

Concept and Vocabulary:

1. The first step in solving $3x - 9x + 30 = 15 - 2x - 4$ is to _____
2. The equation $\frac{x}{5} - \frac{1}{2} = \frac{x}{6}$ can be cleared of fractions by multiplying both sides by _____
4. A linear equation that is not true for even one real number, and therefore has no solution, is called a/an _____ equation.
5. A linear equation that is true for all real numbers is called a/an _____.
6. In solving an equation, if you eliminate the variable and obtain a false statement such as $2 = 5$, the equation is a/an _____ equation.
7. In solving an equation, if you eliminate the variable and obtain a true statement such as $5 = 5$, the equation is a/an _____

Practice Exercises:

In exercises 1 - 29 odd, solve each equation. Use set notation when describing the set of solutions. State your solutions using set notation. Please check your solutions to problems 3, 9, 19 and 27.

1. $5x + 3x - 4x = 10 + 2$

3. $4x - 9x + 22 = 3x + 30$ Check:

$$5. 3x + 6 - x = 8 + 3x - 6$$

$$15. 6x - (3x + 10) = 14$$

$$7. 4(x + 1) = 20$$

$$17. 5(2x + 1) = 12x - 3$$

$$9. 7(2x - 1) = 42 \quad \text{Check:}$$

$$19. 3(5 - x) = 4(2x + 1) \quad \text{Check:}$$

$$11. 38 = 30 - 2(x - 1)$$

$$21. 8(y + 2) = 2(3y + 4)$$

$$13. 2(4z + 3) - 8 = 46$$

$$23. 3(x + 1) = 7(x - 2) - 3$$

$$25. 5(2x - 8) - 2 = 5(x - 3) + 3$$

$$29. 10(z + 4) - 4(z - 2) = 3(z - 1) + 2(z - 3)$$

$$27. 6 = -4(1 - x) + 3(x + 1) \quad \text{Check:}$$

In exercises 31 - 45 odd, solve the following equations. Begin by rewriting each equation without fractions. Use set notation when describing the set of solutions. Check your solutions to problems 35 and 43.

$$31. \frac{x}{5} - 4 = -6$$

$$35. \frac{2y}{3} - \frac{3}{4} = \frac{5}{12}$$

$$33. \frac{2x}{3} - 5 = 7$$

$$37. \frac{x}{3} + \frac{x}{2} = \frac{5}{6}$$

$$39. 20 - \frac{z}{3} = \frac{z}{2}$$

$$43. \frac{3x}{4} - 3 = \frac{x}{2} + 2$$

$$41. \frac{y}{3} + \frac{2}{5} = \frac{y}{5} - \frac{2}{5}$$

$$45. \frac{x-3}{5} - 1 = \frac{x-5}{4}$$

In exercises 47 - 57 odd, solve each equation. **Check your solutions to problems 51 and 55.**

$$47. 3.6x = 2.9x + 6.3$$

$$51. 0.3x - 4 = 0.1(x + 10) \quad \text{Check:}$$

$$49. 0.92y + 2 = y - 0.4$$

$$53. 0.4(2z + 6) + 0.1 = 0.5(2z - 3)$$

$$55. 0.01(x + 4) - 0.04 = 0.01(5x + 4) \quad \text{Check:} \quad 57. 0.6(x + 300) = 0.65x - 205$$

In exercises 59 - 65 odd, solve each equation. Use set notation when describing the set of solutions.

$$59. 3x - 7 = 3(x + 1)$$

$$63. 7 + 2(3x - 5) = 8 - 3(2x + 1)$$

$$61. 2(x + 4) = 4x + 5 - 2x + 3$$

$$65. 4x + 1 - 5x = 5 - (x + 4)$$

In exercises 83 and 85, 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.

83. When one-third of a number is added to one-fifth of the number, the sum is 16. What is the number?

85. When 3 is subtracted from three-fourths of a number, the result is equal to one-half of the number. What is the number?

Application Exercises:

In Massachusetts, speeding fines are determined by the formula

$$F = 10(x - 65) + 50,$$

where F is the cost, in dollars, of the fine if a person is caught driving x miles per hour. Use this information to solve exercise 87.

87. If a fine comes to \$250, how fast was that person driving?

The latest guidelines, which apply to both men and women, give healthy weight ranges, rather than specific weights, for your height. The further you are above the upper limit of your range, the greater are the risks of developing weight-related health problems. The bar graph on page 133 shows these ranges for various heights for people between the ages of 19 and 34, inclusive. The mathematical model

$$\frac{W}{2} - 3H = 53,$$

describes a weight, W , in pounds, that lies within the healthy weight range for a person whose height is H inches over 5 feet. Use this information to solve exercise 89.

89. Use the formula to find a healthy weight for a person whose height is 5'6". (Hint: $H = 6$ because this person's height is 6 inches over 5 feet.) How many pounds is this healthy weight below the upper end of the range shown by the bar graph on page 143?

The formula

$$p = 15 + \frac{5d}{11}$$

describes the pressure of sea water, p , in pounds per square foot, at a depth of d feet below the surface. Use the formula to solve exercise 91.

91. The record depth for breath-held diving, by Francisco Ferreras (Cuba) off Grand Bahama Island, on November 14, 1993, involved pressure of 201 pounds per square foot. To what depth did Ferreras descend on this ill-advised venture?