

2.1

Exercise Set

Solve.

1. $4x + 5 = 21$

2. $2y - 1 = 3$

3. $4x + 3 = 0$

4. $3x - 16 = 0$

5. $3 - x = 12$

6. $4 - x = -5$

7. $8 = 5x - 3$

8. $9 = 4x - 8$

9. $y + 1 = 2y - 7$

10. $5 - 4x = x - 13$

11. $2x + 7 = x + 3$

12. $5x - 4 = 2x + 5$

13. $3x - 5 = 2x + 1$

14. $4x + 3 = 2x - 7$

15. $4x - 5 = 7x - 2$

16. $5x + 1 = 9x - 7$

17. $5x - 2 + 3x = 2x + 6 - 4x$

18. $5x - 17 - 2x = 6x - 1 - x$

19. $7(3x + 6) = 11 - (x + 2)$

20. $4(5y + 3) = 3(2y - 5)$

21. $3(x + 1) = 5 - 2(3x + 4)$

22. $4(3x + 2) - 7 = 3(x - 2)$

23. $2(x - 4) = 3 - 5(2x + 1)$

24. $3(2x - 5) + 4 = 2(4x + 3)$

25. **Hybrid Vehicles.** Each year more Americans purchase vehicles with environmentally friendly gasoline-electric hybrid engines. In 2003 U.S. hybrid registrations rose to 43,435. This was a 25.8% increase over the number registered in 2002. (Source: R.L. Polk & Co.) How many hybrid vehicles were registered in the U.S. in 2002?



26. **Where the Textbook Dollar Goes.** Of each dollar spent on textbooks at college bookstores, 23.2 cents goes to the college store for profit, store operations, and personnel. On average, a college student spends \$501 per year for textbooks. (Source: National Association of College Stores) How much of this expenditure goes to the college store?
27. **U.S. Album Sales.** Sales of 158.0 million music albums were recorded in the U.S. in the first quarter of 2004 while 144.7 million albums were sold in the same period in 2003. (Source: Nielsen SoundScan) What was the percent of increase in U.S. album sales from 2003 to 2004?



28. **The DVD Boom.** The success of the DVD is making a large impact on the movie industry. Americans spent \$4.8 billion to buy and rent DVDs and videocassettes between January and mid-March in 2004. This was \$3.02 billion more than was spent at the box office. (Source: *The New York Times*, April 20, 2004) How much was spent at the box office during this period of time?
29. **High-Speed Internet Access.** In 2003 the number of U.S. households with broadband Internet access

was projected to be 54.8 million in 2006. This is 25.6 million more households than in 2003. (Source: Forrester Research) How many U.S. households had broadband Internet access in 2003?



30. **Fast-Food Nutrition Information.** Together, a Big Mac and an order of Super-Size fries at McDonald's contain 1200 calories. The fries contain 20 calories more than the Big Mac. (Source: *American Journal of Public Health*, February 2002) How many calories are in each?
31. **Nutrition.** A slice of carrot cake from the popular restaurant The Cheesecake Factory contains 1560 calories. This is three-fourths of the average daily calorie requirement for many adults. (Source: The Center for Science in the Public Interest) Find the average daily calorie requirement for these adults.
32. **Television Viewers.** Television's most popular series finale of all time, the last episode of "M*A*S*H," was seen by twice as many viewers as the series finale of "Friends." Together, the two finales had 157.5 million viewers. (Source: Nielsen Media Research) How many viewers watched each finale?
33. **Amount Borrowed.** Tamisha borrowed money from her father at 5% simple interest to help pay her tuition at Wellington Community College. At the end of 1 yr, she owed a total of \$1365 in principal and interest. How much did she borrow?
34. **Amount of an Investment.** Khalid makes an investment at 4% simple interest. At the end of 1 yr, the total value of the investment is \$1560. How much was originally invested?

35. **Sales Commission.** Ryan, a consumer electronics salesperson, earns a base salary of \$1500 per month and a commission of 8% on the amount of sales he makes. One month Ryan received a \$2284 paycheck. Find the amount of his sales for the month.
36. **Commission vs. Salary.** Juliet has a choice between receiving an \$1800 monthly salary from Pearson's Furniture or a base salary of \$1600 and a 4% commission on the amount of furniture she sells during the month. For what amount of sales will the two choices be equal?
37. **Cab Fare.** City Cabs charges a \$1.75 pickup fee and \$1.50 per mile traveled. Diego's fare for a cross-town cab ride is \$19.75. How far did he travel in the cab?
38. **Hourly Wage.** Soledad worked 48 hr one week and earned a \$442 paycheck. She earns time and a half (1.5 times her regular hourly wage) for the hours she works in excess of 40. What is Soledad's regular hourly wage?



