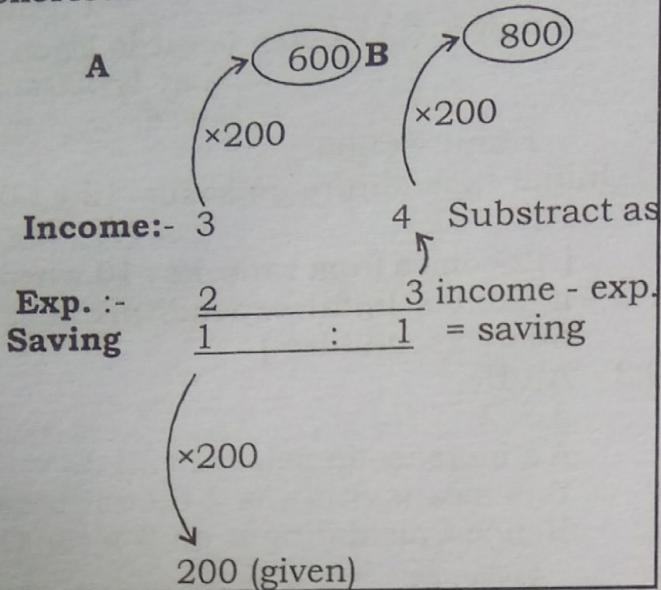


12;1

$$\therefore \frac{3x - 200}{4x - 200} = \frac{2}{3} \quad (\text{Income} - \text{saving} = \text{expenditure})$$

$$\begin{aligned}\text{Income of A} &= 3x = ₹ 600 \\ \text{Income of B} &= 4x = ₹ 800\end{aligned}$$

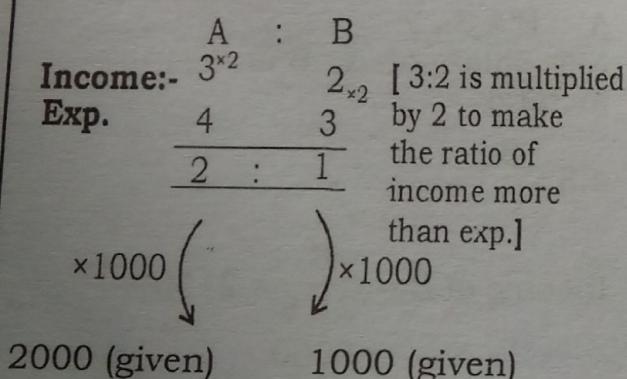
Shortcut:-

11;2

$$\begin{array}{rcl} \text{Income} & = 3(x) & : \quad 2(x) \\ \text{Expenditure} & = 4 & : \quad 3 \end{array}$$

$$\begin{aligned}\text{Now} :& \frac{3x - 2000}{2x - 1000} = \frac{4}{3} \\ \Rightarrow 9x - 6000 &= 8x - 4000 \\ \Rightarrow x &= 2000\end{aligned}$$

$$\begin{aligned}\text{Income of A} &= 3x = 6000 \\ \text{Income of B} &= 4x = 4000\end{aligned}$$

Shortcut:-

Hence income must be multiplied by 1000

$$\begin{aligned}A : B : C &= 6 : 4 = 6 \times 1000 : 4 \times 1000 \\ &= 6000 : 4000\end{aligned}$$

12;1

	A	B	C
Expenditure	16	12	9
Savings	20%	25%	40%
Ratio of income	$\frac{16}{80} \times 100$	$\frac{12}{75} \times 100$	$\frac{9}{60} \times 100$
			= 20 : 16 : 15 = 51 (\text{total})

$$\text{If } 51 = 1530$$

$$1 = 30$$

$$\text{So, } 16 = 480$$

Shortcut:-

Income :- A	B	C
x	y	z
$\frac{20}{100}x$	$\frac{25}{100}y$	$\frac{40}{100}z$
Exp.	16	: 12 : 9

$$x - \frac{20}{100}x = 16 \quad (\text{Since income} - \text{saving} = \text{Exp.})$$

