

Problem-Solving – Modeling with Linear Equations

STEP 1: Read the problem and make sure you understand it. Assign a variable to what you are being asked. If necessary, write other quantities in terms of the variable.

STEP 2: Write an equation that relates the quantities described in the problem. You may need to sketch a diagram and refer to known formulas.

STEP 3: Solve the equation and determine the solution.

STEP 4: Look back and check your solution. Does it seem reasonable?

Examples:

In 2 hours an athlete travels 18.5 miles by running at 11 miles per hour and then by running at 9 miles per hour. How long did the athlete run at each speed?

Pure water is being added to a 25% solution of 120 milliliters of hydrochloric acid. How much water should be added to reduce it to a 15% mixture?

In 1980 the population density of the United States was 64 people per square mile and in 1990 it was 70 people per square mile. Use a linear function to estimate when the U.S. population density reached 72.4 people per square mile.

Modeling with Linear Equations – A Conical Tank of Water

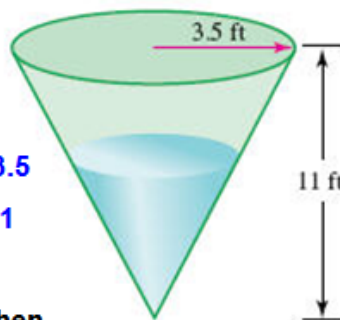
A water tank has the shape of an inverted cone as shown in the figure.

The volume of a cone is

$$V = \frac{1}{3} \pi r^2 h$$

Find the volume of the water in the tank when the depth is 7 feet.

Radius = 3.5
Height = 11



The following table shows the average costs of new one-family homes in a certain neighborhood for three selected years.

Year	1999	2000	2001
Price in \$1000	173	179	186

If a house was worth \$200 thousand in 2001, estimate it worth in 1999. Use percent of change.