

5.2: Writing Linear Equations

Word Problems 😊

For each situation first identify what x and y represent. Do this based on independence vs. dependence.

Remember: m = slope/rate b = y-intercept/initial value x = 1 input value y = 1 output value

1) Sandra is saving up to buy a new racing bike. She has some money in her bank account. She has started saving \$45 per month. After 8 months she has \$722. How much did she initially have in her bank account?

a) State what your variables stand for.

x =

y =

b) What values do you know and which are you looking for?

x =

y =

m =

b =

c) Write an equation to represent the total amount saved after (m) months.

d) How much money will she have in total after a year?

2) Krista is training for a triathlon. She worked out early this morning. After lunch she is planning on biking. She burns 218 calories per hour biking. After 4 hours biking she had burned a total of 1002 calories for the day.

e) State what your variables stand for.

x =

y =

f) What values do you know and which are you looking for?

x =

y =

m =

b =

g) Write an equation to represent the total number of calories burned after (h) hours.

h) How many total calories will she burn for the day if she bikes 6 hours?

- 3)** Jim and Sue hire the same electrician. The electrician charges a service fee and an hourly fee. Jim hires the electrician for 3 hours and pays a total of \$285. Sue hires the electrician for 5 hours and pays \$395.
- What does the electrician charge per hour?
 - How much does the electrician charge as a service fee?
 - Write an equation to represent the total charge after (h) hours.
 - If you are remodeling a house and need to hire this electrician for a total of 16 hours, how much will it cost?
- 4)** Sarah is driving to Florida. She gets up early and drives part of the way before lunch time. She stops to eat and then begins driving again. 5 hours after lunch she is 711 miles from home. 8 hours after lunch she is 876 miles from home.
- Write an equation to represent the number of miles driven since she started driving.
 - How long will she need to drive after lunch to get to Miami which is 1800 miles away?
- 5)** You are cooking a roast beef until it is well-done. You must allow 30 minutes of cooking time for every pound of beef, plus some extra time to preheat the oven. The last time you cooked a 2 pound roast beef, it was well done after 1 hour and 25 minutes.
- State what your variables stand for.
 $x =$ $y =$
 - How much extra time do you need to allow to preheat the oven?
 - How long would you expect it to take to have a 3 pound roast beef be well-done?

6) The annual household cost of telephone service in the United States increased at a relatively constant rate of \$27.80 per year from 1981 to 2001. In 2001 the annual household cost of telephone service was \$914.

- a. State what your variables stand for.

$x =$

$y =$

- b. What was the annual household cost of telephone service in 1981?

- c. Write an equation to represent the total cost of annual household service in terms of years since 1981.

- d. Find the cost of telephone service in the year 2000.

7) From 1970 to 2000, the number of Sunday newspapers in circulation increased at a relatively constant rate of 11.8 newspapers per year. In 1997 there were 903 Sunday newspapers in circulation.

- a. State what your variables stand for.

$x =$

$y =$

- b. About how many Sunday newspapers were in circulation in 1970?

- c. Write an equation to represent the number of Sunday newspapers in circulation for any number of years since 1970.

- d. About how many Sunday newspapers were in circulation in 2000?

8) From 1990 to 2001 the number of airports in the United States increased at a relatively constant rate of 175 airports per year. There were 19,306 airports in the United States in 2001.

a. State what your variables stand for.

$x =$

$y =$

b. How many U.S. airports were there in 1990?

c. Write an equation that gives the number of airports in the U.S. as a function of the number of years since 1990.

d. Find the year in which the number of U.S. airports reached 19,500.

9) You are scheduled to start your job at an oil change shop 2 hours after the shop opens. Two hours after you start, a total of 11 cars have had their oil changed since the shop opened. Three hours later, a total of 14 cars have had their oil changed.

a. State what your variables stand for.

$x =$

$y =$

b. At what rate are cars getting their oil changed since you started working?

c. How many cars had their oil changed before you started work?

d. Write an equation to represent the total number of cars that had their oil changed since the shop opened.

10) A newspaper charges a flat rate to place a 3-line ad in the classified section of the newspaper and then charges a per line fee for any additional lines. One person placed a 4-line ad for \$17.10 and another person placed a 6-line ad for \$22.50.

- a. State what your variables stand for.

$x =$

$y =$

- a. Write an equation that gives the total cost (in dollars) as a function of the number of additional lines in the ad.
- b. What do the rate of change and y -intercept represent in the equation?
- c. Find the total cost to place a 5-line ad.
- d. Find the total cost to place a 2-line ad.

Ex: You are scheduled to start your job at a car wash 2 hours after the car wash opens. Three hours after you start, a total of 47 cars have been washed since the car wash opened. Three hours later, a total of 55 cars have been washed.

- a. At what rate are the cars being washed since you started working?
- b. How many cars were washed before you started work?
- c. Write an equation to represent the total number of cars washed since the car wash opened.