

Maharashtra Board Solutions Class 8-Maths

(Practice Set 7.2): Chapter 7- Variation



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Maharashtra Board Solutions Class 8-Maths

(Practice Set 7.2): Chapter 7- Variation

Class 8: Maths Chapter 7 solutions. Complete Class 8 Maths Chapter 7 Notes.

Maharashtra Board Solutions Class 8-Maths (Practice Set 7.2): Chapter 7- Variation

Maharashtra Board 8th Maths Chapter 7, Class 8 Maths Chapter 7 solutions

Question 1.

The information about number of workers and number of days to complete a work is given in the following table. Complete the table.

	30	20	___	10	___
Number of workers					
Days	6	9	12		36

Solution:

Let, n represent the number of workers and d represent the number of days required to complete a work.

Since, number of workers and number of days to complete a work are in inverse poportion.

$$\therefore n \propto \frac{1}{d}$$

$$\therefore n = k \times \frac{1}{d}$$

where k is the constant of variation.

$$\therefore n \times d = k \dots(i)$$

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i. When $n = 30$, $d = 6$

∴ Substituting $n = 30$ and $d = 6$ in (i), we get

$$n \times d = k$$

$$\therefore 30 \times 6 = k$$

$$\therefore k = 180$$

Substituting $k = 180$ in (i), we get

$$\therefore n \times d = k$$

$$\therefore n \times d = 180 \dots (ii)$$

This is the equation of variation

ii. When $d = 12$, $n = ?$

∴ Substituting $d = 12$ in (ii), we get

$$n \times d = 180$$

$$\therefore n \times 12 = 180$$

$$\therefore n = \frac{180}{12}$$

$$\therefore n = 15$$

iii. When $n = 10$, $d = ?$

∴ Substituting $n = 10$ in (ii), we get

$$n \times d = 180$$

$$10 \times d = 180$$

$$\therefore d = \frac{180}{10}$$

$$\therefore d = 18$$

iv. When $d = 36$, $n = ?$

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∴ Substituting $d = 36$ in (ii), we get

$$n \times d = 180$$

$$\therefore n \times 36 = 180$$

$$\therefore n = 18036$$

$$\therefore n = 5$$

	30	20	15	10	5
Number of workers					
Days	6	9	12	18	36

Question 2.

Find constant of variation and write equation of variation for every example given below:

i. $p \propto 1q$; if $p = 15$ then $q = 4$.

ii. $z \propto 1w$; when $z = 2.5$ then $w = 24$.

iii. $s \propto 1t^2$; if $s = 4$ then $t = 5$.

iv. $x \propto 1y\sqrt{}$; if $x = 15$ then $y = 9$.

Solution:

i. $p \propto 1q$...[Given]

$$\therefore p = k \times 1q$$

where, k is the constant of variation.

$$\therefore p \times q = k \dots(i)$$

When $p = 15$, $q = 4$

∴ Substituting $p = 15$ and $q = 4$ in (i), we get

$$p \times q = k$$

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$$\therefore 15 \times 4 = k$$

$$\therefore k = 60$$

Substituting $k = 60$ in (i), we get

$$p \times q = k$$

$$\therefore p \times q = 60$$

This is the equation of variation.

$\therefore$ The constant of variation is 60 and the equation of variation is $pq = 60$.

ii. $z \propto 1w$...[Given]

$$\therefore z = k \times 1w$$

where, k is the constant of variation,

$$\therefore z \times w = k \dots(i)$$

When $z = 2.5$, $w = 24$

$\therefore$ Substituting $z = 2.5$ and $w = 24$ in (i), we get

$$z \times w = k$$

$$\therefore 2.5 \times 24 = k$$

$$\therefore k = 60$$

Substituting $k = 60$ in (i), we get

$$z \times w = k$$

$$\therefore z \times w = 60$$

This is the equation of variation.

$\therefore$ The constant of variation is 60 and the equation of variation is $zw = 60$.

iii. $s \propto 1t^2$...[Given]

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$$\therefore s = k \times t^2$$

where, k is the constant of variation,

$$\therefore s \times t^2 = k \dots (i)$$

When $s = 4$, $t = 5$

$\therefore$ Substituting, $s = 4$ and $t = 5$ in (i), we get

$$s \times t^2 = k$$

$$\therefore 4 \times (5)^2 = k$$

$$\therefore k = 4 \times 25$$

$$\therefore k = 100$$

Substituting $k = 100$ in (i), we get

$$s \times t^2 = k$$

$$\therefore s \times t^2 = 100$$

This is the equation of variation.

$\therefore$ The constant of variation is 100 and the equation of variation is $st^2 = 100$.

iv. $x \propto \sqrt{y}$... [Given]

$$\therefore x = k \times \sqrt{y}$$

where, k is the constant of variation,

$$\therefore x \times \sqrt{y} = k \dots (i)$$

When $x = 15$, $y = 9$

$\therefore$ Substituting $x = 15$ and $y = 9$ in (i), we get

$$x \times \sqrt{y} = k$$

$$\therefore 15 \times \sqrt{9} = k$$

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$$\therefore k = 15 \times 3$$

$$\therefore k = 45$$

Substituting $k = 45$ in (i), we get

$$x \times \sqrt{y} = k$$

$$\therefore x \times \sqrt{y} = 45 .$$

This is the equation of variation.

