Ratio and Proportion (English Medium)

Activity

Solution 1:

1. 2, 4, 8, 16, 32, 64, do ◯ on it.
3. 1, 3, 9. 27, 81, 243, do ▭ on it.
4. 11, 22, 44, 88, 176, 352, do △ on it.
5. 80, 40, 20, 10, 5, 2.5, do ⬠ on it.
6. 96, 48, 24, 12, 6, 3, do ⬡ on it.

Solution 2:

No	Cost of terms	Cost of 1items	Cost of 2 items	Cost of 3 items	Cost of 4 items	Cost of 5 items	Number of items increases or decreases?	Cost increases or decreases?
1	Ballpen	3	6	9	12	15	Increases	Increases
2	Chocolate	5	10	15	20	25	Increases	Increases
3	Drawing book	10	20	30	40	50	Increases	Increases
4	Spects	70	140	210	280	350	Increases	Increases
5	schoolbag	120	240	360	480	600	Increases	Increases

Solution 3:

No	Friends Name	No. of family members	Per person					
			Wheat (in kg)	Rice (in kg)	Bajara (in kg)	Sugar (in kg)	Oil (in litres)	Kerosene (in litres)
1	Neha	2	100	80	40	70	200	160
2	Mahesh	4	50	40	20	35	100	80
3	Nikhil	10	20	16	8	14	40	32
4	Nilesh	5	40	32	16	28	80	64

Exercise

Solution 1:

The ratio of the price of the bicyde and the price of the scooter

$$= \frac{\text{Price of bicyde}}{\text{Price of scooter}} = \frac{\text{Rs.5000}}{\text{Rs.45000}} = \frac{5000}{5000 \times 9} = \frac{1}{9} = 1:9$$

The ratio of the price of the bicyde and the price of the scooter = 1 : 9

Solution 2:

The ratio of the length of silk doth and cotton doth

$$= \frac{\text{Length of silk doth}}{\text{Length of cotton doth}} = \frac{150m}{200m} = \frac{3}{4} = 3:4$$

∴ The ratio of the length of the silk cloth and the cotton cloth = 3 : 4

Solution 3(1):

Product of the first and the fourth term = 2 × 49 = 98

Product of the second and the third term. 7× 14 = 98

Product of the first and the fourth term = Product of the second and the third term = 98

Hence, 2, 7, 14, 49 are in proportion.

Solution 3(2):

Product of the first and the fourth term = 3 × 35 = 105

Product of the second and the third term. 21× 5 = 105

Product of the first and the fourth term = Product of the second and the third term = 98

Hence, 3, 21, 5, 35 are in proportion.

Solution 3(3):

Product of the first and the fourth term = 2 × 11 = 22

Product of the second and the third term. 11× 4 = 44

Product of the first and the fourth term ≠ Product of second and third term

Hence, 3, 21, 5, 35 are not in proportion.

Solution 4:

Given: Number of purses which can be bought for Rs. 1320 = 11

Number of purses which can be bought for Rs. 960 = ?

The number of purses which can be bought would decrease with a decrease in the amount of money.

This is an example of direct proportion.

Price of one purse = Rs. (1320 ÷ 11)

Number of purses which can be bought for Rs. 960 = Amount of money ÷ Price of one purse

$$= \text{Rs.}960 \div \text{Rs.}(1320 \div 11) = 960 \times \frac{11}{1320} = \frac{11 \times 960}{1320} = \frac{11 \times 8 \times 10 \times 12}{11 \times 12 \times 10} = 8$$

Number of purses which can be bought for Rs. 960 is 8.

Solution 5:

Given: Distance covered by the car using 3 litres of petrol = 120 km
Distance covered by the car using 1 litre of petrol = 120 ÷ 3
Distance covered by the car using 7 litres of petrol = ?
The distance covered by the car would increase with an increase in the amount of money.
This is an example of direct proportion.
Distance covered by the car using 1 litre of petrol = 120 ÷ 3
Distance covered by the car using 7 litres of petrol
= 7 x distance covered by car with 1 litre petrol
$= [7 \times (120 \div 3)]$km
$= \left(7 \times \frac{120}{3}\right)$km
$= \left(\frac{7 \times 3 \times 40}{3}\right)$km
= 280 km
Distance covered by the car using 7 litres of petrol = 280 km

Solution 6:

