SHIKSHA CLASSES

Sub. : Maths

Std. : VIIIth - S.B.

Answer Paper

7. Variation

Marks : 20

Q.1 : A) Select the most appropriate Alternative. 02

1) y varies as x. Express this statement symbolically.

Ans : a) $y \alpha x$

2) $A = \pi r^2$. What statement of variation do we get ?

Ans : b) $A \alpha r^2$

: B) Solve the following. 01

1) Write the following statement using the symbol of variation:

Circumference (c) of a circle is directly proportional to its radius (r).

Ans : $c \alpha r$

Q.2 : A) Solve any one of the following. (Activity) 02

1) Complete the following table considering that the cost of apples and their number are in direct variation.

Ans :

Number of apples (x)	1	4	**7**	12	**20**	**3**
Cost of apples (y)	8	32	56	**160**	160	24

2) If n varies directly as m, complete the following table.

Ans :

m	3	5	6.5	**7**	1.25	**2.5**
n	12	20	**26**	28	**5**	10

: B) Solve any one of the following. 02

1) y varies directly as the square root of x. When x = 16, y = 24. Find the constant of variation and the equation of variation.

Ans : $y \alpha \sqrt{x}$ ... (Given)

$\therefore y = k\sqrt{x}$ ... (k is a constant)

x = 16, y = 24

$\therefore 24 = k\sqrt{16}$

$\therefore 24 = 4k$

$\therefore k = \dfrac{24}{4}$

$\therefore k = 6$ ... (Constant of variation)

$y = 6\sqrt{x}$ is the equation of variation.

The constant of variation is 6; the equation of variation is $y = 6\sqrt{x}$

2) The boxes are to be filled with apples. 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 neeed?

Ans : Let the number of apples be x and the boxes needed to fill them be y.

More the number of apples in a box, less is the number of boxes required to fill them.

This is a case of inverse variation.

$\therefore x \alpha \dfrac{1}{y}$

$\therefore x = \dfrac{k}{y}$ ... (k is a constant)

$\therefore x = \dfrac{k}{y}$ or xy = k is the equation of variation.

When x = 24, y = 27.

$\therefore 24 \times 27 = k$

$\therefore k = 648$ is the constant of variation.

$xy = 648$ is the equation of variation.

Substituting x = 36,

$36 \times y = 648 \quad \therefore y = \dfrac{348}{36} \quad \therefore y = 18$

Thus, 18 boxes will be needed.

Q.3 : **A) Solve any one of the following. (Activity)** 03

1) **If a varies inversely as b then complete the following table.**

Ans :

a	6	12	15	**30**	2.5
b	20	**10**	**8**	4	**48**
$a \times b$	120	120	**120**	**120**	120

(i) $a \, \alpha \, \dfrac{1}{b}$, that is $a \times b = k$

when $a = 6$, $b = 20$ $\therefore k = 6 \times 20 = 120$
(constant of variation)

(ii) If $a = 12$, $b = ?$

$a \times b = 120$

$\therefore 12 \times b = 120$

$\therefore \qquad b = 10$

(iii) If $a = 15$, $b = ?$

$a \times b = 120$

$\therefore 15 \times b = 120$

$\therefore \qquad b = 8$

(iv) If $b = 4$, $a = ?$

$a \times b = 120$

$\therefore a \times 4 = 120$

$\therefore \qquad b = 30$.

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

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

: **B) Solve any one of the following.** 03

1) **If 15 workers can build a wall in 48 hours, how many workers will be required to do the same work in 30 hours?**

Ans : Let the number of workers be n and the time to build a wall in hours be t.

The number of workers varies inversely as the time t (in hours).

$n \, \alpha \, \dfrac{1}{t} \quad \therefore n = \dfrac{k}{t}$ ...(k is a constant)

$\therefore nt = k$ is the equation of variation.

When $n = 15$, $t = 48$ hours

$\therefore 15 \times 48 = k$

$\therefore k = 720$ is the constant of variation.

$\therefore nt = 720$ is the equation of variation.

