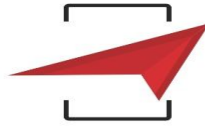


RATIO & PROPORTION

- If $a : b = 5 : 9$ and $b : c = 4 : 7$, find $a : b : c$.
 (a) 20:36:63 (b) 15:32:58 (c) 12:20:53 (d) 20:35:63
- If $a : b = 3 : 4$ and $b : c = 8 : 9$, then $a : c = ?$
 (a) 3:2 (b) 2:3 (c) 4:5 (d) 3:4
- If $a : b = 8 : 15$, $b : c = 5 : 8$ and $c : d = 4 : 5$, then $a : d = ?$
 (a) 4:17 (b) 4:15 (c) 4:25 (d) 1:8
- Rs. 68,000 is divided among A, B and C in the ratio of $\frac{1}{2} : \frac{1}{4} : \frac{5}{16}$. The difference of the greatest and the smallest parts is
 (a) Rs. 6000 (b) Rs. 14440 (c) Rs. 9200 (d) Rs. 16000 (e) None of these
- A sum of Rs. 3115 is divided among A, B and C such that if Rs. 25, Rs. 28 and Rs. 52 be diminished from their shares respectively, the remainder shall be in the ratio of $8 : 15 : 20$. Find the share of each.
 (a) Rs. 585, Rs. 1078, Rs. 1452 (b) Rs. 685, Rs. 1178, Rs. 1252 (c) Rs. 485, Rs. 1088, Rs. 1352 (d) Rs. 785, Rs. 1378, Rs. 1652 (e) None of these
- Two vessels contain equal quantity of mixture of milk and water in the ratio 8:9 and 12:5 respectively. Both the mixtures are now mixed thoroughly. Find the ratio of milk to water in the new mixture so obtained.
 (a) 7 : 10 (b) 13 : 21 (c) 21 : 13 (d) 10 : 7
- Two vessels contain equal quantity of mixture of milk and water in the ratio 9 : 5 and 4 : 3 respectively. Both the mixtures are now mixed thoroughly. Find the ratio of milk to water in the new mixture so obtained.
 (a) 17 : 11 (b) 11 : 17 (c) 8 : 13 (d) 13 : 8
- The contents of two vessels containing water and milk are in the ratio 1 : 2 and 2 : 5 are mixed in the ratio 1 : 4. The resulting mixture will have water and milk in the ratio—
 (a) 35 : 75 (b) 31 : 74 (c) 41 : 65 (d) 31 : 65 (e) None of these
- In a group there are 36 students in which the ratio of boys and girls is 3:1. How many girls should be included in this group so that ratio between boys and girl becomes 9:5 ?
 (a) 7 (b) 8 (c) 9 (d) 6
- The students in three classes are in the ratio 2 : 3 : 5. If 20 students are increased in each class, the ratio changes to 4 : 5 : 7. Originally the total number of students was
 (a) 50 (b) 90 (c) 100 (d) 150 (e) None of these
- The ratio between the boys and girls in a class is 6 : 5 respectively. If 8 more boys join the class and two girls leave the class then the respective ratio becomes 11:7. What is the number of boys in the class now ?
 (a) 28 (b) 38 (c) 44 (d) 36 (e) None of these
- In a mixture of 60 litres, the ratio of milk and water is 2 : 1. If the ratio of milk and water is to be 1 : 2, then the amount of water to be further added is :
 (a) 42 litres (b) 56 litres (c) 60 litres (d) 77 litres
- A mixture contains milk and water in the ratio of 9 : 4. On adding 4 litres of water, the ratio of milk to water becomes 3 : 2. Find the total



