Variation – Day 3   Name_____

Notes   Date_____Period_____

Definition: If y varies inversely with x, then as the value of x increases, the value of y
               decreases.

Equation: $y = \dfrac{k}{x}$, where k is the constant of variation. (k cannot be 0.)

               k can be found by the following equation, $k = yx$.

Example 1

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. Find the frequency of an 8-inch
string. Let x = length in inches, and let y = the frequency per second.

   a. Find the value of k.   k = _____

   b. Find the frequency, in cycles per second, of the 8-inch string.   Frequency _____

   • Sometimes it is easier to solve a variation by using a proportion and cross multiplying.

Example 2

If y varies inversely with x, and y = 5 when x = 15, find x when y = 3.

                                                                   x = _____

Practice

   1. The width of a rectangle varies inversely with the length. Complete the table below that
       shows that length, y, is a function of the width, x. Let Area = 1500 cm^2. (Hint: A = L x w)
       a.

x (width)	10	15	25	30	50	60	75	125
y (length)								

   b. Write the equation for the function _____

   c. If the length is 6, what is the width?_____

For the following word problems, write an equation and answer each question.

2.   The amount of candy shared by the class varies inversely with the number of students in the class. If there are 120 pieces of candy, how much would each student receive in a class of 30?

      k = _____   Equation _____   Answer _____

3.   The life of a battery varies inversely with the number of hours it is used. If a battery has 1250 volts stored, how long will it take to burn out at a rate of 50 volts per hour?

      k = _____   Equation _____   Answer _____

4.   The number of songs a DJ can play in a 3 hour session varies inversely with the length of each song. How many songs ca a DJ play if each song lasts on average $4\frac{1}{2}$ minutes?

      k = _____   Equation _____   Answer _____

5.   Traveling time from San Antonio to Dallas varies inversely with speed. If there are 273 miles between San Antonio and Dallas, how fast would you have to travel to make the trip in $3\frac{1}{2}$ hours?

      k = _____   Equation _____   Answer _____

Solve using proportions. Assume that y varies inversely with x.

6.   If y = 9, when x = 8, find y when x = 6.   y = _____

7.   If y = 27, when x = 12, find x when y = –12.   x = _____

8.   If y = 40, when x = 16, find y when x = 10.   y = _____

9.   If y = 24, when x = –8, find y when x = 4.   y = _____

10.   If y = 60, when x = 80, find x when y = –20.   x = _____