29. A, B and C can walk at the rates of 3, 4 and 5 km per hour respectively. They starts from Pune at 1, 2, 3 o'clock respectively. When B catches A, B sends him back with a message to C. When will C get the message?
(1) 4.15 o'clock
(2) 5.15 o'clock
(3) 6.25 o'clock
(4) Can't be determined
(5) None of these

30. A thief is spotted by a policeman from a distance of 200 metres. When the policeman starts the chase, the thief also starts running. Assuming the speed of the thief 10 kilometres an hour, and that of the policeman 12 kilometres an hour, how far will the thief have run before he is overtaken?
(1) 1 km (2) 3 km
(3) 5 km (4) 7 km
(5) None of these

31. I have to be at a certain place at a certain time and I find that I shall be 15 minutes too late, if I walks at 4 km and hour; and 10 minutes too soon, if I walks at 6 km an hour. How far have I to walk?
(1) 3 km (2) 5 km
(3) 6 km (4) 8 km
(5) None of these

Answers with explanations

1.4; The required distance

$$\frac{\text{Speed multiplied}}{\text{Difference of speed}} \times \text{difference in time}$$

difference in time = 6 + 6 min.

$$= \frac{6+6}{60} \text{ hrs.}$$

$$= \frac{2\frac{1}{2} \times 3\frac{1}{2}}{3\frac{1}{2} - 2\frac{1}{2}} \times \frac{6+6}{60} = \frac{6+6}{60} \frac{\frac{5}{2} \times \frac{7}{2}}{\frac{7}{2} - \frac{5}{2}} \times \frac{1}{5} = \frac{5 \times 7}{4} \times \frac{1}{5}$$

$$= \frac{7}{4} = 1\frac{3}{4} \text{ km.}$$

2.3; Let the distance be x km. Then $T = \frac{D}{S}$

$$T = \frac{x}{25} + \frac{x}{4} = 5 \text{ hrs } 48 \text{ min}$$

$$= 5\frac{48}{60} \text{ hrs.} = 5\frac{4}{5} \text{ hrs.}$$

$$\Rightarrow \frac{4x + 25x}{25 \times 4} = \frac{29}{5}$$

$$\Rightarrow x = \frac{29}{5} \times \frac{25 \times 4}{29} = 20 \text{ km}$$

2.3; **Paramount concept:-**

Better way is to go with the option option 3 satisfies the statement

If distance is 20 kms, time taken to cover at the speed of 25 km/hr.

$$T = \frac{D}{S} = \frac{20}{25} = \frac{4}{5} \text{ hrs.}$$

$$= \frac{4}{5} \times 60 \text{ min.} = 48 \text{ min.}$$

At the speed of 4 kms/hr. = 5 hrs.

Total time = 5 hr. 48 min.

3.1; $\frac{\text{Speed of A}}{\text{Speed of B}} = \sqrt{\frac{\text{Time of B}}{\text{Time of A}}} = \sqrt{\frac{9}{4}} = 3:2$

(we know that speed is inversely propotional to time)

4.3; 550 m. $= \frac{550}{1000}$ km.

The required ratio $= \frac{550}{1000 \times 1} : \frac{33}{45}$

$= 3 : 4$

5.1; Average speed $= \frac{2 \times S_1 \times S_2}{S_1 + S_2}$

$$= \frac{2 \times 70 \times 55}{70 + 55} \text{ km./hr.}$$

$= 61.6$ km./hr.

6.3; Let the distance be x kms.

Time taken to cover x kms at 30 kms/hr. $T = \frac{D}{S} = \frac{x}{30}$ hrs.

Time taken to cover x km at 40 kms/hr. $= \frac{x}{40}$ hrs.

Difference between the time taken

$= 15 \text{ min} = \frac{1}{4}$ hr

$$\therefore \frac{x}{30} - \frac{x}{40} = \frac{1}{4} \text{ or } 4x - 3x = 30$$

$$\Rightarrow x = 30$$

Hence, the required distance is 30 kms.

6.3; **Paramount concept** :-

120 ⟶ L.C.M. of 30 & 40

4hr. / 3 hr.

30 km./hr. 40 km./hr.

when Time difference = 4hr. – 3 hr.

= 1 hr.

= i.e. 60 min then distance
= 120 kms.
but Original difference = 15 min.

