RD SHARMA

Solutions

Class 8 Maths

Chapter 10

Ex 10.2

Q1. In which of the following tables x and y vary inversely:

(i)

x	**4**	**3**	**12**	**1**
y	**6**	**8**	**2**	**24**

(ii)

x	**5**	**20**	**10**	**4**
y	**20**	**5**	**10**	**25**

(iii)

x	**4**	**3**	**6**	**1**
y	**9**	**12**	**8**	**36**

(iv)

x	**9**	**24**	**15**	**3**
y	**8**	**3**	**4**	**25**

Soln:

(i) Since x and y vary inversely, we have: $y = kx \Rightarrow xy = k$

$\therefore$ the product of x and y is constant. In all cases, the product xy is constant (i.e. 24)

Thus, in this case x and y vary inversely.

(ii) In all cases, the product xy is constant for any two pairs of values for x and y. Here, $xy = 100$ for all cases.

Thus, in this cases, x and y do not vary inversely.

(iii) If x and y vary inversely, the product xy should be constant. Here, in one cases, product $= 6 \times 8 = 48$ and in the rest, product = 36

Thus, in this case, x and y do not vary inversely.

(iv) If x and y inversely, the product xy should be constant. Here, the product is different for all cases. Thus in this cases, x and y do not vary inversely.

Q2. If x and y vary inversely, fill in the following blanks:

(i)

x	**12**	**16**	**—**	**8**	**—**
y	**—**	**6**	**4**	**—**	**0.25**

(ii)

x	**16**	**32**	**8**	**128**
y	**4**	**—**	**—**	**0.25**

(iii)

x	**9**	**—**	**81**	**243**
y	**27**	**9**	**—**	**1**

Soln:

(i) Since x and y vary inversely, we have: xy = k

For x = 16 and y = 6, we have: 16 X 6 = k

=> k = 96

For x = 12 and k =96, we have:

xy = k

=> 12y =96

=> y = 96/ 12 = 8

For y = 4 and k = 96, we have: xy = k

=> 4x = 96

=> x = 24

For x = 8 and k = 96, we have:

xy = k

=> 8y = 96 => y = 96/ 8 = 12

For y = 0.25 and k = 96, we have: xy = k

=> 0.25x = 96

=> x = 96/ 0.25 = 384

(ii) Since x and y vary inversely, we have: xy = k

For x = 16 and y = 4, we have: 16 X 4 = k

=> k = 64

For x = 32 and k = 64, we have: xy = k

=> 32y = 64

=> y = 64/ 32 = 2

For x = 8 and k = 64

=> xy = k

=> 8y = 64

=> y = 8

(iii) Since x and y vary inversely, we have: xy = k

For x = 9 and y = 27

9 X 27 = k

=> k = 243

For y = 9 and k = 243, we have: xy = k

=> 9x = 243

=> x = 243/ 9 = 27

For x = 81 and k = 243, we have:

xy = k

=> 81y = 243

=> y = 243/ 81 = 3

Q3. Which of the following quantities vary inversely as each other?

(i) The number of x men hired to construct a wall and the time y taken **to finish the job.**

(ii) The length x of a journey by bus and price y **of the ticket.**

(iii) Journey (x km) undertaken by a car and the petrol (y liters) consumed by it.

Soln:

(i) If the number of men is more, the time taken to construct a wall will be less. Therefore, it is in inverse variation.

(ii) If the length of a journey is more, the price of the ticket will also be more. Therefore, it is not in inverse variation.

(iii) If the length of the journey is more, the amount of petrol consumed by the car will also be more.

Therefore, it is not in inverse variation.

Thus, only (i) is in inverse variation.

Q4. it is known that for a given mass of gas, the volume v varies inversely as the pressure p. fill in the missing entries in the following table:

v (in cm^3)	**—**	**48**	**60**	**—**	**100**	**—**	**200**
P (in atmospheres)	**2**	**—**	**3/ 2**	**1**	**—**	**1/ 2**	**—**

Soln:

Since the volume and pressure for the given mass vary inversely, we have: vp = k

For v = 60 and p = 30, we have: k = 60 X 32 = 90

For p = 2 and k = 90, we have: 2v = 90

=> v = 45

For v = 48 and k =90, we have: 48p = 90

=> p = 48/ 90

For p = 1 and k = 90, we have: 1v = 90

=> v = 90

For v = 100 and k = 90, we have: 100p = 90

=> v = 9/ 10

For p = 12 and k = 90, we have: 12v = 90

=> v = 90 / 12 = 15/ 2

For v = 200 and k = 90, we have:

200p = 90

=> p = 9/ 20

Q5. If 63 men can do a piece of work in 25 days, in how many days will 15 men do it?