Given :
Time taken by 150 students to clean the village = 6 hours
Time taken by 180 students to clean the village = ?
The time taken by students to dean the village would decrease with an increase in the number of students.
This is an example of inverse proportion.
Time taken by 180 students to clean the village :
Time taken by 1 student x 180
= Total time taken ÷ Number of students
= 6 hour ÷ 150
∴ Time taken by 180 students to dean the village = $\left(6 \times \frac{150}{180}\right)$hr= $\left(\frac{6 \times 3 \times 5 \times 10}{3 \times 6 \times 10}\right)$hr = 5 hours
Time taken by 180 students to clean the village = 5 hours

Solution 7:

Given, number of winners of cultural activity program = 33
Amount received by each winner of cultural activity program = Rs. 80
Amount received by each winner of sports competition = Rs. 120
The amount received by students have increased therefore there is a decrease in the number of students.
This is an example of inverse proportion.
Amount received by 33 winners of cultural activity = Rs. 80
Amount received by winners of sports competition = Rs. 120
∴ Number of winners of sports compitition = $\frac{80 \times 33}{120} = \frac{40 \times 2 \times 11 \times 3}{40 \times 3} = 22$
Number of winners of sports competition = 22

Practice – 1

Solution 1:

The ratio of cost of the pair of scissors and the cost of pen
$= \frac{\text{Cost of the pair of scissors}}{\text{Cost of pen}} = \frac{40}{10} = \frac{4}{1} = 4 : 1$
The ratio of cost of the pair of scissors and the cost of pen = 4 : 1

Solution 2:

$$\text{The ratio number of boys and girls} = \frac{\text{Number of boys}}{\text{Number of girls}} = \frac{30}{20} = \frac{3}{2} = 3:2$$

$\therefore$ The ratio of number of boys to number of girls = 3 : 2

OR

$$\text{The ratio number of girls and boys} = \frac{\text{Number of girls}}{\text{Number of boys}} = \frac{20}{30} = \frac{2}{3} = 2:3$$

$\therefore$ The ratio of number of girls to number of boys = 3 : 2

Solution 3:

$$\text{The ratio of weight of Pratik and his father} = \frac{\text{Weight of Pratik}}{\text{Weight of his father}} = \frac{40\ \text{kg}}{50\ \text{kg}} = \frac{4}{5} = 4:5$$

$\therefore$ The ratio of weight of Pratik and his father = 4 : 5

Solution 4:

$$\text{The ratio of cost of the belt and shoes} = \frac{\text{Cost of the belt}}{\text{Cost of the shoes}} = \frac{60}{150} = \frac{6}{15} = \frac{2}{5} = 2:5$$

$\therefore$ The ratio of cost of the belt and shoes = 2 : 5

Practice – 2

Solution 1:

Product of the first and the fourth term = 3 × 21 = 63
Product of the second and the third term. 7 × 9 = 63
Product of the first and the fourth term = Product of second and third term = 63
Hence, 3, 7, 9, 21 are in proportion.

Solution 2:

Product of the first and the fourth term = 7 × 13 = 91
Product of the second and the third term. 6 × 12= 72
Product of the first and the fourth term ≠ Product of the second and the third term
Hence, 7, 6, 12, 13 are not in proportion.

Solution 3:

Product of the first and the fourth term = 4 × 20 = 80
Product of the second and the third term = 8 × 10 = 80
Product of the first and the fourth term = Product of the second and the third term = 80
Hence, 4, 8, 10, 20 are in proportion.

Solution 4:

Product of the first and the fourth term = 10 × 24 = 240
Product of the second and the third term. 15 × 16 = 240
Product of the first and the fourth term = Product of the second and the third term = 240
Hence, 10, 15, 16, 24 are in proportion.

Solution 5:

Product of the first and the fourth term = 25 × 50 = 1250
Product of the second and the third term = 30 × 40 = 1200
Product of the first and the fourth term ≠ Product of the second and the third term
Hence, 25, 30, 40, 50 are not in proportion.

Solution 6:

Product of the first and the fourth term = 9 × 21 = 189
Product of the second and the third term. 11 × 20 = 220
Product of the first and the fourth term ≠ Product of the second and the third term
Hence, 9, 11, 20, 21are not in proportion.

Practice – 3

Solution 1:

When the number of bags increases, then quantity of wheat also increases.