Which is $\frac{1}{4}$ of the assumed.

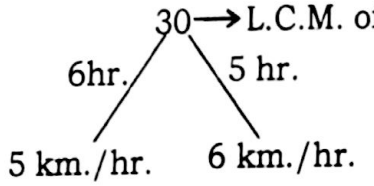
$\therefore$ Distance = $\frac{120}{4}$ = 30 kms.

7.2; **Paramount concept :-**

$$D = \frac{S_1 \times S_2}{S_1 - S_2} \times \text{difference in time}$$

$$\frac{30\times40}{40-30}\times\frac{15}{60} = \frac{30\times40}{10}\times\frac{1}{4} = 30 \text{ kms.}$$

7.2; **Paramount concept :-2**



Time difference = 6 hr. – 5 hr. = 1hr.
When time difference = 60 min, then distance =30 kms
$\therefore$ When time difference = 5 min,then

distance = $30 \times \frac{5}{60}$ = 2.5 km.

8.1; Here, the difference in time

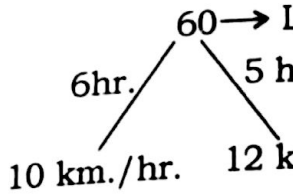
= 15 – 5 = 10 minutes = $\frac{1}{6}$ hours.

His speed during next journey
= 10 + 2 = 12 km./hr.

$\therefore$ Required distance = $\frac{S_1 \times S_2}{S_1 - S_2}$ × diff. in time

$$= \frac{12\times10}{12-10}\times\frac{1}{6} = 10 \text{ kms.}$$

8.1; **Paramount concept :-**



if Time difference = (6 - 5)
= 1hr. i.e. 60 min. then distance = 60 kms
$\therefore$ When time diff. = 10 - 5 = 10 min.

then distance = $\frac{10\times60}{60}$ = 10 kms.

9.3; Let the required distance be x kms.
Then time taken during the first

journey = $\frac{D}{S} = \frac{x}{3}$ hr.

and time taken during the second

journey = $\frac{x}{2}$ hr

Total time = 5 hrs.

$\therefore \frac{x}{3}+\frac{x}{2}=5\text{hrs.} \Rightarrow \frac{2x+3x}{6}=5\text{hrs.}$

$\Rightarrow 5x = 30 \quad \therefore x = 6$

$\therefore$ required distance = 6 kms.

Short cut Method:-
Option (C) will satisfy the statement

i.e. $\frac{6}{3}+\frac{6}{2} = 2 + 3 = 5$ hrs.

10.1; **Paramount concept** :-
Let the distance be $2x$

$T = \frac{D}{S}$

$T_1 = \frac{x}{21}$

$T_2 = \frac{x}{24}$

$T_1 + T_2 = 10$ hrs.

$\frac{x}{21}+\frac{x}{24}$

$= \frac{24x+21x}{21\times24} = 10$

$= \frac{45x}{21\times24} = 10$

$x = \frac{21\times24\times10}{45} = 112$

$D = 2x = 224$kms.

11.1; **Paramount concept :-1**

If speed becomes $= \frac{x}{y}$

the usual time $= \frac{x}{x-y} \times t$

$= \frac{4}{4-3} \times 10 = 40$ minutes

11.1; **Paramount concept :-2**

Speed **Time**

New speed ← 4 — New time ×10

Usual speed ← 3 — 3 : 4 — 1 ×10 → 10 (diff. given)

Usual time × 10

∴ Usual time = 4 × 10 = 40 min.

$\left(S \propto \frac{1}{T}\right)$ Usual time was 40min.

12.4; When they walk in opposite directions, they will be (3 + 3.5) or 6.5 kms apart in one hour.

∴ Hence after 3 hours the distance = 6.5 × 3 = 19.5 km.

13.4; **Direct Formula:**

When the ratio of speeds of A and B is a : b, then in this case:

Distance travelled by A

$= 2 \times$ Distance of two points $\left(\frac{a}{a+b}\right)$

$= 2\times21\left(\frac{3}{3+4}\right) = 18$ km.

13.4; **Paramount concept** :-

Total distance covered = 2 × PQ

= 42 km.

Distance covered by A & B in 2 hrs.

= 3 + 4 = 7 kms.

∴ 21 kms will be covered in 6 hrs.

Distance travelled by A in 6 hrs.

