Section 2.1: Linear Equations

Definition: To solve an equation in the variable x using the **algebraic method** is to use the rules of algebra to isolate the unknown x on one side of the equation.

Definition: To solve an equation in the variable x using the **graphical method** is to move all terms to one side of the equation and set those terms equal to y. Sketch the graph to find the values of x where $y = 0$.

Example 1: Solve each of the following equations algebraically.

a. $\dfrac{16}{x} = \dfrac{8}{7}$

b. $\dfrac{x-3}{2} = \dfrac{x}{5}$

c. $\dfrac{1}{2} - \dfrac{5}{3}x = -2$

d. $\dfrac{1}{4}(x+2) = \dfrac{5}{6}x - \dfrac{3}{8}$

e. $-\dfrac{7}{18x} + \dfrac{5}{3x} = 2$

Section 2.2: Applications

Using Modeling to Solve Problems

Step 1: Define a variable.
Step 2: Write the equation which models the situation given.
Step 3: Solve the equation.
Step 4: Answer the question(s) posed, including appropriate units.

Example 1: The sum of two consecutive integers is 117. Find the largest of these integers.

Example 2: If the first and third of three consecutive odd integers are added, the result is 63 less than five times the second integer. Find the third integer.

Example 3: The length of a rectangular garden is 20 feet more than the width. Its perimeter is 140 feet. What are the dimensions of the garden?

Example 4: David has 27 coins, comprised of nickels, dimes and quarters. If he has twice as many dimes as nickels and 3 more quarters than he has nickels, how much money does David have in coins?

Example 5: Two sides of a triangle have the same length. The third side is 15 cm longer than each of the equal sides. The perimeter is 90 cm. What are the lengths of the sides of the triangle?

Example 6: The length of a rectangle is 6 inches more than its width. If the perimeter of the rectangle is 60 inches, find the length of the rectangle.