As long as we can figure out the initial value and the rate of change of a linear functions, we can solve many different kinds of real-world problems. When building linear models to solve problems involving quantities with a constant rate of change, we typically follow the same problem strategies that we would use for any type of function:

**Strategies**

Typically, a linear model takes the form .

Examples:

1. Marcus currently has 200 songs in his music collection. Every month, he adds 15 new songs. Write a formula for the number of songs, , in his collection as a function of time, , the number of months. How many songs will he won at the end of the year?
2. A company sells doughnuts. They incur a fixed cost of $25,000 for rent, insurance, and other expenses. It costs $0.25 to produce each doughnut.
   * 1. Write a linear model to represent the cost of the company as a function of , the number of doughnuts produced.
     2. Find and interpret the -intercept.
3. A city’s population has been growing linearly. In 2008, the population was 28,200. By 2012, the population was 36,800. Assume this trend continues.
   * 1. Predict the population in 2014.
     2. Identify the year in which the population will reach 54,000.