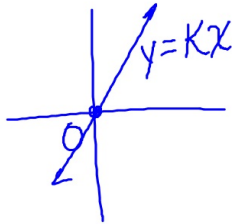


Direct Variation equation:  $y = Kx, K \neq 0$



$K$  is the constant of variation  
 "y varies directly as x"  
 "x and y vary directly"

Ex. 1:  $x$  and  $y$  vary directly. The value of  $y = 19.22$  when  $x = 6.2$ .

a) Write an equation relating  $x$  and  $y$ .

$y = 3.1x$

$y = Kx$   
 $19.22 = K(6.2)$   
 $3.1 = K$

b) Find  $y$  when  $x = 4.3$ .

$y = 3.1(4.3)$   
 $y = 13.33$

Ex. 2 Does the set of data below show a direct variation? Why or why not?

$x$	5	6	7
$y$	7.5	9	10.5

$y = Kx$  *yes*  
 $K = \frac{3}{2}$   
 $1.5 = \frac{y}{x} = K$

Ex. 3: The price ( $p$ ) in dollars of a 14-karat gold chain varies directly as its length ( $L$ ) in inches. A 16-inch chain costs \$288.

a) Write an equation relating price and length.

$P = 18L$   
 $P = kL$   
 $288 = K(16)$   
 $18 = K$

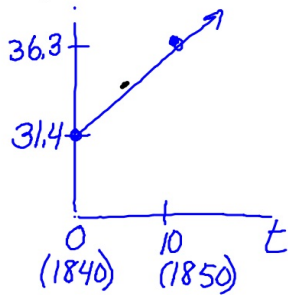
b) Find the length of a chain that costs \$540

$30 \text{ in}$   
 $P = KL$   
 $540 = 18L$

Ex. 4: From 1840 to 1850, the rate at which the percent of the labor force in nonfarming occupations increased was approximately linear. In 1840, 31.4% of the labor force held nonfarming jobs. In 1850, 36.3% of the labor force held nonfarming jobs.

(1840, 31.4) (1850, 36.3)

Write a linear equation for the percent of the labor force ( $p$ ) in nonfarming occupations, where  $t$  represents the number of years since 1840.



$$p = mt + b$$

$$p = 0.49t + 31.4$$

$$m = \frac{36.3 - 31.4}{1850 - 1840}$$

#### Homework Problems:

1. The amount of state sales tax in New Jersey varies directly with the price of merchandise.

Price, $x$ (in dollars)	10	20	30	40	50
Tax, $y$ (in dollars)	0.70	1.40	2.10	2.80	3.50

- a) Use the above tax table to write an equation relating the price  $x$  and the amount of sales tax  $y$ .
- b) Find the sales tax on a car that costs \$22,000.

2. From 1992 through 1994, the per capita (per person) consumption of fish and shellfish in the U.S. increased at a rate that was approximately linear. In 1992, the per capita consumption was 14.7 pounds, and in 1994 it was 15.1 pounds.

- a) Write a linear equation for the per capita consumption ( $C$ ) of fish and shellfish in the U.S. Let  $t$  represent the number of years since 1992.
- b) What would the expected per capita consumption of fish and shellfish be in 2011, if this trend continued?