

# Inverse Variation



## Saltine Activity

<b># of People</b>				
<b>Time</b>				

As  $x$  \_\_\_\_\_,  $y$  \_\_\_\_\_ or as  $x$  \_\_\_\_\_,  $y$  \_\_\_\_\_

Equation:

1. If  $y = 27$  when  $x = 12$ .

a) Find the inverse equation.

b) Find  $x$  when  $y = -12$

2. The grade you earn in math varies inversely with the number of minutes per night you watch TV. If you watch 90 minutes per night, you get a 60 in math.

a) Find the constant of variation.

b) How much TV can you watch if you want to make a 70?

c) If you watch 75 min of TV a night, what grade will you make?

d) What is the maximum amount of television you can watch and still make a 100?

3. The length of a violin string varies inversely with the frequency of its vibrations. A violin string 10 inches long vibrates at a frequency of 512 cycles per second. Let  $x$  = length in inches, and  $y$  = the frequency per second.

a) Find the frequency, in cycles per second, of the 8-inch string.

b) What is the length of a string with a frequency of 320 cycles per second?



4. You are driving from Dallas to Austin for a college visit. Remember the distance formula  $D = rt$ .

- a) What happens to the amount of time it takes to make the trip if you increase your speed?
  
- b) What is the constant?
  
- c) If your rate is 55 mph, the trip takes 2.5 hours, how can we find  $r$  if  $t = 1.25$  hours.

### Practice Problems:

- 1. If  $x$  and  $y$  vary inversely and  $x = 1$  when  $y = 11$ , find  $x$  when  $y = 5.5$
  
- 2. If  $x$  and  $y$  vary inversely and  $x = 2.5$  when  $y = 100$  find  $x$  when  $y = 25$
  
- 3. Heart rates and life spans of most mammals are inversely related. A cat lives for about 15.2 years on average and has a heart rate of 126 beats per minute.
  - a. What is the constant of variation? And what the inverse equation?
  
  - b. A hamster has a heart rate of about 634 beats per minute. About how long will a hamster live?
  
  - c. An elephant lives for about 70 years. About how many times per minute does an elephant's heart beat?
  
- 4. Two gears are used to operate a machine. Gear A has 60 teeth and Gear B has 45 teeth. The speed at which you turn Gear A is 5400 rpm. The number of teeth and speed in rpm are inversely related.
  - a. What is the constant of variation? And what the inverse equation?
  
  - b. At what speed will Gear B turn?