Soln:

Let x be the number of days in which 15 men can do a piece of work.

Number of men	**36**	**15**
Number of days	**25**	**x**

Since the number of men hired and the number of days taken to do a piece of work are in inverse variation, we have:

$36 \times 25 = x \times 15 \Rightarrow x = \frac{36\times25}{15} = \frac{900}{15} = 60$

Thus, the required number of days is 60.

Q6. A workforce of 50 men with a contractor can finish a piece of work in 5 months. In how many months the same work can be completed by 125 men?

Soln:

Let x be the number of days required to complete a piece of work by 125 men.

Number of men	50	125
Months	5	x

Since the number of men engaged and the number of days taken to do a piece of work are in inverse variation, we have:

$50 \times 5 = 125x$

$\Rightarrow x = \frac{50\times5}{125} = 2$

Thus, the required number of months is 2

Q7. A workforce of 420 men with a contractor can finish a certain piece of work in 9 months. How many extra men must he employ to complete the job in 7 months?

Soln:

Let x be the extra number of men employed to complete the job in 7 months.

Number of men	**420**	**x**
Months	**9**	**7**

Since the number of men hired and the time required to finish the piece of work are in inverse variation, we have:

$420 \times 9 = 7x \; x = \frac{420\times9}{7} = 540$

Thus, the number of extra men required to complete the job in 7 months = 540 – 420 = 120

Q8. 1200 men can finish a stock of food provisions in 35 days. How many should more men join them so that the same stock may last for 25 days?

Soln:

Number of men	1200	x
Days	35	25

Let x be the number of addition men required to finish the stock in 25 days.

Since the number of men and the time taken to finish a stock are in inverse variation, we have: $1200 \times 35 = 25x$

$\Rightarrow x = \frac{1200\times35}{25} = 1680$

∴ Required number of men = 1680 – 1200 = 480.

Thus, an additional 480 men should join the existing 1200 men finish the stock in 25 days.

Q9. In a hostel of 50 girls, there are food provisions for 40 days. If 30 more girls join the hostel, how long will these provisions last?

Soln:

Let x be the number of days with food provisions for 80 (i.e. 50 + 30) girls.

Number of girls	50	80
Number of days	40	x

Soln: Since the number of girls and number of days with food provisions are in inverse variation, we have: $50 \times 40 = 80x$

$\Rightarrow x = \frac{50 \times 40}{80} = \frac{2000}{80} = 25$

Thus, the required number of days is 25

Q10. A car can finish a certain journey in 10 hours at the speed of 48 km/ hr. by how much should its speed be increased so that it may take only 8 hours to cover the same distance?

Soln:

Let the increased speed be x km/h.

Time (in h)	10	8
Speed (km/h)	48	x + 48

Since speed and time taken are in inverse variation, we get:

$10 \times 48 = 8(x + 48)$
$\Rightarrow 8x = 480 - 384$

$\Rightarrow 8x = 96 = 12$

Thus, the speed should be increased by 12 km/h.

Q11. 1200 soldiers in a fort had enough food for 28 days. After 4 days, some soldiers were transferred to another fort and thus the food lasted now for 32 more days. How many soldiers left the fort?

Soln:

It is given that after 4 days, out of 28 days, the fort had enough food for 1200 soldiers for $(28 - 4 = 24)$

Let x be the number of soldiers who left the fort.

Number of soldiers	1200	1200-x
Number of days for which food lasts	24	32

Since the number of soldiers and the number of days for which the food lasts are in inverse variation, we have:

$1200 \times 24 = 1200 - x \times 32$
$\Rightarrow 1200 \times 2432 = 1200 - x$

$\Rightarrow 900 = 1200 - x$

$\Rightarrow x = 300$

Thus, 300 soldiers left the fort

Q12. Three spraying machines working together can finish painting a house in 60 minutes. How long will it take for 5 machines of the same capacity to do the same job?