= t × s

= 6 × 3 = 18 kms.

14.1; Dist. travelled by bullet in 30 sec. = distance travelled by train in 12 min. 30 sec.

30 × 330 = Train in 12 min. 30 sec.

Speed of train $= \frac{D}{T} = \frac{9900}{750 \text{ sec.}}$

$= \frac{990}{75}$ m/sec $= \frac{990}{75} \times \frac{18}{5}$ kms/hr.

$= 47\frac{13}{25}$ km./hr.

15.5; **Paramount concept :-**

In every 2 minutes he is able to ascend 2 – 1 = 1 metre. This way he ascends upto 12 metres because when he reaches at the top, he does not slip down. Thus, upto 12 metres he takes 12 × 2 = 24 minutes and for the last 2 metres he takes 1 minute. Therefore, he takes 24 + 1 = 25 minutes to reach the top.

16.3; Let the distance be x km.

Time taken by the first runner

$= \frac{D}{S} = \frac{x}{15}$ hrs.

Time take by the second runner

$= \frac{D}{S} = \frac{x}{16}$ hrs.

Difference = 16 min.

Now, $\frac{x}{15} - \frac{x}{16} = \frac{16}{60}$ hr.

or, $\frac{x(16-15)}{15\times16} = \frac{16}{60}$

$\therefore x = \frac{16}{60} \times 15 \times 16 = 64$ kms.

16.3; **Paramount concept** :-

240 → L.C.M. of 15 and 16

16 hr. / 15 hr.

15 km./hr. 16 km./hr.

When difference in time = 60 min, then distance = 240 kms.

When difference in time = 16 min,

then distance = $\frac{16 \times 240}{60}$ kms.

= 64 kms.

17.3; **Paramount concept** :-

Time finished = $\frac{3}{5}$ of 10 hrs. = 6hrs.

Time left = 4 hrs.

Distance left = 40 km.

Speed = $\frac{D}{T} = \frac{40}{4}$ = 10 km./hr.

18.1; Time taken, if travels by air only = 2 hr.

∴ Speed by air = 180 kms/hr.

Time saved = 2 hours which is $\frac{4}{5}$ th of the time he travels by the train

the time he travels by train = 2.5 hrs

($\frac{4}{5} T_{train} = 2$, $T_{train} = \frac{5 \times 2}{4}$ = 2.5hrs)

Travels by air = 1.5 hrs = 270 kms.

(In 1hr = 180 kms.)

∴ In 1.5 hrs = 270 kms.

∴ distance travelled by train = 360 - 270 = 90kms

19.4; **Direct Formula:**

Distance

$= \text{Total time} \times \frac{\text{Multiplication of two speeds}}{\text{Sum of speeds}}$

$= 5\frac{48}{60} \times \frac{25 \times 4}{25+4} = \frac{29}{5} \times \frac{25 \times 4}{29}$ = 20 kms

2nd Method:-

$T = \frac{D}{S} = 5\frac{48}{60} = \frac{x}{25} + \frac{x}{4}$ (Distance assumed as x)

$= 5\frac{4}{5} = \frac{4x + 25x}{100}$

$= \frac{29}{x} = \frac{29x}{100}$ ∴ x = 20 kms

20.2; Use the option

Distance = 1500 km

Let original speed = 750 km./hr.

Original time taken = 2 hr.

Now, delay in time = 30 min.

Increased speed = (750 + 250)

= 1000 km./hr.

Thus, time taken = $\frac{1500 \text{ km}}{1000 \text{ km./hr}}$

= 1.5 hr.

21.1; **Paramount concept** :-

	Streamer		Train		Horse
Dist. =	120 kms.		450 kms.		60 kms.
Speed =	2	:	3	:	1
	40 km./hr.		60 km./hr.		20 km./hr.
	↓		↓		↓
Time = $\frac{D}{S}$ =	3 hrs.		7.5 hrs.		3 hrs.

Total time = 13.5 hr.

(3 × 20 gives 60 which makes option(i) more feasible than other options)

21.1; Speed = 2n, 3n, 1n

$T_1 = \frac{120}{2n}$ $T_2 = \frac{450}{3n}$ = $T_3 = \frac{60}{1n}$

Total time - 13.5 hrs.

