Topic: Inverse variation

Question: If $k/10 = 2$ and $k/x = 6$, find x.

Answer choices:

A $x = \frac{3}{10}$

B $x = \frac{10}{3}$

C $x = -\frac{10}{3}$

D $x = -\frac{3}{10}$

Solution: B

We'll solve the first equation for k.

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

$$\frac{k}{10}(10) = 2(10)$$

$$k = 20$$

Now we'll take the value we found for k and plug it into the second equation to solve for x.

$$\frac{k}{x} = 6$$

$$\frac{20}{x} = 6$$

$$\frac{20}{x}(x) = 6(x)$$

$$20 = 6x$$

$$\frac{20}{6} = \frac{6x}{6}$$

$$x = \frac{10}{3}$$

Topic: Inverse variation

Question: If $k/4 = 3$ and $k/x = 4$, find x.

Answer choices:

A $x = 4$

B $x = 3$

C $x = 12$

D $x = 6$

Solution: B

We'll solve the first equation for k.

$$\frac{k}{4} = 3$$

$$\frac{k}{4}(4) = 3(4)$$

$$k = 12$$

Now we'll take the value we found for k and plug it into the second equation to solve for x.

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

$$\frac{12}{x} = 4$$

$$\frac{12}{x}(x) = 4(x)$$

$$12 = 4x$$

$$\frac{12}{4} = \frac{4x}{4}$$

$$x = 3$$

Topic: Inverse variation

Question: Suppose you drive your car to the store a number of different times at different speeds and record your results in the table below. How long would it take you to make the trip at a speed of 30?

Speed	Time
60	10
40	15
25	24
10	60

Answer choices:

A 18

B 20

C 22

D 25

Solution: B

An inverse variation follows the pattern

$$xy = k$$

Let x be speed and y be time. To see that speed and time are inversely related, we'll multiply each speed (each value of x) by the corresponding value of time (y).

$$60 \cdot 10 = 600$$

$$40 \cdot 15 = 600$$

$$25 \cdot 24 = 600$$

$$10 \cdot 60 = 600$$

Since we get the same result for all the multiplications, we see that speed and time are inversely related, and that $k = 600$.

Now plug in $x = 30$ and $k = 600$, and solve for y.

$$xy = k$$

$$(30)y = 600$$

$$y = \frac{600}{30}$$

$$y = 20$$