

Determine if the table has a constant of proportionality, if so determine the value.

proportional

X	Y
0	0
1	3
2	6
3	9

$$\frac{3}{1} = 3$$

$$\frac{6}{2} = 3$$

$$\frac{9}{3} = 3$$

$$k = 3$$

$$y = 3x$$

X	Y
1	2
2	4
3	8
4	16

$$\frac{2}{1} = 2$$

$$\frac{4}{2} = 2$$

$$\frac{8}{3} = 2\frac{2}{3}$$

not proportional

(0, 0)

X	Y
1	5
2	10
3	15
4	20

$$\frac{5}{1} = 5$$

$$\frac{10}{2} = 5$$

$$\frac{15}{3} = 5$$

$$\frac{20}{4} = 5$$

$$k = 5$$

$$y = 5x$$

$$\frac{y}{x} = \frac{kx}{x}$$

$$k = \frac{y}{x}$$

constant of proportionality

proport. graphs  $\rightarrow$  graphed thru the origin (0,0)

Determine the missing value with the given tables that have a constant of proportionality.

proportional

X	Y
0	0
1	13
2	26
3	39

$$\frac{13}{1} = 13$$

$$k = 13$$

$$y = 13x$$

unit rate

constant

of proportionality  
rate

X	Y
1	26
2	52
3	78
4	104

$$\frac{26}{1} = 26$$

$$k = 26$$

$$y = 26x$$

unit rate

proportional

X	Y
4	60
8	120
10	150
12	180

$$\frac{120}{8} = 15$$

$$\frac{120}{8} = 15$$

$$k = 15$$

$$y = 15x$$

unit rate

Use the equation to determine the table values, then identify the constant of proportionality.

$Y = 2x$

X	Y
0	0
1	2
2	4
3	6

Constant Proportionality = 2

$y = 6x$

X	Y
0	0
1	6
2	12
3	18

Constant Proportionality = 6

$y = 15x$

X	Y
5	75
8	120
10	150
12	180

Constant Proportionality = 15

Proof:

$y = 2(0) \quad y = 2(1) \quad y = 2(2) \quad y = 2(3)$   
 $y = 0 \quad y = 2 \quad y = 4 \quad y = 6$

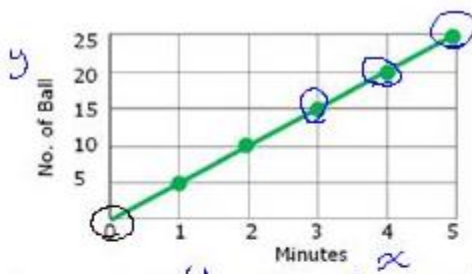
$y = 15x$

$y = 15(8) \quad y = 15(12)$   
 $y = 120 \quad y = 180$

Example 1: Write an equation that will model the proportional relationship given in each graph below and explain what the equation means in a statement.



$K = \frac{y}{x}$   
 $\frac{20}{4} = 5$   
 $\frac{80}{16} = 5$



$K = \frac{y}{x}$   
 $\frac{20}{4} = 5 \quad \frac{15}{3} = 5$   
 $K = 5 \quad y = 5x$   
 $\frac{25}{5} = 5$

a. Both are proportional they go through the origin (0,0)  
 no. of cups  $\rightarrow y = 5x$  ← lbs of sugar  
 is to 5 cups/lb  $\cdot x$

b. # of balls depends on minutes  
 $K = 5$   
 $y = 5x$

Example 2: Write an equation that will model the proportional relationship given in each real world situation.

2. There are 3 cans that store 9 tennis balls. Consider the number of balls per can.

- a. Find the constant of proportionality for this situation. What does it mean for this situation?
- b. Write an equation to represent the relationship.

cans  
TB =

cans (x)	TB
1	3
2	6
3	9

$\frac{3}{1} = 3 \quad \frac{9}{3} = 3$   
 $\frac{6}{2} = 3$

$K = 3$   
 $\rightarrow y = 3x$   
 no. of TB is to 3 balls/can times # of cans

$\rightarrow$  No. of balls = to  
 5 balls/m  $\cdot$   
 minutes

Proportions are equivalent fractions.

Graphs and tables are proportional when the table includes the origin and the graph is graphed through the origin.

Using the rule (the equation), when substituting 0 in for x and your y ends up 0, too then the table will include the origin (0,0) which will make the table proportional.

K = Constant of proportionality

Constant of Proportionality is the multiplier of x in the equation  $y = kx$

The equation is  $y = k$  times  $x$  or  $y = kx$

To get K you will divide y by x ( $y/x = k$ )