$\frac{120}{2n} + \frac{450}{3n} + \frac{60}{1n} = 13.5$

$\frac{270}{x} = 13.5$

$x = \frac{270}{13.5}$

$x = 20$

$S_1 = 2n = 40$ kms./hr
$S_2 = 3n = 60$ kms/hr
Train travels at the speed of 60kms/hr.

22.3; option 3 satisfies the condition
distance = 40 km. speed
= 12 km./hr.
$\therefore$ Time = 3 hr. and 20 min.
If speed reduced to 10 km./hr. , time = 4 hr.
If speed increased to 15 km./hr; time = 2 hr. and 40 min.

22.3; **Long method:-**
Let d be the distance and S and T are the normal speed and time respectively.
According to the question

$$\therefore (S+3)\left(t-\frac{40}{60}\right) = (S-2)\left(t+\frac{40}{60}\right) \text{ ____(i)}$$

$t_1 = t - 40$
$t_2 = t + 40$
and $t - t_1 = t_2 - t = 40$

$$t = \frac{D}{S}$$

$$\text{or, } \frac{d}{S} - \frac{d}{S+3} = \frac{d}{S-2} - \frac{d}{S}$$

$$\text{or, } \frac{1}{S} - \frac{1}{S+3} = \frac{1}{S-2} - \frac{1}{S}$$

$$\text{or, } \frac{S+3-S}{S(S+3)} = \frac{S-S+2}{(S-2)S}$$

$$\text{or, } \frac{3}{S+3} = \frac{2}{S-2}$$

or, $3S - 6 = 2S + 6$
$S = 12$ km/hr.
Now, from (i)

$$(S+3)\left(t-\frac{40}{60}\right) = (S-2)\left(t+\frac{40}{60}\right)$$

$$\text{or, } 15\left(t-\frac{2}{3}\right) = 10\left(t+\frac{2}{3}\right)$$

$$\text{or, } 15t - 10 = 10t + \frac{20}{3}$$

$$\text{or, } 5t = \frac{50}{3} \Rightarrow t = \frac{10}{3} \text{ hr.}$$

So, Distance; $d = S \times T$

$$= 12 \times \frac{10}{3} \text{ km.} = 40 \text{ km.}$$

23.2; Speed in 1st case $= \frac{D}{T} = \frac{60}{6}$
$= 10$ km./hr.

speed in 2nd case $= \frac{60}{5} = 12$ km./hr.

$$A + B = 10 \text{ _____(i)}$$

$$\frac{2}{3}A + 2B = 12 \text{ _____(ii)}$$

or, $2A + 6B = 36$ _____(ii)

$(A + B = 10) \times 2$ (multiplied by 2 to make A equal)

$$\begin{array}{r} 2A + 6B = 36 \\ 2A + 2B = 20 \\ \hline 4B = 16 \end{array}$$

$B = 4$ kms./hr.
$A + 4 = 10$
$\therefore A = 6$ km./hr.

24.4; Time taken to complete a revolution:

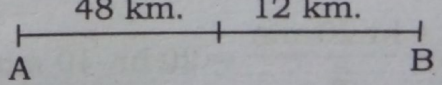
$$t = \frac{D}{S}$$

$$A \Rightarrow \frac{12}{4} = 3 \text{ hours; } B \Rightarrow \frac{12}{3} = 4 \text{ hrs}$$

$$C \Rightarrow \frac{12}{3/2} = \frac{12}{3} \times 2$$

= 8 hours
$\therefore$ Required time = L.C.M. of 3, 4 and 8 hours = 24 hours.

25.3;



Ajay covers = 60 + 12 = 72 kms.
Ravi covers = 48 kms.

$$S_{Ajay} = S_{Ravi + 4}$$

$$\frac{72}{T} = \frac{48}{T} + 4 \text{ (time is equal)}$$

$$\frac{72}{T} - \frac{48}{T} = 4$$

$4T = 24$

$T = 6$ hrs.

$$S_{Ravi} = \frac{D}{T} = \frac{48}{6} = 8 \text{ km./hr.}$$

25.3; **Other method:-**

Distance travelled by Ravi
= (60 - 12) km
= 48 km.
and distance travelled by Ajay
= (60 + 12) km.
= 72 km.
Difference between the distance travelled by them
= (72 - 48)kms.
= 24 kms.

Time required by Ravi= $\frac{24}{4}$ hr. = 6 hr.