$$\frac{80x}{100} = 16$$

$$x = \frac{1600}{80} = 20, \quad \mathbf{A = 20}$$

$$y - \frac{25}{100}y = 12$$

$$\Rightarrow \frac{75y}{100} = 12$$

$$y = \frac{1200}{75}$$

$$y = 16, \quad \mathbf{B = 16}$$

$$z - \frac{40}{100}z = 9$$

$$\frac{60z}{100} = 9$$

$$z = \frac{100 \times 9}{60} = 15, \quad \mathbf{C = 15}$$

$$A : B : C = 20 : 16 : 15$$

$$51 = 1530$$

$$1 = 30$$

$$\text{So, } B's = 16 \times 30 = 480$$

$$13;3 \text{ Salary of A} = 3x = ₹ 2400$$

$$\text{Salary of B} = 7x = ₹ 5600$$

$$\text{Salary of C} = 4x = ₹ 3200$$

Expenditure of A, B and C = $4y, 3y$ &
5y respectively.

Saving of A is 300.

$$\begin{aligned}\text{Expenditure} &= 4y = (2400 - 300) \\ &= 2100\end{aligned}$$

$$y = 2100/4 = 525$$

$$\text{Expenditure of B} = 3y = 1575$$

$$\text{Savings of B} = 4025$$

$$\text{Expenditure of C} = 5y = 2625$$

$$\text{Savings of C} = 575.$$

$$14;2 \text{ Income of 2nd year} = 3x = 45000$$

$$x = 45000 \div 3 = 15000$$

$$\text{Income of 1st year} = 2x$$

$$= 2 \times 15000 = 30000$$

$$\text{Expenditure of 1st year} = 5y = 25000$$

$$y = 25000 \div 5 = 5000$$

$$\text{Expenditure of 2nd year} = 9y = 45000$$

$$y = 45000 \div 9 = 5000$$

Total savings =

$$\begin{aligned}[\text{Total income} - \text{total expenditure}] \\ = 45000 + 30000 - (25000 + 45000) \\ = 75000 - 70000 = 5000\end{aligned}$$

15;1

<u>A</u>	<u>B</u>	<u>C</u>
----------	----------	----------

$$\text{Days of working} = 30 : 50 : 40$$

$$\text{Each day salary} = 4 : 3 : 2$$

$$\text{Total income} = 120 : 150 : 80$$

$$12 : 15 : 8$$

$$12 \text{ unit} = 144$$

$$1 \text{ unit} = 12$$

$$\text{Income of B} = 12 \times 15 = 180$$

16;3

<u>Train</u>	<u>Bus</u>	<u>Car</u>
--------------	------------	------------

$$\text{Distance Covered} = 4 : 3 : 2$$

$$\text{Fair per km} = 1 : 2 : 4$$

$$\begin{aligned}\text{total fair} &= 4 : 6 : 8 \\ &2 : 3 : 4\end{aligned}$$

$$\begin{aligned}\text{Train fair} &= \frac{2}{2+3+4} \times 720 \\ &= \frac{2}{9} \times 720 = ₹ 160/-\end{aligned}$$

17.2;

	<u>A</u>	<u>B</u>
Original	4	: 5
After reduction	3	: 4
Reduction	1	: 1

$$1 \text{ unit} = 25$$

$$A = 4 \times 25 = 100 \quad B = 5 \times 25 = 125$$

$$18;4 \text{ Ratio} = 3 : 2 : 1, 3x, 2x, 1x \text{ Initial price} \\ = (6x)^2 = 36x^2$$

After breaking into pieces

$$= 9x^2 + 4x^2 + x^2 = 14x^2$$

$$\text{Loss} = 36x^2 - 14x^2$$

$$4620 = 22x^2$$

$$x^2 = 210$$

$$\text{Initial price} = 36x^2 = 36 \times 210 = 7560$$

$$19.1; A \propto \frac{1}{B^3}$$

$$\therefore A = \frac{K}{B^3} [K = \text{proportionality constant}]$$

$$\text{Now, } B = \frac{K}{8}$$

$$\text{Now, } A = \frac{8}{9}$$

$$\therefore \frac{8}{9} = \frac{24}{B^3}$$

$$\therefore B^3 = \frac{9 \times 24}{8} = 27$$

$$B = \sqrt[3]{27} = 3$$

$$20.4; A : B = 3 : 4$$

$$B : C = 2 : 3$$

$$A : B = 3 : 4$$

$$B : C = 2 : 3$$

$$A : B : C$$

$$3 : 4 \rightarrow ④$$

$$\underline{\underline{② \leftarrow 2 : 3}}$$

$$\underline{\underline{6 \quad 8 : 12}}$$

$$A : B : C = 6 : 8 : 12$$

$$3 : 4 : 6$$

$$\begin{aligned} \text{If } (3+4+6) &= 7800 \\ 13 &= 7800 \\ 1 &= 600 \end{aligned}$$