39. **Angle Measure.** In triangle ABC , angle B is five times as large as angle A . The measure of angle C is 2° less than that of angle A . Find the measures of the angles. (Hint: The sum of the angle measures is 180° .)
40. **Angle Measure.** In triangle ABC , angle B is twice as large as angle A . Angle C measures 20° more than angle A . Find the measures of the angles.
41. **Test Plot Dimensions.** Morgan's Seeds has a rectangular test plot with a perimeter of 322 m.

The length is 25 m more than the width. Find the dimensions of the plot.



42. **Garden Dimensions.** The children at Tiny Tots Day Care plant a rectangular vegetable garden with a perimeter of 39 m. The length is twice the width. Find the dimensions of the garden.
43. **Soccer Field Dimensions.** The width of the soccer field recommended for players under the age of 12 is 35 yd less than the length. The perimeter of the field is 330 yd. (Source: U.S. Youth Soccer) Find the dimensions of the field.
44. **Poster Dimensions.** Marissa is designing a poster to promote the Talbot Street Art Fair. The width of the poster will be two-thirds of its height and its perimeter will be 100 in. Find the dimensions of the poster.
45. **Water Weight.** Water accounts for 50% of a woman's weight (Source: National Institute for Fitness and Sport). Kimiko weighs 135 lb. How much of her body weight is water?
46. **Water Weight.** Water accounts for 60% of a man's weight (Source: National Institute for Fitness and Sport). Emilio weighs 186 lb. How much of his body weight is water?
47. **Train Speeds.** The speed of an Amtrak passenger train is 14 mph faster than the speed of a Central Railway freight train. The passenger train travels 400 mi in the same time it takes the freight train to travel 330 mi. Find the speed of each train.
48. **Distance Traveled.** A private airplane leaves Midway Airport and flies due east at a speed of 180 km/h. Two hours later, a jet leaves Midway and flies due east at a speed of 900 km/h. How far from the airport will the jet overtake the private plane?
49. **Traveling Upstream.** A kayak moves at a rate of 12 mph in still water. If the river's current flows at a rate of 4 mph, how long does it take the boat to travel 36 mi upstream?

50. **Flying into a Headwind.** An airplane that travels 450 mph in still air encounters a 30-mph headwind. How long will it take the plane to travel 1050 mi into the wind?
51. **Flying with a Tailwind.** An airplane that can travel 375 mph in still air is flying with a 25-mph tailwind. How long will it take the plane to travel 700 mi with the wind?
52. **Traveling Downstream.** Angelo's kayak travels 14 km/h in still water. If the river's current flows at a rate of 2 km/h, how long will it take him to travel 20 km downstream?



53. **Investment Income.** Erica invested a total of \$5000, part at 3% simple interest and part at 4% simple interest. At the end of 1 yr, the investments had earned \$176 interest. How much was invested at each rate?
54. **Student Loans.** Dimitri's two student loans total \$9000. One loan is at 5% simple interest and the other is at 6% simple interest. At the end of 1 yr, Dimitri owes \$492 in interest. What is the amount of each loan?
55. **NCAA Violations.** Colleges and universities are responsible for self-reporting their secondary violations to the National Collegiate Athletic Association. (Most secondary violations are honest mistakes for which there is rarely a penalty.) One year, Division I and Division II schools together reported 1989 secondary violations. Division I schools reported about 6.5 times as many secondary violations as Division II schools. (Source: NCAA) How many secondary violations did each division report?

56. **Working Pharmacists.** It is estimated that there will be 224,500 working pharmacists in the United States in 2010. This is about 1.84 times the number of working pharmacists in 1975. (Source: U.S. Department of Health and Human Services) Find the number of working pharmacists in the United States in 1975.



57. **Instant Messenger Services.** AOL's Instant Messenger Service and Microsoft's MSN Messenger Service had a total of 81.9 million users in a recent month. AOL had 23.1 million more users than Microsoft. (Source: ComScore Media Matrix) How many users did each service have?



58. **Vanity Plates.** More vanity plates (automobile license plates personalized by the owner) are issued

in Florida than in any other state. A total of 1,017,866 vanity plates were sold in Florida in a recent year. These plates accounted for 5.6% of all plates sold in Florida. (Source: *The Fredericksburg, VA Free Lance-Star*) How many license plates in all were sold in Florida?

59. **Erosion.** Because of erosion, Horseshoe Falls, one of the two falls that make up Niagara Falls, is migrating upstream at a rate of 2 ft per year (Source: *Indianapolis Star*, February 14, 1999). At this rate, how long will it take the falls to move one-fourth mile?