Speed of Ravi = $\frac{48}{6}$ km./hr

= 8 km/hr.

26.3; Distance (in 5 min) at the speed of 15 km./hr.

$$= S \times T = 15 \times \frac{5}{18} \times 5 \times 60 \text{ m.}$$

= 1250 metres

27.3; **Other method:-**

Time taken by the man while riding both the way = 6 hr. 30 min. - 2 hr. 10 min.
= 4 hr. 20 min.

⇒ Time taken by the man in riding one way

$$= \frac{4 \text{ hr.} 20 \text{ min}}{2} = 20 \text{ hr. } 10 \text{ min.}$$

⇒ Time taken by the man to walk one way
= 6 hr. 30 min - 2 hr. 10 min.
= 4 hr. 20 min.

⇒ Time taken by the man to walk both way
= 2 × 4 hr. 20min
= 8 hr. 40 min.

28.1; **Paramount concept:-**

$$\frac{200}{150} = \frac{4}{3}$$

8190 (8190 divided in the ratio of 200 : 150 i.e. 4 : 3)

4 3

4680 3510

They will meet at 4680 line if we start from the starting and at 3510 line if we start from back.

28.1; **Other method:-**

Duration of time of their meet

$$= \frac{8190 \text{ lines}}{(200 + 150) \text{ lines / hr.}} = 23.4 \text{ hr.}$$

Their line of meet = 200 × 23.4
= 4680 line

29. 2;

	A	B	C
Speed	3 km./hr.	4 km./hr.	5 km./hr.
Time	1'o clock	2'o clock	3'o clock

At 2'o clock when B starts A will be 3 km. ahead of B and B will catch A after 3 hr. i.e. at 5'o clock
Till 5'o clock after starting at 3'o clock, C would have covered a distance of 10 km and and there would be distance of 2 km. between A and C and both will be walking in opposite direction So, their total speed will be 3 + 5 = 8 km./hr. and distance is 2km.so they will take 15 min. to meet So, A and C will meet at 5:15.

29.2; **Other method:-**

Distance already covered by A when B starts moving at 2o' clock = 3km./

29.2; **Other method:-**

Distance already covered by A when B starts moving at 2o' clock = 3km./hr. × (2 - 1) hr.
= 3 kms

Now,Time taken by B to catch A

$$= \frac{3 \text{ km.}}{(4-3) \text{ km./hr.}} = 3 \text{ hrs}$$

B will catch A at (2o' clock + 3 hrs) i.e. at 5 o'clock

Distance where B will catch A
= 4km./hr × (5 - 2) hr. = 12 km.

Also, at 5o' clock, C will be at 5 km./hr. × (5 - 3) hrs = 10 kms

i.e. at 5'o clock distance between (A or B) and C = (12 - 10) = km. = 2 km.

Now, time to meet A & C

$$\frac{2 \text{ km.}}{(5+3) \text{ km./hr.}}$$

$$= \frac{1}{4 \text{ hr.}} = 15 \text{ min.}$$

Time of meeting of A & C
= 5 : 15 o'clock

30.1; Distance between the two = 200 m.

Relative speed in the same direction
= (12- 10) = 2 kms/hr

Difference in speed = 2km./hr.

$$200\text{m} = \frac{200}{1000}\text{m} = \frac{1}{5}\text{m}$$

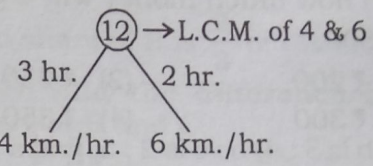
$\therefore$ Time taken by policeman to catch the thief $= \frac{D}{S} = \frac{1/5}{2}$ hr.

$$= \frac{1}{5\times 2} = \frac{1}{10} \text{ hrs or 6 minutes}$$

$\therefore$ Distance covered by thief in $\frac{1}{10}$ hr.

$$T \times S = \frac{1}{10} \times 10 \Rightarrow 1\text{km.}$$

31.2;**Paramount concept:-**



If Difference = 1hr = 60 mins then, distance = 12 kms

If Difference = 25 mins then distance

$$= \frac{25}{60} \times 12 = 5 \text{ kms.}$$

31.2; **Other method:-**

A.T.Q,

Distance covered is same

$$4 \text{ km./hr.} \times \left(t + \frac{1}{4}\right) \text{hr.} = 6 \text{ km./hr} \times \left(t - \frac{1}{6}\right) \text{hr.}$$

(15 min. = $\frac{1}{4}$ hr. & 10 min. = $\frac{1}{6}$ hr.)

or, 4t + 1hr. = 6t - 1hr.

t = 1hr.