$$\text{Difference between B and C} = 2 = 2 \times 600 = 1200$$

21;3 First convert the ratio in 1 Re form

$$\begin{array}{ccc} 4 & : & 6 & : & 9 \\ \downarrow & & \downarrow & & \downarrow \\ 4x & & 6x & & 9x \\ \times 5 & & \times 2 & & \times 1 \\ 20x & & 12x & & 9x \end{array}$$

$$\text{Now, Total } ₹ = 410$$

$$[20x + 12x + 9x] = 410 \\ x = 10$$

$$\therefore \text{Value of } ₹ 2 \text{ coin} = 12 \times 10 = 120$$

$$\therefore \text{No. of } ₹ 2 \text{ coin} = \frac{120}{2} = 60$$

22;3	<u>Re. 1</u>	<u>50 P</u>	<u>25 P</u>
Face Value =	1	: 50	: 25
No. of coins =	$\frac{1}{x}$: 2	: 3

$$x + 2x + 3x = 55$$

$$\frac{x}{1} + \frac{2x}{2} + \frac{3x}{4} = 55$$

$$\frac{4x + 4x + 3x}{4} = 55$$

$$\frac{11x}{4} = 55$$

$$x = 20$$

$$50 \text{ paise coins} = 2x = 40/-$$

22;3 Other method-

$$1 : \frac{2}{2} : \frac{3}{4}$$

$$4 : 4 : 3$$

$$11 = 55$$

$$1 = 5$$

$$4 = 20$$

$$20 \times 2 = 40$$

23.1;

$$\text{Copper : Zinc} \\ 4 : 3$$

$$\text{Copper} = \frac{4}{7} \times 63 = 36 \text{ kg}$$

$$\text{Zinc} = \frac{3}{7} \times 63 = 27 \text{ kg}$$

Let x kg copper is extracted
Remaining copper = $63 - x$ kg

$$\text{New ratio} = \frac{10}{9}$$

$$\frac{\text{Cu}}{\text{Zn}} = \frac{10}{9}$$

$$\frac{36-x}{27} = \frac{10}{9}$$

$$\frac{36-x}{3} = \frac{10}{1}$$

$$36 - x = 30$$

$$x = 6 \text{ kg}$$

$$24;2 \left(1 - \frac{3}{5}\right) : \left(2 - \frac{9}{10}\right)$$

$$\frac{2^{10}}{5} : \frac{11^{10}}{10} \Rightarrow 4 : 11$$

Exercise

1. If $\frac{2}{3}$ of A = 75% of B = 0.6 of C, then
A : B : C is
(1) 2 : 3 : 3 (2) 3 : 4 : 5
(3) 4 : 5 : 6 (4) 9 : 8 : 10
(5) None of these
2. If $a : b = 5 : 7$ and $c : d = 2a : 3b$ then
 $ac : bd$ is
(1) 20 : 38 (2) 50 : 147
(3) 10 : 21 (4) 50 : 151
(5) None of these
3. If $x : y = 3 : 2$, then the ratio $2x^2 + 3y^2 : 3x^2 - 2y^2$ is equal to
(1) 12 : 5 (2) 6 : 5
(3) 30 : 19 (4) 5 : 3
(5) None of these
4. Divide ₹ 324.36 into three parts in the proportion of 5 : 6 : 7.
(1) ₹ 90.10, ₹ 108.12, ₹ 126.14
(2) ₹ 80.12, ₹ 118.14, ₹ 124.14
(3) ₹ 95.10, ₹ 128.12, ₹ 136.14
(4) ₹ 80.10, ₹ 118.12, ₹ 146.14
(5) None of these
5. Two sums of money are proportional to 8 : 9. If the first is ₹ 20, what is the other?
(1) ₹ 20.5 (2) ₹ 22.5
(3) ₹ 23.5 (4) ₹ 24.5
(5) None of these
6. If A and B are in the ratio 3 : 4 and B and C in the ratio 12 : 13 then A and C will be in the ratio
(1) 3 : 13 (2) 9 : 13
(3) 36 : 13 (4) 13 : 9
(5) None of these
7. 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
(1) 20 : 66 : 95 (2) 21 : 66 : 95
(3) 21 : 66 : 92 (4) 19 : 66 : 92
(5) None of these
8. A boy has a few coins of denominations 50 paise, 25 paise and 10 paise in the ratio 1 : 2 : 3. If the total amount of the coins is ₹ 6.50, the number of 10 paise coins is
(1) 5 (2) 10
(3) 15 (4) 20
(5) None of these
9. Two numbers are in the ratio 2 : 3. If 2 is subtracted from the first and 2 is added to the second, the ratio becomes 1 : 2. The sum of the number is
(1) 30 (2) 28
(3) 24 (4) 10
(5) None of these
10. ₹ 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
(1) ₹ 6000 (2) ₹ 14440
(3) ₹ 9200 (4) ₹ 16000
(5) None of these
11. Three numbers are in the ratio $\frac{1}{2} : \frac{2}{3} : \frac{3}{4}$. The difference between the greatest and the smallest number is 36. The numbers are
(1) 72, 84, 108 (2) 60, 72, 96
(3) 72, 84, 96 (4) 72, 96, 108
(5) None of these

