



Lesson Check

Do you know HOW?

Solve each equation. Check your answer.

1. $5x + 12 = -13$

2. $6 = \frac{m}{7} - 3$

3. $\frac{y-1}{4} = -2$

4. $-x - 4 = 9$

5. **Fundraising** The junior class is selling granola bars to raise money. They purchased 1250 granola bars and paid a delivery fee of \$25. The total cost, including the delivery fee, was \$800. What was the cost of each granola bar?

Do you UNDERSTAND? MATHEMATICAL PRACTICES

What properties of equality would you use to solve each equation? What operation would you perform first? Explain.

6. $-8 = \frac{s}{4} + 3$

7. $2x - 9 = 7$

8. $\frac{x}{3} - 8 = 4$

9. $-4x + 3 = -5$

10. **Reasoning** Can you solve the equation $\frac{d-3}{5} = 6$ by adding 3 before multiplying by 5? Explain.



Practice and Problem-Solving Exercises



A Practice

Solve each equation. Check your answer.

11. $2 + \frac{a}{4} = -1$

12. $3n - 4 = 11$

13. $-1 = 7 + 8x$

14. $\frac{y}{5} + 2 = -8$

15. $4b + 6 = -2$

16. $10 = \frac{x}{4} - 8$

17. $10 + \frac{h}{3} = 1$

18. $-14 = -5 + 3c$

19. $26 = \frac{m}{6} + 5$

20. $\frac{a}{5} - 18 = 2$

21. $-5x - 2 = 13$

22. $14 = -2k + 3$

Define a variable and write an equation for each situation. Then solve.

23. **Maximum Capacity** A delivery person uses a service elevator to bring boxes of books up to an office. The delivery person weighs 160 lb and each box of books weighs 50 lb. The maximum capacity of the elevator is 1000 lb. How many boxes of books can the delivery person bring up at one time?
24. **Shopping** You have \$16 and a coupon for a \$5 discount at a local supermarket. A bottle of olive oil costs \$7. How many bottles of olive oil can you buy?
25. **Rentals** Two college friends rent an apartment. They have to pay the landlord two months' rent and a \$500 security deposit when they sign the lease. The total amount they pay the landlord is \$2800. What is the rent for one month?

Solve each equation. Check your answer.

26. $\frac{y-4}{2} = 10$

27. $7 = \frac{x-8}{3}$

28. $\frac{z+10}{9} = 2$

29. $4 = \frac{a+10}{2}$

30. $7\frac{1}{2} = \frac{x+3}{2}$

31. $\frac{b+3}{5} = -1$

32. $-2 = \frac{d-7}{7}$

33. $\frac{g-3}{3} = \frac{5}{3}$

Solve each equation. Justify each step.

34. $14 - b = 19$

35. $20 - 3h = 2$

36. $3 - \frac{x}{2} = 6$

37. $-1 = 4 + \frac{x}{3}$

See Problem 1.

See Problem 2.

See Problem 3.

See Problem 4.

B Apply

Solve each equation. Check your answer.

38. $\frac{2+y}{3} = -1$

39. $-24 = -10t + 3$

40. $10 = 0.3x - 9.1$

41. $\frac{1}{2} = \frac{1}{2}c - 2$

42. $\frac{x-3}{3} = -4\frac{1}{2}$

43. $9.4 = -d + 5.6$

44. $\frac{d+17}{2} = 5\frac{1}{3}$

45. $2.4 + 10m = 6.89$

46. $\frac{1}{5}t - 3 = -17$

Solve each equation. Justify each step.