No. of bags	Quantity of wheat
a = 5	b = 100 kg
c = 7	d = (?)kg

For direct proportion,

$a \times d = b \times c$

$\therefore 5 \times d = 100 \times 7$

$\therefore d = \frac{700}{5} = 140$

∴ Quantity of wheat in 7 such bags = 140 kg.

Solution 2:

The number of soaps increases with an increase in the number of boxes.

No. of boxes	number of soaps
a = 4	b = 240
c = 3	d = (?)kg

For direct proportion $a \times d = b \times c$

$\therefore 4 \times d = 240 \times 3$

$\therefore d = \frac{4 \times 60 \times 3}{4} = 180$

∴ Number of soaps in 3 such boxes = 180

Solution 3:

The quantity of water increases with an increase in the number of tanks.

Quantity of water	Number of tanks
a = 3600	b = 6
c = 8400	d = (?)

For direct proportion $a \times d = b \times c$

$\therefore 3600 \times d = 8400 \times 6$

$\therefore d = \frac{8400 \times 6}{3600}$

$\therefore d = \frac{7 \times 1200 \times 2 \times 3}{3 \times 1200}$

$= 14$ tanks

$\therefore$ Number of tanks required for 8400 litres of water $= 14$

Solution 4:

Given :

Amount required for 8 water bags = Rs.560

Amount required for 5 water bags = ?

$\therefore$ This is an example of direction proportion.

Amount required for 5 water bags $= Rs.\left(\frac{5 \times 560}{8}\right) = Rs.\left(\frac{5 \times 8 \times 70}{8}\right) = Rs.350$

$\therefore$ The amount necessary to buy 5 waterbags = Rs. 350

Solution 5:

Given :

Time taken to print 3 pages of a book = 15 minutes

Time taken to print 56 pages of the book =?

The time taken to print increases with an increase in the number of pages.

This is an example of direction proportion.

Amount required to print 56 pages of the book $= \left(\frac{56 \times 15}{3}\right)$ minutes = 280 minutes = 4 hours 40 minutes

Hence, time required to print the whole book = 4 hours 40 minutes

Practice – 4

Solution 1:

Given: Number of chocolates when distributed among 300 students = 4

Number of chocolates when distributed among 400 students =?

The Number of chocolates will decrease with an increase in the number of students.

$\therefore$ This is an example of inverse proportion.

Number of choclates received when distributed among 400 students $= \left(\frac{300 \times 4}{400}\right)$ chocolates

= 3 chocolates

Hence, number of choclates received when distributed among 400 students = 3

Solution 2:

Given : Number of benches in the class = 15
Number of students on each bench when sitting 15 benches = 4
Number of benches reduced to 12 then the number of students sitting on each bench =?
The Number of students on each bench will increase with a decrease in the number of benches.
∴ This is an example of inverse proportion.
Total number of students in the class = 15 × 4

∴ Number of student on each bench if there are 12 benches $=\left(\frac{15 \times 4}{12}\right) = 5$

Hence, 5 students will sit on each bench.

Solution 3:

Given: Number of persons receiving grains from Mansukhbhai = 150
Quantity of grains received from Mansukhbhai = 7 kg
Number of persons receiving grains from Jitubhai = 210
Quantity of grains received from Jitubhai =?
The Quantity of grains received by each person will decrease with an increase in the number of persons.
This is an example of inverse proportion.
Total quantity of grains = (150 × 7) kg

∴ Quantity of grains received from Jitubhai $= \left(\frac{150 \times 7}{210}\right)\text{kg} = \left(\frac{30 \times 5 \times 7}{30 \times 7}\right)\text{kg} = 5\text{ kg}$

Hence, each person would get 5 kg of grains.

Solution 4:

Given:Number of persons among which the fund gets distributed = 81
Amount of fund each person gets when distributed among 81 persons = Rs.600
Number of persons among which the fund is to be distributed = 54
Amount of fund each person gets when distributed among 54 persons =?
The amount of fund each person would receive increase with a decrease in the number of persons.
This is an example of inverse proportion.
Total amount of fund =Rs.(81 × 600)

Amount of fund each person gets when distributed among 54 persons $= \text{Rs.}\left(\frac{81 \times 600}{54}\right)$

$= \text{Rs.}\left(\frac{9 \times 9 \times 6 \times 100}{9 \times 6}\right) = \text{Rs. } 900$

Amount of fund each person gets when distributed among 54 persons = Rs.900