

Let x be indep. var
 y dep var

Name Key

Homework 7.25 Linear Applications

1-6 The following problems can be modeled by linear functions. Find the following:

- What is the independent variable and the dependent variable?
- What is the rate of change?
- Write an equation for the linear function.
- Answer the question using the equation you wrote in part c.

1) The price of a particular model of car is \$15,000 today and rises with time at a constant rate of \$800 per year. How much will a new car of this model cost in 3.5 years?

a) Years from today Price of car

$\frac{\$800}{\text{year}}$ $\frac{\Delta y}{\Delta x}$

b) $\$800/\text{year}$

c) $y = 15,000 + 800x$

d) $\$17,800$ $y = 15,000 + 800(3.5)$

2) The world record time in the 100-meter butterfly (swimming) was 50.40 seconds in 2006. Assume that the record falls at a constant rate of .05 second per year. Use your equation to predict the record for 2015.

a) Year since 2006 World record time (sec)

$\frac{\text{sec}}{\text{year}}$

b) $-.05 \text{ sec/year}$

c) $y = 50.40 - .05x$

d) 49.95 sec $y = 50.40 - .05(9)$

3) A snowplow has a maximum speed of 40 miles per hour on a dry highway. Its maximum speed decreases by 1.1 miles per hour for every inch of snow on the highway. According to this model, at what snow depth will the plow be unable to move?

a) Inches snow Max speed plow (mph)

$\frac{\text{MPH}}{\text{inch snow}}$

b) $-1.1 \text{ miles per hour / inch snow}$

c) $y = 40 - 1.1x$

d) 36 inches

$$0 = 40 - 1.1(x)$$

$$\frac{-40}{-1.1} = \frac{-1.1x}{-1.1}$$

$$36.4 \checkmark = x$$

inches

4) The cost of leasing a car is \$800 for a down payment and processing fee plus \$240 per month. For how many months can you lease a car with \$3680?

I D
a) # months cost to lease

\$
month

b) \$240/month

c) $y = 800 + 240x$

d) 12 months $3680 = 800 + 240x$
 $2880 = 240x$
 $12 = x$

5) You can rent time on computers at the local copy center for an \$8 setup charge and an additional \$1.50 for every 5 minutes. How much time can you rent for \$25?

I D
a) # minutes Cost \$

\$
min

b) \$1.50/5min = \$0.3/min

c) $y = 8 + .3x$

d) 57 min $y = 25 = 8 + .3x$
 $17 = .3x$
 $57 \text{ min} = x$

6) In 1980, the population of Boom Town began increasing at a rate of 200 people per year. The 1980 population was 2000 people. What is your projection for the population in the year 2010?

I D
a) # year after 1980 # people

People
year

b) 200 people/year

c) $y = 2000 + 200x$

d) 8000 people $y = 2000 + 200(30)$