So, the required distance

$$= 4 \text{ km./hr.} \times \left(1 + \frac{1}{4}\right) \text{hr.} = 5 \text{ kms.}$$

7 RATIO AND PROPORTION

CHAPTER

1. A : B : C is in the ratio of 3 : 2 : 5. Then how much money will C get out of ₹ 500.
   (1) ₹ 200 (2) ₹ 250
   (3) ₹ 300 (4) ₹ 350
2. If a : b is 3 : 4, b : c is 2 : 5, find a : b : c .
   (1) 3 : 4 : 10 (2) 3 : 5 : 2
   (3) 3 : 4 : 5 (4) 3 : 2 : 2
3. A : B is 1 : 2, B : C is 3 : 2, C : D is 1 : 3. Find A : B : C : D.
   (1) 3 : 6 : 9 : 12 (2) 3 : 4 : 8 :10
   (3) 2 : 6 : 8 : 10 (4) 3 : 6 : 4 : 12
4. ₹ 5600 is to be divided into A, B, C, D in such a way that the ratio of share of A : B is 1 : 2, B : C is 3 : 1, and C : D is 2 : 3. Find the sum of share of A & C and B & C.
   (1) ₹ 2400, ₹ 3000 (2) ₹ 2000, ₹ 3000
   (3) ₹ 2000, ₹ 3200 (4) ₹ 2400, ₹ 3200
5. a : b 2 : 1
   b : c 1 : 3
   c : d 2 : 3
   d : e 1 : 2
   Find a : b : c : d : e.
   (1) 4 : 2 : 6 : 9 : 18
   (2) 4 : 3 : 6 : 9 :18
   (3) 2 : 4 : 8 : 10 : 12
   (4) 5 : 4 : 8 : 12 : 18
6. If a : b : c is 1 : 3 : 2 and c : d : e is 1 : 2 : 3. Find a : b : c : d : e ?
   (1) 1 : 2 : 3 : 4 : 5
   (2) 1 : 3 : 2 : 4 : 6
   (3) 1 : 4 : 3 : 2 : 6
   (4) 1 : 6 : 3 : 2: 4
7. The ratio of total amount distributed in all the males and females as salary is 6 : 5. The ratio of salary of each male and female is 2 : 3. Find the ratio of the no. of male and female.
   (1) 5 : 9 (2) 5 : 7
   (3) 7 : 5 (4) 9 : 5
8. The number of employees are reduced in the ratio 3 : 2 and the salary of each employee is increased in the ratio 4 : 5. By doing so, company saves ₹ 12,000. So, find the initial expenditure on salary.
   (1) ₹ 72000 (2) ₹ 62000
   (3) ₹ 82000 (4) ₹ 52000
9. The ratio of income of A and B one year ago is 3 : 2. The ratio of increased income to original income of A is 2 : 3 and that of B is 3 : 4. The total present income of A and B together is ₹ 21500. So, find the income of B.
   (1) ₹ 6000 (2) ₹ 7000
   (3) ₹ 8000 (4) ₹ 9000
10. The ratio of income of A and B is 3 : 4. The ratio of expenditure of both is 2 : 3 and each saves ₹ 200, find the income of A and B.
    (1) ₹ 500, 600 (2) ₹ 600, 800
    (3) ₹ 600, 900 (4) ₹ 800, 1000
11. The ratio of income of A and B is 3 : 2 and the ratio of their expenditure is 4 : 3 and their savings are respectively ₹ 2,000 and ₹ 1000. Find the income of A and B respectively.
    (1) ₹ 3000, ₹ 4000
    (2) ₹ 4000, ₹ 6000
    (3) ₹ 5000, ₹ 6000
    (4) ₹ 6000, ₹ 4000
12. The ratio of the expenditure of A, B and C are 16 : 12 : 9 resepectively and their savings are 20%, 25% and 40% of their income. If the sum of their income is ₹ 1530, find B's salary.