Soln:

Let the time taken by 5 spraying machines to finish a painting job be x minutes.

Number of machines	3	5
Time (in minutes)	60	x

Since the number of spraying machines and the time taken by them to finish a painting job are in inverse variation, we have:

$3 \times 60 = 5 \times x$
$\Rightarrow 180 = 5x$

$\Rightarrow x = 36$

Thus, the required time will be 36 minutes.

Q13. A group of 3 friends staying together consume 54 kg of wheat every month. Some more friends join this group and they find that the same amount of wheat lasts for 18 days. How many new members are there in this group now?

Soln:

Let x be the number of new members in group.

Number of members	3	X
Number of days	30	18

Since more members can finish the wheat in less number of days, it is a case of inverse variation. Therefore, we get:

$3 \times 30 = x \times 18$
$\Rightarrow 90 = 18x$

$\Rightarrow x = 90/ 18 = 5$

Thus, the number of new members in the group = 5 – 3 = 2

Q14. 55 cows can graze a field in 16 days. How many cows will graze the same field in 10 days?

Soln:

Let the number of cows and the number of days taken by them to graze the field is in inverse variation, we have:

$16 \times 55 = 10 \times x$
$\Rightarrow x = \frac{16 \times 55}{10} = 88$

The required number of cows is 88

Q15. 18 men can reap a field in 35 days. For reaping the same field in 15 days, how many men are required?

Soln:

Let the number of men required to reap the field in 15 days be x.

Number of days	35	15
Number of men	18	X

Since the number of days and the number of men required to reap the field are in inverse variation, we have:

$35 \times 18 = 15 \times x$
$\Rightarrow x = \frac{35 \times 18}{15} = 42$

Thus, the required number of men is 42.

Q16. A person has money to buy 25 cycles worth Rs 500 each. How many cycles will he be able to buy if each cycle is costing Rs 125 more?

Soln:

Let x be the number of cycles bought if each cycle costs Rs 125 more

Cost of a cycle (in Rs)	500	625
Number of cycles	25	x

It is in inverse variation. Therefore, we get:

500 **x** 25 = 625 **x** x

$\Rightarrow x = \frac{500 \times 256}{25} = 20$

∴ The required number of cycles is 20.

Q17. Raghu has enough money to buy 75 machines worth Rs 200 each. How many machines can he buy if he get **a discount of Rs 50 on each** machines**?**

Soln:

Let x be the number of machines he can buy if a discount of Rs. 50 is offered on each machine.

Number of machines	75	x
Price of each machine (in Rs)	200	150

Since Raghu is getting a discount of Rs 50 on each machine, the cost of each machine will get decreased by 50.

If the price of a machine is less, he can buy more number of machines. It is a case of inverse variation. Therefore, we have:

$75 \times 200 = x \times 150$

$\Rightarrow x = \frac{75 \times 200}{150} = \frac{15000}{150} = 100$

∴ The number of machines he can buy is 100.

Q18. If x and y vary inversely as each other and

(i) x = 3 when y = 8, find y when x = 4

(ii) x = 5 when y = 15, find x when y = 12

(iii) x = 30, find y when constant of variation = 900

(iv) y = 35, find x when constant of variation = 7

Soln:

(i) Since x and y vary inversely, we have: xy = k

For x =3 and y = 8, we have:

=> 3 **x** 8 = k

=> k = 24

For x = 4, we have:

4y = 24

=> y = 6

∴ y = 6

(ii) Since x and y vary inversely, we have: xy = k

For x = 5 and y = 15, we have:

=> 5 **x** 15 = k

=> k = 75

For y = 12, we have:

12x = 75

=> x = 75/ 12 = 25/ 4

∴ x = 25/ 4

(iii) Given: x = 30 and k = 900

∴ xy = k

=> 30y = 900

=> y = 900/ 30 = 30

=> y = 30

(iv) Given: y = 35 and k = 7 Now, xy = k

=> 35x = 7

=> x = 1/ 5

∴ x = 1/ 5