- quantity of the original mixture.
- (a) 26 litres (b) 18 litres
(c) 10 litres (d) 30 litres
14. A mixture contains milk and water in the ratio of 9 : 4. On adding 8 litres of water, the ratio of milk to water becomes 3 : 2. Find the total quantity of the original mixture.
- (a) 52 litres (b) 26 litres
(c) 104 litres (d) 30 litres
15. A bucket contains a mixture of two liquids A and B in the proportion 7 : 5. If 9 litres of the mixture is replaced by 9 litres of liquid B, then the ratio of the two liquids becomes 7 : 9. How much of the liquid A was there in the bucket?
- (a) 21 litres (b) 23 litres
(c) 25 litres (d) 27 litres
(e) None of these
16. A vessel contains liquids A and B in ratio 5 : 3. If 16 litres of the mixture are removed and the same quantity of liquid B is added, the ratio becomes 3 : 5. What quantity does the vessel hold?
- (a) 30 litres (b) 40 litres
(c) 35 litres (d) 45 litres
(e) None of these
17. Salaries of A, B and C were in the ratio of 3 : 5 : 7 respectively. If their salaries were increased by 50%, 60% and 50% respectively, what will be the new respective ratio of their salaries.
- (a) 3 : 6 : 7 (b) 4 : 5 : 7
(c) 4 : 5 : 8 (d) 9 : 16 : 21
18. The salaries of A, B and C are in the ratio 1 : 3 : 4. If the salaries are increased by 5%, 10% and 15% respectively, then the increased salaries will be in the ratio
- (a) 20 : 66 : 95 (b) 21 : 66 : 95
(c) 21 : 66 : 92 (d) 19 : 66 : 92
(e) None of these
19. In a bag, there are coins of 25 p, 10 p and 5 p in the ratio of 1 : 2 : 3. If there are Rs. 30 in all, how many 5 p coins are there ?
- (a) 50 (b) 100
(c) 150 (d) 200
20. A bag contains one-rupee, 50-paise and 25-paise coins in the ratio 5 : 6 : 8. If the total amount of money in the bag is Rs. 210, find the number of coins of each kind.
- (a) 105, 126, 168 (b) 104, 136, 176
(c) 106, 116, 156 (d) 108, 126, 146
(e) None of these
21. A and B are two alloys of gold and copper prepared by mixing metals in proportion 7 : 2 and 7:11 respectively. If equal quantities of alloys are melted to form a third alloy C, the proportion of gold and copper in C will be:
- (a) 5 : 9 (b) 5 : 7
(c) 7 : 5 (d) 9 : 5
22. Present ages of a and b are in the ratio 5:6 respectively. Seven years hence this ratio will become 6:7 respectively. What is a's present age in years?
- (a) 35 (b) 42
(c) 49 (d) None of these
23. Present age of Sameer and Anand are in the ratio of 5:4 respectively. Three years hence, the ratio of their ages will become 11:9 respectively. What is Anand's present age in years?
- (a) 24 (b) 27
(c) 40 (d) 35
24. The incomes of Ram and Shyam are in the ratio 4 : 3 and their expenditures are in the ratio 3 : 2. If each saves Rs.2500, what are the their incomes?
- (a) Rs.10000, Rs.7500
(b) Rs.12000, Rs.9000
(c) Rs.8000, Rs.6000
(d) None of these
25. If 30 men do a piece of work in 27 days, in what time can 18 men do another piece of work 3 times as great ?
- (a) 145 days (b) 135 days
(c) 130 days (d) 134 days
26. If 27 men take 15 days to mow 225 hectares of grass, how long will 33 men take to mow 165 hectares?
- (a) 9 days (b) 12 days
(c) 15 days (d) 6 days

27. If 10 spiders can catch 10 flies in 10 min, how many flies can 200 spiders catch in 200 min?
(a) 2000 (b) 5000
(c) 4000 (d) 3000
28. 20 men complete one third of a work in 20 days. How many more men should be employed to finish the rest of work in 25 more days?
(a) 10 men (b) 12 men
(c) 15 men (d) 20 men
29. A certain number of men can do a work in 50 days. If there were 3 men more it could be finished in 5 days less. How many men are there?
(a) 36 men (b) 18 men
(c) 27 men (d) 30 men
30. A builder decided to build a farmhouse in 45 days. He employed 150 men in the beginning and 120 more after 30 days and completed the construction in stipulated time. If, he had not employed the additional men how many days behind schedule would it have been finished?
(a) 12 days (b) 10 days
(c) 15 days (d) 8 days
31. A builder decided to build a farmhouse in 20 days. He employed 40 men in the beginning and 20 more after 10 days and completed the construction in stipulated time. If he had not employed the additional men in how many days would it have been finished by the men in the beginning?
(a) 25 days (b) 60 days
(c) 40 days (d) 5 days