the number of failures was 2 less than earlier, the ratio of passers to failures would have been 22 : 3. The number

(5) None of these

23. The income of A and B are in the ratio 5 : 3. The expenses of A, B and C are in the ratio 8 : 5 : 2. If C spends ₹ 2000 and B saves ₹ 700, then A saves

(5) None of these

- (5) None of these
 The number of students in three classes are in the ratio $2 : 3 : 5$. If the number of student in each class is increased by 20 the ratio becomes $4 : 5 : 7$. The total number of students before the increase is

(5) None of these

26. One man adds 3 litres of waters 12 litres milk and another 4 litres of water to 10 litres of milk. What is the rate of the strengths of milk in the two mixtures?

(5) None of these

27. ₹ 425 is divided among 4 men, 5 women and 6 boys such that the share of a man, a woman and a boy may be in the ratio of 9 : 8 : 4. What is the share of a woman?

(5) None of these

28. The same type of work is assigned to three groups of men. The ratio of person in the groups is $3 : 4 : 5$. Find the ratio of days in which they will complete the work.

- (1) $20 : 15 : 12$ (2) $15 : 12 : 18$
 (3) $20 : 12 : 15$ (4) $15 : 25 : 20$
 (5) None of these

(c) None of these

19. 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—
 (1) 35 : 75 (2) 31 : 74

(3) None of these

36. One year ago, the ratio between Laxman's and Gopal's salaries was $3 : 5$. The ratio of their individual salaries of last year and present year are $2 : 3$ and $4 : 5$ respectively. If their total salaries for the present year are ₹ 4300, find the present salary of Laxman.

(1) G-14-1

- (4) Can't be determined
(5) None of these

31. 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?

(5) None of these

32. 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?