47. $15 = 9 - 3p$

48. $4 - 5k = -16$

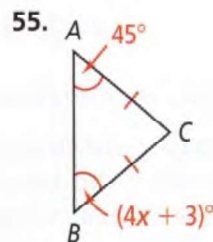
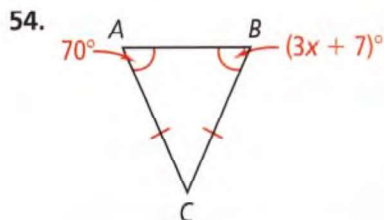
49. $9 + \frac{c}{-5} = -5$

50. $\frac{q}{-3} + 12 = 2$

51. **Error Analysis** Describe and correct the error in finding the solution of the equation at the right.
52. **Writing** Without solving the equation $-3x + 5 = 44$, tell whether the value of x is positive or negative. How do you know?
53. a. Solve the equation $2x - 1 = 7$ by undoing subtraction first.
 b. Solve the equation in part (a) by undoing multiplication first. Do you get the same answer you got in part (a)?
 c. **Reasoning** Which method from parts (a) and (b) do you prefer? Explain.

$$\begin{aligned} 2x - 4 &= 8 \\ 2x &= 4 \\ x &= 2 \end{aligned}$$

Geometry In each triangle, the measure of $\angle A$ equals the measure of $\angle B$. Find the value of x .



56. **Think About a Plan** A Web site allows musicians to post their songs online. Then people using the Web site can buy any of the posted songs. Suppose each musician must pay a one-time fee of \$5 to use the Web site. Each musician earns \$.09 every time a particular song of his or hers is downloaded. If a musician earned \$365 for a particular song, how many times was the song downloaded?
- How can the model at the right help you solve the problem?
 - How does the model tell you which operations to use in the equation?
57. **Open-Ended** Write a real-world problem that you can model with the two-step equation $8b + 6 = 38$. Then solve the problem.
58. **Home Improvement** A contractor is adding a back porch on to a house. The porch needs to hold 20 people and furniture that weighs 250 lb. The contractor calculates that the porch needs to hold 3750 lb to meet that specification. What value did the contractor use for the weight of a person?

-----365-----	
0.09x	-5

STEM 59. **Earth Science** The air temperature beneath Earth's surface increases by about 10°C per kilometer. The surface temperature and the air temperature at the bottom of a mine are shown. How many kilometers below Earth's surface is the bottom of the mine?



60. **Car-Sharing Program** Members of a car-sharing program pay a fee of \$50 per month plus \$7.65 for every hour they use a car. A member's bill was \$149.45 last month. How many hours did the customer use a car last month?

Challenge 61. **Word Processing** You format a document in three columns of equal width. The document is 8.5 in. wide. You want left and right margins of 1 in. each. Between the columns there is a "gutter" that is one eighth as wide as each column. What is the width of each column?

Tell whether each equation has a solution. If so, find the solution. If not, explain why not.

62. $2x - 0 = 0$

63. $0(-2x) = 4$

64. $\frac{x-2}{2} = 0$

65. $\frac{x-2}{0} = 2$

Standardized Test Prep

GRIDDED RESPONSE

SAT/ACT

66. William's age w and Jamie's age j are related by the equation $w = 2j - 12$. When William is 36.5 years old, how old is Jamie?

67. Dominique paints faces at an annual carnival. Her goal this year is to earn \$100. She spends \$15 on supplies and will work for 2.5 h. How much will she need to earn in dollars per hour in order to reach her goal?

68. The cost of a gallon of milk m is \$.50 more than five times the cost of a gallon of water w . If a gallon of milk costs \$3.75, what is the cost of a gallon of water?

Mixed Review

Solve each equation.

69. $-5x = -25$

70. $7 = 3.2 + y$

71. $\frac{y}{4} = 36$

72. $z - 2 = 4.5$

← See Lesson 2-1.

Tell whether each statement is *true* or *false*. If it is false, give a counterexample.

← See Lesson 1-4.

73. The difference of the absolute value of two numbers is the same as the difference of the two numbers themselves.

74. Adding 1 to a number always increases its absolute value.

Get Ready! To prepare for Lesson 2-3, do Exercises 75-78.

Simplify each expression.

← See Lesson 1-7.

75. $7(5 - t)$

76. $-2(-2x + 5)$

77. $-3(2 - b)$

78. $5(2 - 5n)$