HINTS & SOLUTIONS

1.(a)

$$a : b : c$$

$$5 : 9$$

$$\frac{4 : 7}{20 : 36 : 63}$$

2.(b)

$$a : b : c$$

$$3 : 4$$

$$\frac{8 : 9}{24 : 32 : 36}$$

$$\backslash \quad a : c = 24 : 36 = 2 : 3$$

3.(b)

$$a : b : c : d$$

$$8 : 15$$

$$\frac{5 : 8}{40 : 75 : 120}$$

$$8 : 15 : 24$$

$$\frac{4 : 5}{32 : 60 : 96 : 120}$$

$$\backslash \quad a : d = 32 : 120 = 4 : 15$$

4.(d)

5.(a);

The total sum after deduction

$$= 3115 - (25 + 28 + 52) = \text{Rs. } 3010$$

Their diminished share in the ratio 9.(d)

$$8 : 15 : 20$$

$$\therefore \text{A's diminished share} = \frac{3010}{43} \times 8 = \text{Rs. } 560$$

$$\text{B's diminished share} = 70 \times 15 = \text{Rs. } 1050$$

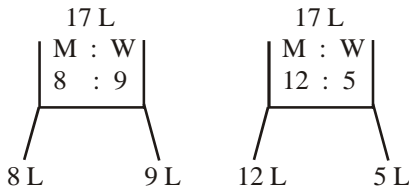
$$\text{C's diminished share} = 70 \times 20 = \text{Rs. } 1400$$

$$\therefore \text{A's share} = 560 + 25 = \text{Rs. } 585$$

$$\text{B's share} = 1050 + 28 = \text{Rs. } 1078$$

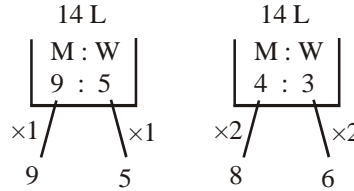
$$\text{C's share} = 1400 + 52 = \text{Rs. } 1452$$

6.(d)



$$\text{Required ratio} = \frac{8+12}{9+5} = \frac{20}{14} = 10 : 7$$

7.(a)



$$\text{Required ratio} = \frac{9+8}{5+6} = \frac{17}{11} = 17 : 11$$

8.(b);

Change the ratios into fractions

| | Water | : | Milk |
|-----------|---------------|---|---------------|
| Vessel I | $\frac{1}{3}$ | | $\frac{2}{3}$ |
| Vessel II | $\frac{2}{7}$ | | $\frac{5}{7}$ |

From Vessel I, $\frac{1}{5}$ is taken and from Vessel II, $\frac{4}{5}$ is taken.

Therefore, the ratio of water to milk in the new vessel

$$= \left(\frac{1}{3} \times \frac{1}{5} + \frac{2}{7} \times \frac{4}{5} \right) : \left(\frac{2}{3} \times \frac{1}{5} + \frac{5}{7} \times \frac{4}{5} \right)$$

$$= \left(\frac{1}{15} + \frac{8}{35} \right) : \left(\frac{2}{15} + \frac{20}{35} \right) = \frac{31}{105} : \frac{74}{105} = 31 : 74$$

9.(d)

B G

$$3 \times (3 : 1)$$

$$\left. \begin{array}{l} \text{Initially} = 9 : 3 \\ \text{Finally} = 9 : 5 \end{array} \right\} +2 \text{ units}$$

$$\text{Now, } (9 + 3) \text{ units} = 36$$

$$\backslash \quad 2 \text{ units} = \frac{36}{12} \times 2 = 6$$

$$\backslash \quad \text{Number of girls included in the group} = 6$$

10.(c)

11.(c)

; Let the number of boys and girls be $6x$ and $5x$ respectively.

