 12 = -5s + 51$
- $8(2f - 3) = 4(4f - 8)$
- $6k - 25 = 7 - 2k$
- $12 \cdot 3v - 9 = 7 + 2v - v$
- $4(b - 1) = -4 + 4b$
- $6k - 25 = 7 - 2k$
- $6 - 4d = 16 - 9d$
- $\frac{2}{3}a - \frac{3}{4} = \frac{3}{4}a$
- $14 \cdot \frac{1}{4}x + \frac{1}{2} = \frac{1}{4}x - \frac{1}{2}$
- $15 \cdot 6 - 4d = 16 - 9d$
- $4 \cdot 3y - 6 = 8 + 2 \cdot 3y$
- $2a - 12 + 2s = 4s - 12$
- $18 \cdot 3 \cdot 6y = 5 \cdot 4 + 3 \cdot 3y$
- $6y + 9 = 3(2y + 3)$
- $4b - 1 = -4 + 4b + 3$
- $21 \cdot \frac{2}{3}(6x + 3) = 4x + 2$
- $6 - 3d = 5(2 - d)$
- $6 \cdot 1h = 9 \cdot 3 - 3 \cdot 2h$
- $24 \cdot 2(n + 2) = 5n - 5$
- $3 \cdot 3v + 8 = 8 + 2v + v$
- $3 \cdot \frac{2}{3}d - \frac{3}{4} = \frac{3}{4}d$
- $29 \cdot \frac{3}{4}c - \frac{5}{6} = \frac{2}{3}c$
- $30 \cdot 3v + 8 = 8 + 2v + v$
- $5(r + 3) = 2r + 6$
- $33 \cdot 8 - 3(p - 4) = 2p$

Write an equation to model each situation. Then solve. Check your answer.

- Hans needs to rent a moving truck. Suppose Company A charges a rate of \$40 per day and Company B charges a \$60 fee plus \$20 per day. For what number of days is the cost the same?
- Suppose a video store charges nonmembers \$4 to rent each video. A store membership costs \$21 and members pay only \$2.50 to rent each video. For what number of videos is the cost the same?
- Suppose your club is selling candles to raise money. It costs \$100 to rent a booth from which to sell the candles. If the candles cost your club \$1 each and are sold for \$5 each, how many candles must be sold to equal your expenses?

Find the value of x.

37. $4x - 21 = 5x - 31$

38. $\frac{1}{4}x + 3 = \frac{3}{2}x - 7$

39. $1.15 + 0.85x = 2.3 - 1.5x$

© Pearson Education, Inc. All rights reserved.