Substituting $t = 30$,

$n \times 30 = 720$

$\therefore n = \dfrac{720}{30}$

$\therefore n = 24$

Thus, 24 workers will be required.

2) **The total remuneration paid to labourers, employed to harvest soya bean, is in direct variation with the number of labourers. If the remuneration of 4 labourers is ₹ 1000, find the remuneration of 17 labourers.**

Ans : Let the remuneration of labourers be r and the number of labourers be n.

Then $r \, \alpha \, n$ ... (Given)

$\therefore r = kn$ ... (k is a constant)

When $n = 4$, $r = 1000$.

$\therefore 1000 = k \times 4$

$\therefore k = \times \dfrac{1000}{4}$

$\therefore k = 250$ is the constant of variation
$r = 250\,n$ is the equation of variation.

Substituting $n = 17$,

$r = 250 \times 17 \qquad \therefore r = 4250$

Thus, The remuneration of 17 labourers is ₹ 4250.

Q.4 : **Solve any one of the following.** 04

1) **Suneeta types 1080 words in one hour. What is her GWAM (gross words a minute rate) ?**

Ans : The time taken to type the words varies directly as number of words

Let the number of words be x and the time taken to type the words per minute be y

Then, $x \, \alpha \, y$

$\therefore$ x = ky   ... (k is a constant)

$\therefore$ $\dfrac{x}{y}$ = k is the equation of variation.

When x = 1080, y = 1 hours = 60 minutes.

$\therefore$ $\dfrac{1080}{60}$ = k

$\therefore$ k = 18 is the constant of variation.

So, $\dfrac{x}{y}$ = 18 is equation of variation.

Substituting, y = 1 minute

$\therefore$ $\dfrac{x}{1}$ = 18

$\therefore$ x = 18

Thus, Her, GWAM is 18.

2) A car with speed 60 km/h takes 8 hours to travel some distance. What should be the increase in the speed, if the same distance is to be covered in $7\dfrac{1}{2}$ hours ?

Ans : Let the speed of the car be s and the time taken to travel some distance be t.

There is inverse variation in the speed and the time.

s α $\dfrac{1}{t}$ $\therefore$ s = $\dfrac{k}{t}$ ...(k is a constant.)

$\therefore$ st = k is the equation of variation.

When s = 60, t = 8

$\therefore$ 60 $\times$ 8 = k

$\therefore$ k = 480 is the constant of variation.

$\therefore$ st = 480 is the equation of variation.

Substituting t = $7\dfrac{1}{2}$ = 7.5,

s $\times$ 7.5 = 480

$\therefore$ s = $\dfrac{480}{7.5}$ $\therefore$ s = 64

To cover the distance, speed of the car should be 64 km/h.

$\therefore$ increase in the speed

= (64 – 60) km/h = 4 km/h.

Thus, The speed of the car should be increased by 4 km/h.

Q.5 : Solve any one of the following.   03

1) 15 women finish the work of harvesting a groundnut crop in 8 days. Find the number of women if the same job is to be completed in 6 days.

Ans : The number of days required to finish a job is inversely proportional to the number of women employed. Let the number of days be d and number of women be n.

d α $\dfrac{1}{n}$ $\therefore$ d $\times$ n = k   (k is constant)

If n = 15, then d = 8

$\therefore$ k = d $\times$ n = 15 $\times$ 8 = 120

Now let us find n when d = 6.

d $\times$ n = k

$\therefore$ d $\times$ n = 120 $\therefore$ 6 $\times$ n = 120   n = 20

$\therefore$ 20 women should be employed to finish the work in 6 days.

2) Which of the following statements are of inverse variation ?

i) Number of workers on a job and time taken by them to complete the job.

ii) Number of pipes of same size to fill a tank and the time taken by them to fill the tank.

iii) Area of circle and its radius.

Ans : (i) As the number of workers increases, the time taken by them to finish a job decreases.

This is an example of inverse variation.

(ii) As the number of pipes increases, the time taken to fill the tank decreases.

This is an example of inverse variation.

(iii) As the radius of circle increases, its area of the circle also increases.

This is not an example of inverse variation.

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