Now, according to the question,

$$\frac{6x+8}{5x-2} = \frac{11}{7}$$

$$\text{or, } 42x + 56 = 55x - 22$$

$$\text{or, } 55x - 42x = 56 + 22 = 78$$

$$\text{or, } x = \frac{78}{13} = 6$$

$$\therefore \text{ Number of boys in the class} = 6 \times 6 + 8 = 44$$

12. (c)

$$M : W$$

$$2 : 1 \text{ unit}$$

$$2 \times (1 : 2) \text{ unit} + 3 \text{ units}$$

$$2 : 4 \text{ unit}$$

$$\text{Amount of water added} = \frac{60}{(2+1)} \times 3 = 60 \text{ L}$$

13. (a)

$$M : W$$

$$9 : 4 \text{ unit}$$

$$3 \times (3 : 2) \text{ unit} + 2 \text{ units}$$

$$9 : 6 \text{ unit}$$

$$\therefore 1 \text{ unit} = \frac{4}{2} = 2 \text{ L}$$

$$\text{Total amount of original mixture} = (9+4) \times 2 = 26 \text{ L}$$

14. (a)

$$M : W$$

$$9 : 4 \text{ unit}$$

$$3 \times (3 : 2) \text{ unit} + 2 \text{ units}$$

$$9 : 6 \text{ unit}$$

$$\therefore 1 \text{ unit} = \frac{8}{2} = 4 \text{ L}$$

$$\text{Total quantity of the original mixture} \\ = (9+4) \text{ units} = 13 \times 4 = 52 \text{ L}$$

15. (a)

16. (b);

Suppose the vessel contains $5x$ litres and $3x$ litres of liquids A and B respectively.

$$\text{The removed quantity contains } \frac{16}{5+3} \times 5 = 10$$

litres of A and $16 - 10 = 6$ litres of B. Now,

$$(5x - 10) : (3x - 6 + 16) = 3 : 5$$

$$\text{or, } \frac{5x - 10}{3x + 10} = \frac{3}{5} \text{ or, } 25x - 50 = 9x + 30$$

$$\text{or, } 16x = 80$$

$$\therefore x = 5$$

$$\therefore \text{ The vessel contains } 8x = 8 \times 5 = 40 \text{ litres}$$

17. (d)

$$(3 : 5 : 7) \times 10 = 30 : 50 : 70$$

$$\begin{array}{ccc} +50\% \downarrow & +60\% \downarrow & \downarrow +50\% \\ 45 & 80 & 105 \end{array}$$

$$45 : 80 : 105$$

$$= 9 : 16 : 21$$

18. (c);

Let the initial salaries of A, B and C be Rs. x , Rs. $3x$ and Rs. $4x$ respectively.

Respective ratio after corresponding increase

$$= \frac{x \times 105}{100} : \frac{3x \times 110}{100} : \frac{4x \times 115}{100}$$

$$= 105 : 330 : 460$$

$$= 21 : 66 : 92$$

19. (c)

| | | | |
|--------------|------|-----|----|
| Denomination | 25 P | 10P | 5P |
|--------------|------|-----|----|

| | | | |
|-----------------|----------------|----------------|----------------|
| Number of coins | $\frac{1}{25}$ | $\frac{2}{20}$ | $\frac{3}{15}$ |
|-----------------|----------------|----------------|----------------|

| | | | |
|-------------|----|----|----|
| Total Value | 25 | 20 | 15 |
|-------------|----|----|----|

$$1 \text{ unit} = \frac{30 \times 100}{25 + 20 + 15} = \frac{3000}{60} = 50$$

$$\therefore \text{ Number of 5 p coins} = 3 \text{ units} = 3 \times 50 = 150$$

20. (a) Let the number of coins of one rupee, 50 paise and 25 paise be $5x$, $6x$ and $8x$ respectively, As per question,

$$\therefore 5x \times 1 + 6x \times \frac{1}{2} + 8x \times \frac{1}{4} = 210$$

$$\Rightarrow x(5 + 3 + 2) = 210$$

$$\therefore x = 21$$

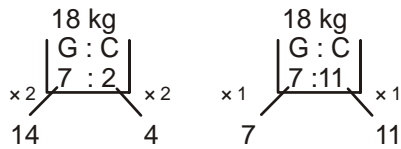
$$\therefore \text{ Number of coins of one rupee}$$

$$= 5 \times 21 = 105$$

$$\text{Number of coins of 50 paise} = 6 \times 21 = 126$$

$$\text{Number of coins of 25 paise} = 8 \times 21 = 168$$

21. (c)



Proportion of gold and copper in alloy C =

$$\frac{14+7}{4+11} = \frac{21}{15} = \frac{7}{5} = 7:5$$

22. (a) 23. (a)

24. (a)

