Exercise 10.2

Q.1 In which of the following tables x and y vary inversely.

(i)

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

Sol: here $4\times6=24$; $3\times8=24$, $12\times2=24$, $1\times24=24$

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

Therefore, x and y are in inverse variation.

(ii)

x :	5	20	10	4
y :	20	5	10	25

Sol: $\because 5\times20=100$; $20\times5=100$; $10\times10=100$, $4\times25=100$.

here $x\times y=k$

Therefore x and y are in inverse variation.

(iii)

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

Solution: here $4\times9=36$; $3\times12=36$, $6\times8=48$

$1\times36=36$

here $4\times9=3\times12\neq6\times8$

$\therefore$ It is not varies inversely.

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(iv)

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

$\because \quad 9 \times 8 = 72 \; ; \quad 24 \times 3 = 72$

But $15 \times 4 = 60$ and $3 \times 25 = 75$

$\therefore$ x and y does not vary inversely.

Q.2 If x and y vary inversely, fill in the following blanks.

(i)

x :	12	16	...	8	...
y :	...	6	4	...	0.25

Solution :

let x :	12	16	x_1	8	x_2
y :	y_1	6	4	y_2	0.25

$\because$ x and y varies inversely

$$xxy = K$$

$$\Rightarrow 16 \times 6 = K \Rightarrow K = 96$$

Now $12 \times y_1 = 96$

$$y_1 = \frac{96}{12} = 8$$

also $x_1 \times 4 = 96$

$$\Rightarrow x_1 = \frac{96}{4} = 24$$

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also $8 \times y_2 = 96$

$\Rightarrow y_2 = \frac{96}{8} = 12$

Again $x_2 \times 0.25 = 96$

$\Rightarrow x_2 = \frac{96}{0.25} = 384$

(ii)

x :	16	32	8	128
y :	4	y_1	y_2	0.25

Solution: $K = x \times y = 16 \times 4 = 64$

$32 \times y_1 = 64 \Rightarrow y_1 = \frac{64}{32} = 2$

$8 \times y_2 = 64 \Rightarrow y_2 = \frac{64}{8} = 8$

(iii)

x :	9	24	81	243
y :	27	9	y_1	1

Sol $K = x \times y = 9 \times 27 = 243$

$\because \quad x_1 \times 9 = 243$

$\Rightarrow x_1 = \frac{243}{9} = 27$

also $81 \times y_1 = 243$

$y_1 = \frac{243}{81} = 3$

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Q.3 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 litres) Consumed by it.

Sol Here only (i) part is an example of inverse Variation.

Q.4 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)	:	v_1	48	60	v_2	100	v_3	200
p (in atmosphere)	:	2	p_1	3/2	1	p_2	1/2	p_3

Sol Here $x \times y = K \Rightarrow K = 60 \times \frac{3}{2} = 90$

$v_1 \times 2 = 90 \Rightarrow v_1 = 90/2 = 45$

$48 \times p_1 = 90 \Rightarrow p_1 = \frac{90}{48} = \frac{15}{8}$

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$v_2 \times 1 = 90 \Rightarrow v_2 = 90$

$100 \times p_2 = 90 \Rightarrow p_2 = \frac{90}{100} = \frac{9}{10}$

$v_3 \times \frac{1}{2} = 90 \Rightarrow v_3 = 90 \times 2 = 180$

$200 \times p_3 = 90 \Rightarrow p_3 = \frac{90}{200} = \frac{9}{20}$

Q.5 If 36 men can do a piece of work in 25 days, In how many days will 15 man do it?

Sol:

No of Men	36	15
Time taken (days)	25	x

$36 \times 25 = 15 \times x$

$\Rightarrow x = \frac{\overset{12}{\cancel{36}} \times 25}{\underset{1}{\cancel{15}}} \overset{5}{} \Rightarrow x = 12 \times 5$

$= 60$ days.

Q.6 A work force 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?

Solution:

No. of Men	50	125
Time (months)	5	x

$\therefore 50 \times 5 = 125 \times x$

$\Rightarrow 250 = 125x \Rightarrow x = \frac{250}{125}$

$= 2$ Months.

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Q.7 A work force 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?

Solution: Let no. of men employed = x

No. of men	:	420 x
Time (Months)	:	9 7

$\therefore$ $420 \times 9 = x \times 7$

$\Rightarrow x = \frac{420 \times 9}{7} = 540$ men

$\therefore$ Extra Men needed = $540 - 420$

$= 120$ Men.

Q.8 1200 man can finish a stock of food in 35 days. How many more men should join them so that the same stock may last for 25 days?