33. A amount of money is to be distributed among A, B and C in the ratio of 3 : 3 : 5. If the total share of A, B and C is ₹ 22,000, then what will be the total share of A and C?
- (1) ₹ 16,500 (2) ₹ 15,000
 (3) ₹ 12,500 (4) ₹ 16,000
 (5) None of these
34. Vessels A and B contain mixtures of milk and water in the ratios 4 : 5 and 5 : 1 respectively. In what ratio should quantities of mixture be taken from A and B to form a mixture in which milk to water is in the ratio 5 : 4?
- (1) 2 : 5 (2) 4 : 3
 (3) 5 : 3 (4) 2 : 3
 (5) None of these
35. 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 ₹ 210, find the number of coins of each kind.
- (1) 105, 126, 168 (2) 104, 136, 176
 (3) 106, 116, 156 (4) 108, 126, 146
 (5) None of these
36. One-rupee coins, 50 P coins and 25 P coins, are in the ratio of 4:5:6. Find the number of coins of each denomination if the total money amounts to ₹ 32 ?
- (1) 16, 20, 24 (2) 22, 24, 28
 (3) 14, 24, 22 (4) 18, 20, 22
 (5) None of these
37. A sum of ₹ 3115 is divided among A, B and C such that if ₹ 25, ₹ 28 and ₹ 52 be diminished from their shares respectively, the remainder shall be in the ratio of 8 : 15 : 20. Find the share of each.
- (1) ₹ 585, ₹ 1078, ₹ 1452
 (2) ₹ 685, ₹ 1178, ₹ 1252
 (3) ₹ 485, ₹ 1088, ₹ 1352
 (4) ₹ 785, ₹ 1378, ₹ 1652
 (5) None of these
38. What must be added to two numbers that are in the ratio of 3 : 4, so that they become in the ratio 4 : 5?
- (1) 0.5 (2) 1
 (2) 1.5 (4) 2
 (5) None of these
39. Find the number which, when subtracted from the terms of the ratio 19 : 23 makes it equal to the ratio of 3 : 4.
- (1) 5 (2) 6
 (3) 7 (4) 8
 (5) None of these
40. An employer reduces the number of his employees in the ratio 9 : 8 and increases their wages in the ratio 14 : 15. State whether his bill of total wages increases or decreases, and in what ratio.
- (1) 11 : 15 (2) 20 : 21
 (3) 21 : 20
 (4) Can't be determined
 (5) None of these
41. Ratio of earnings of A and B is 8 : 9 respectively. If the earnings of A increase by 50% and the earnings of B decrease by 25%, the new ratio of their earnings becomes 16 : 9 respectively. What are A's earnings?
- (1) ₹ 37,000 (2) ₹ 28,500
 (3) ₹ 22,000
 (4) Can't be determined
 (5) None of these
42. A mixture contains milk and water in the ratio of 4 : 3 respectively. If 6 litres of water is added to this mixture, the respective ratio of milk and water becomes 8 : 7. What is the quantity of milk in the original mixture?
- (1) 96 litres (2) 36 litres
 (3) 84 litres (4) 48 litres
 (5) None of these

43. 1300 is to be distributed among A, B, C and D in such a way that

$$\frac{A's \text{ share}}{B's \text{ share}} = \frac{B's \text{ share}}{C's \text{ share}} = \frac{C's \text{ share}}{D's \text{ share}}$$

$$= \frac{2}{3}.$$

What is the share of A?

44. A dog chases a rabbit. The dog takes 6 leaps for every 7 leaps of the rabbit. The rabbit takes 6 leaps for every 5 leaps of the dog. Ratio of their speed is-

45. Which smallest number must be subtracted from both the terms of ratio $6 : 7$, so that the new ratio is less than $16 : 21$

46. Two positive numbers are in the ratio 11 : 12. Their product is 4752. What is the smallest number?

Answers with explanations

1.4; According to the question,

$$A \times \frac{2}{3} = B \times \frac{75}{100} = C \times \frac{6}{10}$$

$$\Rightarrow A \times \frac{2}{3} = B \times \frac{3}{4} = C \times \frac{3}{5}$$

$$\text{Ratio } A : B = 9 : 8$$

$$B : C = 4 : 5$$

$$A : B : C = 36 : 32 : 40$$

$$A : B : C = 9 : 8 : 10$$

2.4; Given that $a : b = \frac{5}{7}$ _____(i)

$$\text{and } c : d = 2a : 3b = 2 \frac{a}{b} : 3$$

$$= 2 \times \frac{5}{7} : 3 [\text{ since } \frac{a}{b} = \frac{5}{7} \text{ given in (i)}]$$

$$= 10 : 21$$

$$ac : bd \Rightarrow 5 \times 10 : 7 \times 21$$

$$(\text{Since } \frac{a}{b} = \frac{5}{7} \text{ and } \frac{c}{d} = \frac{10}{21})$$

$$\Rightarrow 50 : 147$$

2.4; or

$$\frac{a}{b} = \frac{5}{7}$$

$$\frac{c}{d} = \frac{2a}{3b}$$

$$\frac{ac}{bd} = \frac{5 \times 2a}{7 \times 3b}$$

$$\frac{ac}{bd} = \frac{10}{21} \times \left(\frac{a}{b}\right)$$

$$\frac{ac}{bd} = \frac{10}{21} \times \left(\frac{5}{7}\right)$$

$$\frac{ac}{bd} = \frac{50}{147}$$

$$3.3; \quad \frac{x}{y} = \frac{3}{2}$$

$$\frac{2x^2 + 3y^2}{3x^2 - 2y^2}$$

$$\frac{2\left(\frac{x}{y}\right)^2 + 3\left(\frac{y}{y}\right)^2}{3\left(\frac{x}{y}\right)^2 - 2\left(\frac{y}{y}\right)^2} = \frac{2 \times \left(\frac{3}{2}\right)^2 + 3}{3 \times \left(\frac{3}{2}\right)^2 - 2}$$

$$= \frac{2 \times \frac{9}{4} + 3}{3 \times \frac{9}{4} - 2} = \frac{\frac{18}{4} + 3}{\frac{27}{4} - 2} = \frac{\frac{18+12}{4}}{\frac{27-8}{4}}$$

$$= \frac{30}{4} \times \frac{4}{19} = 30 : 19$$

4. 1;