(1) ₹480 (2) ₹490
(3) ₹500 (4) ₹510

13. The ratio of income of A, B and C is 3 : 7 : 4 and the ratio of their expenditure is 4 : 3 : 5 respectively. If A saves ₹300 out of ₹ 2400, find the savings of C.
(1) ₹565 (2) ₹570
(3) ₹575 (4) ₹580

14. The ratio of income in two consecutive years is 2 : 3 respectively. The ratio of their expenditure is 5 : 9. Income of second year is ₹45000 and Expenditure of 1st year is ₹ 25000. Savings in both years together is .
(1) ₹4000 (2) ₹5000
(3) ₹6000 (4) ₹7000

15. A, B, C along completed a piece of work in 30, 50 and 40 days. The ratio of the salary of each day is 4 : 3 : 2 respectively. If the total income of A is ₹144, find total income of B.
(1) ₹180 (2) ₹185
(3) ₹190 (4) ₹195

16. A person cover certain distance by Train, Bus and Car in ratio 4 : 3 : 2. The ratio of fair is 1 : 2 : 4 per km. The total expenditure as a fair is ₹ 720. Then, total expenditure as fair on train.
(1) ₹140 (2) ₹150
(3) ₹160 (4) ₹170

17. Two numbers are in ratio 4 : 5 respectively. If each number is reduced by 25, then the ratio becomes 3 : 4. Find the 2nd numbers.
(1) 120 (2) 125
(3) 130 (4) 135

18. The price of gold is directly proportional to square of its weight. A person broke down the gold in the ratio of 3 : 2 : 1 and faces a loss of ₹ 4620. Find the initial price of gold.
(1) ₹7520 (2) ₹7530
(3) ₹7540 (4) ₹7560

19. A is inversely proportional to the cube of B. If A = 3, then B = 2. If A = $\frac{8}{9}$, then find the value of B.
(1) 3 (2) 4
(3) 5 (4) 6

20. ₹7800 are distributed among A, B and C. The share of A is $\frac{3}{4}$ share of B and share of B is $\frac{2}{3}$ of the share of C. Then find the difference between share of B and C.
(1) ₹ 1000 (2) ₹ 1100
(3) ₹ 900 (4) ₹ 1200

21. A bag contains ₹ 410 in the form of ₹ 5, ₹ 2 and ₹ 1 coins. The number of coins are in ratio 4 : 6 : 9. So, find the number of 2 ₹ coins.
(1) 40 (2) 50
(3) 60 (4) 70

22. A bag contains ₹55 in the denominations of ₹ 1,50 paise and 25 paise coins. The coins are in the ratio 1 : 2 : 3. Find the number of 50 p coins.
(1) ₹41 (2) ₹ 42
(3) ₹ 40 (4) ₹38

23. The ratio of copper and zinc in a 63 kg alloy is 4 : 3. Some amount of copper is extracted from the alloy and the ratio becomes 10 : 9. How much copper is extracted.
(1) 6 kg (2) 8 kg
(3) 12 kg (4) 10kg

24. Ratio of land and water on earth is 1 : 2. In northern hemisphere, the ratio is 2 : 3. What is the ratio in Southern hemisphere.
(1) 2 : 11 (2) 4 : 11
(3) 3 : 11 (4) 5 : 11

Answers with explanation:

1;2 $A = \frac{3}{3+2+5} \times 500 = \frac{3}{10} \times 500$

$= ₹\ 150$

$B = \frac{2}{3+2+5} \times 500 = \frac{2}{10} \times 500 = ₹\ 100$

$C = \frac{5}{10} \times 500 = ₹\ 250$

Shortcut:-

A : B : C

3 : 2 : 5 $\Rightarrow$ 10 (total)

×50 ×50 ×50 ×50

150 , 100 250 = 500 (given)

2;1 a : b
b : c

3 : 4
2 : 5

6 8 20 $\Rightarrow$ 3 : 4 : 10

Multiply a to b, then b to b, and then b to c. We will get the answer.

Note:- Whenever such form is given

a : b
3 : 4

b : c
2 : 5

⇓ It can be simplified as

a : b : c

3 : 4 : 4
: $2^{\times 2}$: $5^{\times 2}$

$\Rightarrow$ 3 : 4 : 10

[Make b equal in both cases. If 2 is multiplied with 2 then 5 should also be multiplied by 2 to keep the ratio the same as it was and at the same time to make 'b' equal (i.e. 4) in both cases]

Paramount Concept:-

3;4 First find A : B : C : D

1 : 2 → ② → ②

③ ← 3 : 2 → ②

① ① 1 : 3

A : B : C : D = 3 : 6 : 4 : 12

Note-To understand this shortcut, remember you need to make the lefthand side all missing numbers the same as that of last given number and for the right hand side the same is done.

