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Inverse Variation

Unit 11 Lesson 6

Inverse Variation

Students will be able to:

Solve problems involving inverse variation.

Key Vocabulary:

- Constant
- Inverse Proportion
- Unknown values



Inverse Variation

Inverse variation:

Two variables are inversely proportional if one variable decreases corresponding to an increase in other variable.

In inverse variation, the product of the two variables is a constant. In the form where ***y*** varies inversely as ***x***, and ***k*** is the constant of the variation or proportionality.

$$xy = k \text{ or } y = \frac{k}{x},$$



Inverse Variation

Sample Problem 1: Solve the problem involving inverse variation.

1. The relationship between the worker and the time required to finish the job. is shown in the table below

Number of worker (x)	1	2	3	4	5	6
Number of days (y)	36	18				

- A. Find the value of the constant k ?
- B. Complete the table above.

Inverse variation

Sample Problem 1: Solve the problem involving inverse variation.

1. The relationship between the worker and the time required to finish the job. is shown in the table below

Number of worker (x)	1	2	3	4	5	6
Number of days (y)	36	18				

A. Find the value of the constant k?

Solution:

$$y \propto \frac{k}{x} \quad 36 = \frac{k}{1} \quad 36(1) = k \quad k = 36$$

Inverse Variation

Sample Problem 1: Solve the problem involving inverse variation.

1. The relationship between the worker and the time required to finish the job. is shown in the table below

Number of worker (x)	1	2	3	4	5	6
Number of days (y)	36	18	12	9	7.2	6

B. Complete the table above.

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

$y = \frac{36}{3}$

$y = \frac{36}{4}$

$y = \frac{36}{5}$

$y = \frac{36}{6}$

$y = 12$

$y = 9$

$y = 7.2$

$y = 6$

Inverse Variation

Sample Problem 1: Solve the problem involving inverse variation.

2. If y varies inversely as x^2 , and $y = 25$ when $x=2$, (a) find the equation relating x and y . (b) Find also the value of when.

Solution:

A. Since $y \propto \frac{1}{x^2}$, then $y = \frac{k}{x^2}$, where k is a constant.

Substitute $y = 25$ when $x = 2$,

$$25 = \frac{k}{2^2} \quad k = 25 \times 4 \quad k = 100$$

Inverse Variation

Sample Problem 1: Solve the problem involving inverse variation.

2. If y varies inversely as x^2 , and $y = 25$ when $x=2$, (a) find the equation relating x and y . (b) Find also the value of y when $x=20$.

Solution:

B. Therefore $y = \frac{100}{x^2}$

$$y = \frac{100}{\left(\frac{1}{2}\right)^2}$$
$$y = 400$$

Inverse Variation

Sample Problem 1: Solve the problem involving inverse variation.

3. The time H in hours taken to deliver a batch of brochures to a shopping center varies inversely as the number of people N delivering them. For one job, 50 people take 8h.

A. Find the equation relating H and N .

B. Calculate (1) H when $N = 80$ and (2) H when $N = 16$.

Solution:

A. Since $H \propto \frac{1}{N}$, then $H = \frac{m}{N}$, where m is a constant.

Substitute $H = 8$ when $N = 50$

$$8 = \frac{m}{50} \quad m = 8(50) \quad m = 400$$

Inverse Variation

Sample Problem 1: Solve the problem involving inverse variation.

3. The time H in hours taken to deliver a batch of brochures to a shopping center varies inversely as the number of people N delivering them. For one job, 50 people take 8h.

A. Find the equation relating H and N .

B. Calculate (1) H when $N = 80$ and (2) H when $N = 16$.

Solution:

B. The equation is $H = \frac{400}{N}$

$$\text{When } N = 80, \quad H = \frac{400}{80} = 5$$

$$\text{When } N = 16, \quad H = \frac{400}{16} = 25$$