Income of R and S = $4x : 3x$

Expenditure R and S = $3y : 2y$

$$4x - 3y = 2500 \times 3 \quad \text{----- (1)}$$

$$3x - 2y = 2500 \times 4 \quad \text{----- (2)}$$

$$16x - 9y = 7500$$

$$16x - 8y = 10000$$

$$y = 2500$$

put in -(1)

$$4x - 7500 = 2500$$

$$4x = 2500 + 7500$$

$$x = 10000/4 = 2500.$$

Thus, Income = $4(2500), 3(2500)$
=Rs. 10000, Rs. 7500

25. (b)

| | |
|------------|------------|
| $M_1 = 30$ | $M_2 = 18$ |
| $D_1 = 27$ | $D_2 = ?$ |
| $W_1 = x$ | $W_2 = 3x$ |

$$D_2 = ?$$

$$W_2 = 3x$$

Acc. to formula : $M_1 D_1 W_2 = M_2 D_2 W_1$

$$30 \times 27 \times 3x = x \times 18 \times 3 \times D_2$$

$$D_2 = 135 \text{ days.}$$

26. (a)

| | |
|-------------|-------------|
| $M_1 = 27$ | $M_2 = 33$ |
| $D_1 = 15$ | $D_2 = ?$ |
| $W_1 = 225$ | $W_2 = 165$ |

According to formula,

$$W_2 \times M_1 D_1 H_1 = W_1 M_2 D_2 H_2$$

$$165 \times 27 \times 15 \times 225 = 225 \times D_2 \times 33$$

$$D_2 = 9$$

27. (c)

$$M_1 = 10 \text{ Spider} \quad M_2 = 200 \text{ Spider}$$

$$W_1 = 10 \text{ files}$$

$$W_2 = ?$$

$$H_1 = 10 \text{ min}$$

$$H_2 = 200 \text{ min}$$

$$\frac{W_1}{W_2} = \frac{M_1 \times H_1}{M_2 \times H_2}$$

[Direct Proportion]

$$\frac{10}{x} = \frac{10 \times 10}{200 \times 200}$$

$$x = \frac{10 \times 200 \times 200}{10 \times 10}$$

$$x = 4000 \text{ flies}$$

28. (b)

$$\text{Work done} = \frac{1}{3}$$

$$\text{Remaining work} = 1 - \frac{1}{3} = \frac{2}{3}$$

| | | |
|------|---------------------|---------------------|
| Here | $W_1 = \frac{1}{3}$ | $W_2 = \frac{2}{3}$ |
| | $M_1 = 20$ | $M_2 = (20 + x)$ |
| | $D_1 = 20$ | $D_2 = 25$ |

We know

$$\frac{W_1}{W_2} = \frac{M_1 D_1}{M_2 D_2}$$

$$\Rightarrow \frac{1/3}{2/3} = \frac{20 \times 20}{(20+x) \times 25}$$

$$\Rightarrow \frac{1}{2} = \frac{4 \times 4}{20+x}$$

$$\Rightarrow 20+x = 32$$

$$\Rightarrow x = 32 - 20 = 12 \text{ Men}$$



29. (c)

$$\begin{array}{l|l} M_1 = x & M_2 = x + 3 \\ D_1 = 50 & D_2 = 50 - 5 = 45 \end{array}$$

Since work is same in both the cases

$$50x = 45(x+3)$$

$$50x - 45x = 45 \times 3$$

$$5x = 45 \times 3$$

$$x = 27$$

30. (a)

After 30 days

$$\text{no. of men } M_1 = (150 + 120) = 270$$

$$D_1 = 15$$

$$M_2 = 150$$

$$D_2 = x$$

$$270 \times 15 = 150x \quad [\because M_1 D_1 = M_2 D_2]$$

$$x = 27$$

$$\text{Days at Disposal} = 15$$

$$\text{delay} = 27 - 15$$

$$= 12 \text{ days}$$

31. (d) After 10 days

$$\text{No. of men } M_1 = (40+20) = 60$$

$$D_1 = 10 \text{ days}$$

$$D_2 = x$$

$$60 \times 10 = 40x \quad [M_1 D_1 = M_2 D_2]$$

$$x = 15 \text{ days}$$

$$\text{days at disposal} = 15 \text{ days}$$

$$\text{delay} = 15 - 10 = 5 \text{ days}$$