Suppose you have

A : B = 1 : 2

B : C = 4 : 5

Now,

A : B : C

1 : 2 ↝2 [C also made 2 as nearest number is 2.]

4 ↜4 : 5 [A also made 4 as nearest number is 4.]

A : B : C

1 : 2 : ②

↑ ↑ ↑ = Multiply

④ : 4 : 5

4 : 8 : 10 = 2 : 4 : 5

Paramount Concept:-

4;3 First find A : B : C : D

A : B = 1 : 2

B : C = 3 : 1

C : D = 2 : 3

A : B : C : D

1 : 2 → ② → ②

③ ← 3 : 1 → ①

② ← ② ← 2 : 3

6 12 4 6 = 3 : 6 : 2 : 3

Share of A + C $= \frac{A+C}{A+B+C+D} \times 5600$

$= \frac{3+2}{3+6+2+3} \times 5600$

$= \frac{5}{14} \times 5600 = ₹\ 2000$

Share of B + C $= \frac{B+C}{A+B+C+D} \times 5600$

$= \frac{6+2}{3+6+2+3} \times 5600$

$= \frac{8}{14} \times 5600 = ₹\ 3200$

2nd Method

A	:	B	:	C	:	D	
1	:	2	→	②	→	②	
③	←	3	:	1	→	①	
②	←	②	←	2	:	3	
6	:	12	:	4	:	6	
3	:	6	:	2	:	3	=14 (total)
×400 ↓		×400 ↓		×400 ↓		×400 ↓	×400 ↓
1200		2400		800		1200	5600
A		B		C		D	

[14 when multiplied by 400 becomes 5600 hence all the respective ratios will be multiplied by 400]

A + C = 2000

B + D = 3200

5;1 **Shortcut:-**

A	:	B	:	C	:	D	:	E
2	:	1	→	①	→	1	:	①
①	←	1	:	3	→	③	:	③
②	←	②	←	2	:	3	:	③
①	:	①	:	①	←	1	:	2
4	:	2	:	6	:	9	:	18

6;2

A	:	B	:	C	:	D	:	E
1	:	3	:	2	→	②	:	②
①	:	①	←	1	:	2	:	3
1	:	3	:	2	:	4	:	6

7;4 Total salary of male : Total salary of female

Salary of each male : Salary of each female

If a : b :: c : d then, $\frac{a}{b} = \frac{c}{d}$, $\frac{6}{5} = \frac{2}{3}$

Hence, ad = cd

$6 \times 3 : 5 \times 2$

No. of males : number of females

= 18 : 10 = 9 : 5

8;1

	Initial		Final	
Employees	3	:	2	multiplied
Salary of each	4	:	5	
Total expenditure	12	:	10	

Total expenditure reduced by 12 – 10 = 2 units

2 unit = ₹ 12,000 (as it is given that 12000/- is saved)

∴ 1 unit = 6000

∴ Initial expenditure on salary 12×6000 = ₹ 72,000

[12 comes from ratio 12 : 10 when 12 indicates inital expenditure and 10 final expenditure]

9;3 A : B

3 : 2

A's increase in salary is 2 : 3.

this means if it was 2 then it became

Hence Calculating it on 3 means

$2 \xrightarrow{\text{becomes}} 3$ then

$3 \xrightarrow{\text{becomes}} \frac{3 \times 3}{2} = \frac{9}{2} = 4.5$

Similarly B's increase is 3 : 4

Hence,

$3 \xrightarrow{\text{becomes}} 4$ then,

$2 \xrightarrow{\text{becomes}} \frac{2 \times 4}{3} = \frac{8}{3}$

↓

A : B = 3 : 2

New salary of A : B is in ratio

$4.5 : \frac{8}{3}$

Income of B $= \frac{8}{21.5} \times 21500$

₹ 8000

10;2

	A	:	B
Income	3(x)	:	4(x)
Expenditure	2	:	3

Each saves = ₹ 200