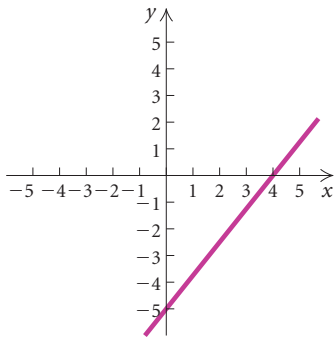
60. **Volcanic Activity.** A volcano that is currently about one-half mile below the surface of the Pacific Ocean near the Big Island of Hawaii will eventually become a new Hawaiian island, Loihi. The volcano will break the surface of the ocean in about 50,000 yr. (Source: U.S. Geological Survey) On average, how many inches does the volcano rise in a year?

Find the zero of the linear function.

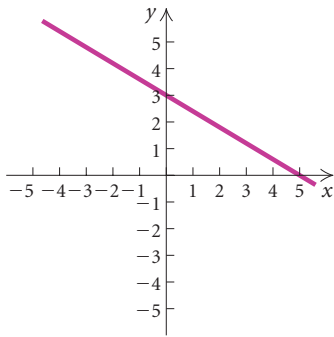
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|----------------------|-----------------------|
| 61. $f(x) = x + 5$ | 62. $f(x) = 5x + 20$ |
| 63. $f(x) = -x + 18$ | 64. $f(x) = 8 + x$ |
| 65. $f(x) = 16 - x$ | 66. $f(x) = -2x + 7$ |
| 67. $f(x) = x + 12$ | 68. $f(x) = 8x + 2$ |
| 69. $f(x) = -x + 6$ | 70. $f(x) = 4 + x$ |
| 71. $f(x) = 20 - x$ | 72. $f(x) = -3x + 13$ |
| 73. $f(x) = x - 6$ | 74. $f(x) = 3x - 9$ |
| 75. $f(x) = -x + 15$ | 76. $f(x) = 4 - x$ |

In Exercises 77–82, use the given graph to find each of the following: (a) the x -intercept and (b) the zero of the function.

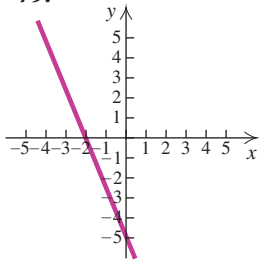
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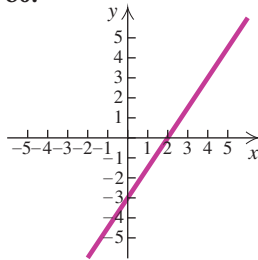
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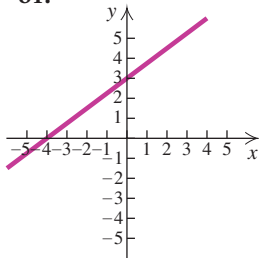
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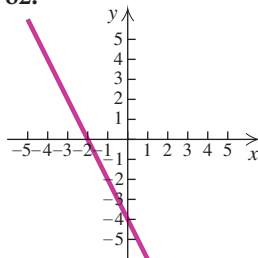
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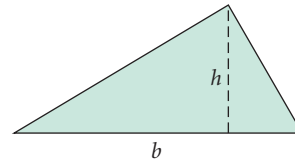


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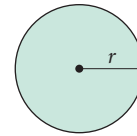


Solve.

83. $A = \frac{1}{2}bh$, for b
(Area of a triangle)



84. $A = \pi r^2$, for π
(Area of a circle)



85. $P = 2l + 2w$, for w
(Perimeter of a rectangle)

86. $A = P + Prt$, for r
(Simple interest)

87. $A = \frac{1}{2}h(b_1 + b_2)$, for h
(Area of a trapezoid)

88. $A = \frac{1}{2}h(b_1 + b_2)$, for b_2

89. $V = \frac{4}{3}\pi r^3$, for π
(Volume of a sphere)

90. $V = \frac{4}{3}\pi r^3$, for r^3

91. $F = \frac{9}{5}C + 32$, for C
(Temperature conversion)

92. $Ax + By = C$, for y
(Standard linear equation)

93. $Ax + By = C$, for A

94. $2w + 2h + l = p$, for w

95. $2w + 2h + l = p$, for h

96. $3x + 4y = 12$, for y

97. $2x - 3y = 6$, for y

98. $T = \frac{3}{10}(I - 12,000)$, for I

99. $a = b + bcd$, for b

100. $q = p - np$, for p