

Direct Variation

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Direct variation is the
same as proportional

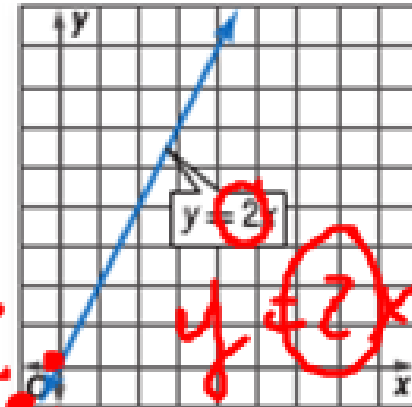
Key Concept

Direct Variation

Words

A linear relationship is a direct variation when the ratio of y to x is a constant, k . We say y varies directly with x .

Model



Symbols

$\frac{y}{x} = k$ or $y = kx$,
where $k \neq 0$

Work Zone

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

k - constant
proportionality

$(1, 2)$

$\frac{y}{x}$

Direct Variation

When a relationship varies directly, the graph of the function will always go through the origin, $(0, 0)$. Also, the unit rate r is located at $(1, r)$.

$$k = 2$$

~~Inverse Variation~~

Got It? Do this problem to find out.

- a. Two minutes after a diver enters the water, he has descended 52 feet. After 5 minutes, he has descended 130 feet. At what rate is the scuba diver descending?

time x | y distance

3	2	52	78
	5	130	

$$\frac{78}{3} = 26$$

$$\frac{52}{2} = \frac{130}{5} = 26 \text{ ft/min}$$

The equation $y = 10x$ represents the amount of money y Julio earns for x hours of work. Identify the constant of proportionality. Explain what it represents in this situation.

$$y = kx$$
$$y = 10x$$

Compare the equation to $y = kx$, where k is the constant of proportionality.

$$k = 10$$

$$y = kx$$

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

direct variation

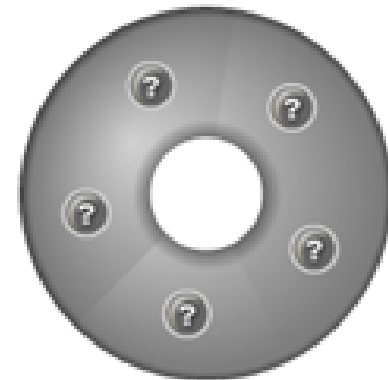
x	y
1	10
3	30
10	100

$$k = 10$$

The distance y traveled in miles by the Chang family in x hours is represented by the equation $y = 55x$. Which of the following is the constant of proportionality?

$$k = 55$$

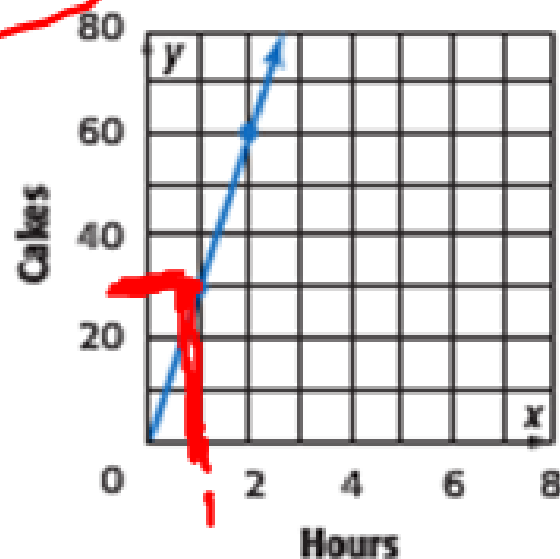
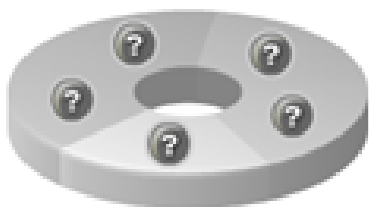
- A $k = y$
- B $k = 55$
- C $k = x$
- D $k = 10$



The number of cakes baked varies directly with the number of hours the caterers work. What is the unit rate shown in the graph?

30 cakes
1 hr

- A** 20 cakes per hour
- B** 30 cakes per hour
- C** 40 cakes per hour



Which of the following equations would be the correct direct variation equation for the cakes baked per hour?

$$k = 30$$

A

$$y = 30x$$

$$y = 30x$$

B

$$y = 20x$$

C

$$y = 40x$$

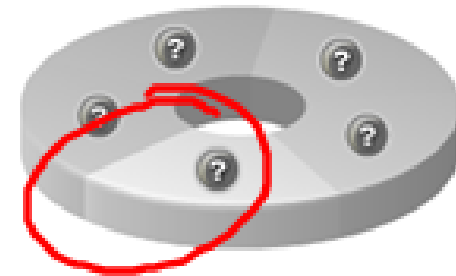


What is the constant of proportionality (k) for this situation?

A $k = 40$

 **B** $k = 30$

C $k = 20$



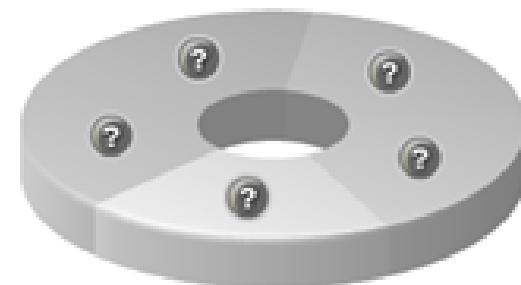
If Harvest Foods have apples on sale 12 for \$3, what would be the direct variation equation that shows the price per apple?

$$\frac{\$3}{12} = .25$$

A $y = 3x$

B $y = 4x$

C $y = .25x$



9. If $y = 14$ when $x = 8$, find y when $x = 12$.

What is the constant of proportionality (k) for this situation?

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

$$k = \frac{7}{4}$$

or 1.75

$$\frac{7}{4} = \frac{14}{8} = \frac{y}{12}$$

$$y = 21$$

$$y = \frac{7}{4}x$$

10. Find y when $x = 15$, if $y = 6$ when $x = 30$.

$$y = kx$$

What is the constant of proportionality (k) for this situation?

$$3 \frac{y}{15} = \frac{6}{30}$$

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

$$y = 3$$

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

$$k = \frac{6}{30} = \frac{1}{5}$$

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