$\therefore$ The constant of variation is $k = 45$ and the equation of variation is $x\sqrt{y} = 45$.

Question 3.

The boxes are to be filled with apples in a heap. If 24 apples are put in a box then 27 boxes are needed. If 36 apples are filled in a box how many boxes will be needed?

Solution:

Let x represent the number of apples in each box and y represent the total number of boxes required.

The number of apples in each box are varying inversely with the total number of boxes.

$$\therefore x \propto 1y$$

$$\therefore x = k \times 1y$$

where, k is the constant of variation,

$$\therefore x \times y = k \dots(i)$$

If 24 apples are put in a box then 27 boxes are needed.

i.e., when $x = 24$, $y = 27$

$\therefore$ Substituting $x = 24$ and $y = 27$ in (i), we get

$$x \times y = k$$

$$\therefore 24 \times 27 = k$$

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$$\therefore k = 648$$

Substituting $k = 648$ in (i), we get

$$x \times y = k$$

$$\therefore x \times y = 648 \dots(ii)$$

This is the equation of variation.

Now, we have to find number of boxes needed

when, 36 apples are filled in each box.

i.e., when $x = 36, y = ?$

$\therefore$ Substituting $x = 36$ in (ii), we get

$$x \times y = 648$$

$$\therefore 36 \times y = 648$$

$$\therefore y = 648/36$$

$$\therefore y = 18$$

$\therefore$ If 36 apples are filled in a box then 18 boxes are required.

Question 4.

Write the following statements using symbol of variation.

1. The wavelength of sound (l) and its frequency (f) are in inverse variation.
2. The intensity (I) of light varies inversely with the square of the distance (d) of a screen from the lamp.

Solution:

1. $I \propto 1/f$
2. $I \propto 1/d^2$

Question 5.

$x \propto 1/y$ and when $x = 40$ then $y = 16$. If $x = 10$, find y .

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Solution:

$$x \propto \sqrt{y}$$

$$\therefore x = k \times \sqrt{y}$$

where, k is the constant of variation.

$$\therefore x \times \sqrt{y} = k \dots (i)$$

When $x = 40$, $y = 16$

$\therefore$ Substituting $x = 40$ and $y = 16$ in (i), we get

$$x \times \sqrt{y} = k$$

$$\therefore 40 \times \sqrt{16} = k$$

$$\therefore k = 40 \times 4$$

$$\therefore k = 160$$

Substituting $k = 160$ in (i), we get

$$x \times \sqrt{y} = k$$

$$\therefore x \times \sqrt{y} = 160 \dots (ii)$$

This is the equation of variation.

When $x = 10$, $y = ?$

$\therefore$ Substituting, $x = 10$ in (ii), we get

$$x \times \sqrt{y} = 160$$

$$\therefore 10 \times \sqrt{y} = 160$$

$$\therefore \sqrt{y} = 160/10$$

$$\therefore \sqrt{y} = 16$$

$$\therefore y = 256 \dots [\text{Squaring both sides}]$$

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Question 6.

x varies inversely as y, when $x = 15$ then $y = 10$, if $x = 20$, then $y = ?$

Solution:

Given that,

$$x \propto \frac{1}{y}$$

$$\therefore x = k \times \frac{1}{y}$$

where, k is the constant of variation.

$$\therefore x \times y = k \dots (i)$$

When $x = 15$, $y = 10$

$\therefore$ Substituting, $x = 15$ and $y = 10$ in (i), we get

$$x \times y = k$$

$$\therefore 15 \times 10 = k$$

$$\therefore k = 150$$

Substituting, $k = 150$ in (i), we get

$$x \times y = k$$

$$\therefore x \times y = 150 \dots (ii)$$

This is the equation of variation.

When $x = 20$, $y = ?$

$\therefore$ substituting $x = 20$ in (ii), we get

$$x \times y = 150$$

$$\therefore 20 \times y = 150$$

$$\therefore y = \frac{150}{20}$$

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$$\therefore y = 7.5$$



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The Maharashtra State Board of Secondary & Higher Secondary Education (MSBSHSE), Pune is an independent body of the Maharashtra Government. There are more than 1.4 million students that appear in the examination every year. The Maha State Board conducts the board examination twice a year. This board conducts the examination for SSC and HSC.

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How many state boards are there in Maharashtra?

The Maharashtra State Board of Secondary & Higher Secondary Education, conducts the HSC and SSC Examinations in the state of Maharashtra through its nine Divisional Boards located at Pune, Mumbai, Aurangabad, Nasik, Kolhapur, Amravati, Latur, Nagpur and Ratnagiri.

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