2.1 EXERCISES

PRACTICE

Solve the following linear equations. See Examples 1 and 2.

1. $-3(2t-4)=7(1-t)$
2. $5(2x-1)=3(1-x)+5x$
3. $\frac{y+5}{4}=\frac{1-5y}{6}$
4. $3x+5=3(x+3)-4$
5. $3w+5=2(w+3)-4$
6. $3x+5=3(x+3)-5$
7. $\frac{4s-3}{2}+\frac{7}{4}=\frac{8s+1}{4}$
8. $\frac{4x-3}{2}+\frac{3}{8}=\frac{7x+3}{4}$
9. $\frac{4z-3}{2}+\frac{3}{8}=\frac{8z+3}{4}$
10. $3(2w+13)=5w+w\left(7-\frac{3}{w}\right)$
11. $\frac{6}{7}(m-4)-\frac{11}{7}=1$
12. $0.08p+0.09=0.65$
13. $0.6x+0.08=2.3$
14. $0.9x+0.5=1.3x$
15. $0.73x+0.42(x-2)=0.35x$
16. $\frac{8y-2}{4}+\frac{6}{8}=\frac{16y+2}{8}$
17. $\frac{3}{7}(y-2)-\frac{14}{7}=-5$
18. $6(5w-5)=-31(3-w)$
19. $\frac{7x-5}{4}+\frac{14}{8}=\frac{14x+4}{8}$
20. $\frac{3}{11}(y-2)-\frac{33}{11}=-6$
21. $3z+3=3(z+4)-9$
22. $4y+9=4(y+4)-10$
23. $2.8x+1.2=3.2x$
24. $0.73z+0.34=9.1$
25. $0.24x+0.58(x-6)=0.82x-3.67$

Solve the following absolute value equations. See Example 3.

26. $|3x-2|=5$
27. $-|3y+5|+6=2$
28. $|4x+3|+2=0$
29. $|6x-2|=0$
30. $|-8x+2|=14$
31. $|2x-109|=731$
32. $|4x-4|-40=0$
33. $|5x-3|=7$
34. $|4x+15|=3$
35. $-|6x+1|=11$
36. $|-14y+3|+3=2$
37. $|3x-2|-1=|5-x|$

Solve the following absolute value equations geometrically and algebraically. See Figure 1.

38. $|x+3|=|x-7|$
39. $|x-3|-|x-7|=0$
40. $|2-x|=|2+x|$
41. $|x|=|x+1|$
42. $|x+97|=|x+101|$
43. $\left|x+\frac{1}{4}\right|=\left|x-\frac{3}{4}\right|$
44. $|z-51|-|z-5|=0$
45. $\left|x-\frac{5}{7}\right|=\left|x+\frac{3}{7}\right|$
46. $|6y-3|=|5y+5|$

Solve each of the following equations for the indicated variable. See Example 4.

47. Circumference of a circle: $C = 2\pi r$; solve for r

48. Ideal Gas Law: $PV = nRT$; solve for T

49. Velocity: $v^2 = v_0^{\,2} + 2ax$; solve for a

50. Area of a trapezoid: $A = \frac{1}{2}h(b+c)$; solve for h

51. Temperature conversions: $C = \frac{5}{9}(F-32)$; solve for F

52. Volume of a right circular cone: $V = \frac{1}{3}\pi r^2 h$; solve for h

53. Surface area of a rectangular prism: $A = 2lw + 2wh + 2hl$; solve for h

54. Distance: $d = rt_1 + rt_2$; solve for r

55. Kinetic energy of protons: $K = \frac{1}{2}mv^2$; solve for m

56. Finance: $A = P(1+rt)$; solve for t

APPLICATIONS

57. A riverboat leaves port and proceeds to travel downstream at an average speed of 15 miles per hour. How long will it take for the boat to arrive at the next port, 95 miles downstream?

58. Two trucks leave a warehouse at the same time. One travels due east at an average speed of 45 miles per hour, and the other travels due west at an average speed of 55 miles per hour. After how many hours will they be 450 miles apart?

59. Two cars leave a rest stop at the same time and proceed to travel down the highway in the same direction. One travels at an average rate of 62 miles per hour, and the other at an average rate of 59 miles per hour. How far apart are the two cars after four and a half hours?

60. Two trains are 630 miles apart, heading directly toward each other on parallel tracks. The first train is traveling at 95 mph, and the second train is traveling at 85 mph. How long will it be before the trains pass each other?

61. Two brothers, Rick and Tom, each inherit $10,000. Rick invests his inheritance in a savings account with an annual return of 2.25%, while Tom invests his in a CD paying 6.15% annually. How much more money does Tom have than Rick after 1 year?

62. Sarah, sister to Rick and Tom in the previous problem, also inherits $10,000, but she invests her inheritance in a global technology mutual fund. At the end of 1 year, her investment is worth $12,800. What has her effective annual rate of return been?

63. An industrial acid-etching procedure calls for 3 gallons of a 46% hydrofluoric acid solution, but the supplier currently only has 44% solution and 50% solution. How many gallons of each should be mixed for the procedure?

64. An agricultural stress test calls for soaking seeds in 8% saline solution. The scientist running the test wants to make use of 1 liter of 20% saline solution that is already made up. How much pure water should she add to the 20% solution to obtain an 8% solution?

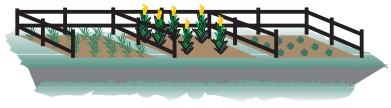
65. A total of 39 tickets were sold for a puppet show, with child tickets selling for \$7.50 and adult tickets selling for \$10.00. The ticket sales raised \$330.00 in all. How many child tickets and how many adult tickets were sold?

66. Joe's Java Joint wants to make a blend of two coffees that can be sold for \$15 per pound. The first of the two types of coffee costs \$18 per pound, while the second costs \$13 per pound. How many pounds of each should be mixed to get 10 pounds of the desired blend?

67. Bob buys a large screen digital TV priced at \$9500, but pays \$10,212.50 with tax. What is the rate of tax where Bob lives?

68. Will and Matt are brothers. Will is 6 feet, 4 inches tall, and Matt is 6 feet, 7 inches tall. How tall is Will as a percentage of Matt's height? How tall is Matt as a percentage of Will's height?

69. A farmer wants to fence in three square garden plots situated along a road, as shown, and he decides not to install fencing along the edge of the road. If he has 182 feet of fencing material total, what dimensions should he make each square plot?



70. Find three consecutive integers whose sum is 288. (**Hint:** If n represents the smallest of the three, then $n+1$ and $n+2$ represent the other two numbers.)

71. Find three consecutive odd integers whose sum is 165. (**Hint:** If n represents the smallest of the three, then $n+2$ and $n+4$ represent the other two numbers.)

72. Kathy buys last year's best-selling novel, in hardcover, for \$15.05. This is a 30% discount from the original price. What was the original price?

73. The highest point on Earth is the peak of Mount Everest. If you climbed to the top, you would be approximately 29,035 feet above sea level. Remembering that a mile is 5280 feet, what percentage of the height of the mountain would you have to climb to reach a point two miles above sea level?

TECHNOLOGY

Use a graphing utility to solve the following equations. Round your answers to two decimal places if necessary.

74. $453x = 95(34x + 291)$

75. $-0.23 = 0.79x - 0.47(x + 0.98)$

76. $254 + 0.98(x - 124) = 0$

77. $323x - 1745 = 531(68x - 887)$