Solution: Let no. of men needed = x

No. of men	:	1200 x
Time (Days)	:	35 25

$1200 \times 35 = x \times 25$

$\Rightarrow x = \frac{1200 \times 35}{25} = 48 \times 35$

$= 1680$ man.

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$\therefore$ Extra men needed $= 1680 - 1200 = 480$ Men.

Q.9 In a hostel of 50 girls, there are food provisions for 40 days. If 30 more girls join the hostel, how long will these provision last?

Solution: If 30 more girls join the hostel, then

total girls $= 50 + 30 = 80$.

No. of girls	50	80
days	40	x

$\therefore 50 \times 40 = 80 \times x$

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

$\Rightarrow x = 25$ days.

Q.10 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?

Solution: Let required speed $= x$ Km/h.

Speed	48 Km/h	x Km/h
Time	10	8

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$\therefore 48 \times 10 = 8 \times x$

$\Rightarrow x = \frac{48 \times 10}{8} = 60$ Km/h.

Q.11 1200 Soldiers in fort had enough food for 28 days. After 4 days, some soldiers were transfered to another fort and thus the food lasted now for 32 more days. How many soldiers left the fort.

Sol: Let Total Soldiers = 1200

Let us consider the number of soldiers transfered to another fort = x

After 4 days no. of Soldiers left = 1200 - x

And for remaining soldiers (1200-x) the food lasted for 32 More days.

Time (days)	24	32
No. of Soldiers	1200	1200 - x

$\therefore 24 \times 1200 = 32(1200 - x)$

$\Rightarrow 24 \times 1200 = 38400 - 32x$

$\Rightarrow 28800 = 38400 - 32x$

$\Rightarrow 32x = 38400 - 28800 = 9600$

$x = \frac{9600}{32} = 300$

$\therefore$ 300 Soldiers left for another fort.

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Q.12 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?

Solution: Let time taken by 5 machines = x ~~days~~ Min

No. of Machines	3	5
Time (Mins)	60	x

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

$\Rightarrow x = \frac{180}{5} = 36$ Minutes.

Q.13 A group of 3 friends staying together, consumes 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?

Sol: Let no. of friends joined in a group = x

No. of friends	3	x
Time	30	18

$\therefore 3 \times 30 = x \times 18$

$\Rightarrow x = \frac{90}{18} = 5$

$\therefore$ Joined friends = $5 - 3 = 2$

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Q.14 55 cows can graze a field in 16 days. How many cows will graze the same field in 10 days?

Sol: Let No. of cows be x, then

No. of cows	55	x
No. of day	16	10

$\therefore 55 \times 16 = x \times 10$

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

Q.15 18 men can reap a field in 35 days. For reaping the same field in 15 days. How many men are required?

Sol: Let no. of men required = x

No. of men	18	x
No. of days	35	15

$\therefore 18 \times 35 = x \times 15$

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

Q.16 A person has money to buy 25 cycles worth Rs 500 each. How many cycles he will be able to buy if each cycle is costing Rs 125 more?

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Sol: Let's consider no. of cycles = x

Cost of one cycle = ~~150~~ 500 + 125 = 625.

Cost (Rs)	500	625
No. of cycles	25	x

$\therefore 500 \times 25 = 625 \times x$

$\Rightarrow x = \frac{500 \times 25}{625} = 20$ cycles.

Q.17 Raghee has enough money to buy 75 machines worth Rs 200 each. How many machines can he buy if he gets a discount of Rs. 50 on each machine?.

Sol: let no. of machines = x

When cost of each money decreases = 200 - 50
= 150

Cost (Rs)	200	150
Machines	75	x

$\therefore 200 \times 75 = 150 \times x$

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

Q.18 If x and y vary inversely as each other and.

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

Sol:

x	3	4
y	8	---(y)

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$\therefore \quad 3 \times 8 = 4 \times y_1 \Rightarrow y_1 = \frac{24}{4}$

$\Rightarrow y_1 = 6$

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

Sol:

x	5	x_1
y	15	12

$\therefore \quad 5 \times 15 = x_1 \times 12$

$\Rightarrow \frac{75}{12} = x_1 \Rightarrow x_1 = \frac{25}{4}$

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

Sol: $x \times y = K$

$\Rightarrow 30 \times y = 900$

$\Rightarrow y = \frac{900}{30} = 30$

$\therefore y = 30$

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

Sol: $\because x \times y = K$

$x \times 35 = 7$

$x = \frac{7}{35}$

$x = \frac{1}{5}$

$\therefore x = \frac{1}{5}$

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