

Concept and Vocabulary:

1. The process of finding the number or numbers that make an equation a true statement is called _____ the equation.
2. An equation of the form $mx + b = c$, such as $7x + 9 = 13$, is called a/an _____ equation in one variable.
5. The addition property of equality lets us add or _____ the same number on both sides of an equation without changing the equation's _____.

Practice Exercises:

In exercises 1 - 10, identify the linear equations in one variable.

1. $x - 9 = 13$

6. $\frac{15}{x} = 20$

2. $x - 15 = 20$

7. $\sqrt{2}x + \pi = 0.\bar{3}$

3. $x^2 - 9 = 13$

8. $\sqrt{3}x + \pi = 0.\bar{6}$

4. $x^2 - 15 = 20$

9. $|x + 2| = 5$

5. $\frac{9}{x} = 13$

10. $|x + 5| = 8$

In exercises 11 - 53 odd, solve each equation using the the addition property of equality. **Check your proposed solutions in problems 11, 19, 29, 37 and 45.**

11. $x - 4 = 19$ Check:

13. $z + 8 = -12$

$$15. -2 = x + 14$$

$$25. t + \frac{5}{6} = -\frac{7}{12}$$

$$17. -17 = y - 5$$

$$27. x - \frac{3}{4} = \frac{9}{2}$$

$$19. 7 + z = 11 \quad \text{Check:}$$

$$29. -\frac{1}{5} + y = -\frac{3}{4} \quad \text{Check:}$$

$$21. -6 + y = -17$$

$$31. 3.2 + x = 7.5$$

$$23. x + \frac{1}{3} = \frac{7}{3}$$

$$33. x + \frac{3}{4} = -\frac{9}{2}$$

$$35. 5 = -13 + y$$

$$43. -3.7 + m = -3.7$$

$$37. -\frac{3}{5} = -\frac{3}{2} + s \quad \text{Check:}$$

$$45. 6y + 3 - 5y = 14 \quad \text{Check:}$$

$$39. 830 + y = 520$$

$$47. 7 - 5x + 8 + 2x + 4x - 3 = 2 + 3 \cdot 5$$

$$41. r + 3.7 = 8$$

$$49. 7y + 4 = 6y - 9$$

51. $12 - 6x = 18 - 7x$

53. $4x + 2 = 3(x - 6) + 8$

The equations in exercises 55 and 57 contain small geometric figures that represent real numbers. Use the addition property of equality to isolate x on one side of the equation and the geometric figures on the other side.

55. $x - \square = \triangle$

57. $2x + \triangle = 3x + \square$

In exercises 59 and 61, use the given information to write an equation. Let x represent the number described in each exercise. Then solve the equation and find the number.

59. If 12 is subtracted from a number, the result is -2. Find the number.

61. The difference between $\frac{2}{5}$ of a number and 8 is $\frac{7}{5}$ of that number. Find the number.

Application Exercises:

Formulas frequently appear in the business world. For example, the cost, C , of an item (the price paid by a retailer) plus the markup, M , on that item (the retailer's profit) equals the selling price, S , of the item. The formula is

$$C + M = S.$$

Use the formula to solve exercise 63.

63. The selling price of a computer is \$1850. If the markup on the computer is \$150, find the cost to the retailer for the computer.

The diversity index, from 0 (no diversity) to 100, measures the chance that two randomly selected people are a different race or ethnicity. The diversity index in the United States varies widely from region to region, from as high as 9 in Hawaii and 68 in California to as low as 10 in Maine and Vermont and 13 in west Virginia. The line graph on page 121 shows the national diversity index for the United States for four years in the period from 1980 through 2009.

The data displayed by the line graph can be described by the mathematical model

$$I - 0.6x = 34,$$

where I is the national diversity index in the United States x years after 1980. Use this information to solve exercise 67.

67. a. Use the line graph to estimate the U.S. diversity index in 2009.
- b. Use the formula to determine the U.S. diversity index in 2009. How does this compare with your graphical estimate from part (a)?