Ist	2nd	3rd
$\frac{5}{18} \times 324.36$	$\frac{6}{18} \times 324.36$	$\frac{7}{18} \times 324.36$
5×18.02	6×18.02	7×18.02
90.10	108.12	126.14

5. 2; 8 : 9

↓

20

If 8 = 20

$$\text{then } 9 = \frac{20}{8} \times 9 = 22.5$$

or

if $8x = 20$

$$\text{then } 9x = \frac{20 \times 9x}{8x} = ₹ 22.5$$

6. 2; $A : B = 3 : 4$

$B : C = 12 : 13$

$$A : C = \frac{A}{B} \times \frac{B}{C} = \frac{3}{4} \times \frac{12}{13} = 9 : 13$$

6.2; Short cut:

$$\begin{array}{l} A : B : C \\ 3 : 4 \rightarrow 4 \\ 12 \leftarrow 12 : 13 \\ 36 \quad 48 : 52 \\ A : C = 36 : 52 \\ \quad \quad \quad 9 : 13 \end{array}$$

For this trick
see ratio and
Proportion

7.3; Let the initial salaries of A, B and C be ₹ x , ₹ $3x$ and ₹ $4x$ respectively. Respective ratio after corresponding increase

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

$$= 105 : 330 : 460 = 21 : 66 : 92$$

OR

	A	B	C
Initial	100	: 300	: 400
After increment	105	: 330	: 460
i.e.	21	: 66	: 92

OR

$$\begin{array}{l} A : B : C \\ 1 : 3 : 4 \\ \times 100 \downarrow \quad \downarrow \quad \downarrow \\ 100 : 300 : 400 \\ \text{after 5% increase } 100 \text{ becomes } 105/- \end{array}$$

After 10% increase 300 becomes 330/-

After 15% increase 400 becomes 460/-

New ratio is

$$\begin{array}{l} 105 : 330 : 460 \\ 21 : 66 : 92 \end{array}$$

$$8.3; 50 \text{ paise} = ₹ \frac{1}{2}$$

$$25 \text{ paise} = ₹ \frac{1}{4}$$

$$10 \text{ paise} = ₹ \frac{1}{10}$$

and Ratio of number of coins = 1: 2 : 3

Ratio of the value of coins

$$= \frac{1}{2} : \frac{2}{4} : \frac{3}{10} = 5 : 5 : 3$$

∴ Value of the 10-paise coins

$$= ₹ \left(\frac{3}{13} \times 6.50 \right) = ₹ 1.5$$

$$\therefore \text{Number of 10-paise coins} = 1.5 \times 10 = 15$$

9.1; Let the numbers are $2x$ and $3x$

$$\frac{2x - 2}{3x + 2} = \frac{1}{2}$$

$$\Rightarrow 4x - 4 = 3x + 2$$

$$\Rightarrow x = 6$$

$$\text{So, sum of numbers} = 2x + 3x = 5x = 5 \times 6 = 30$$

$$10.4; \quad \frac{1}{2} : \frac{1}{4} : \frac{5}{16}$$

$$\frac{8 : 4 : 5}{16}$$

→ L.C.M. of 2, 4 and 16

Hence ratio is 8 : 4 : 5

Difference between biggest and smallest is $8x - 4x = 4x$

$$\text{Now } 8x + 4x + 5x = 68000 \\ 17x = 68000$$

$$\therefore 4x = \frac{68000 \times 4x}{17x} = 16000$$

$$11.4; \quad \frac{1}{2} : \frac{2}{3} : \frac{3}{4}$$

$$\frac{6 : 8 : 9}{12}$$

→ L.C.M of 2, 3 and 4.

Ratio = 6 : 8 : 9

Difference between greatest and smallest number is $9x - 6x = 3x$

$$x = \frac{36}{3} = 12$$

$$1\text{st No.} = 6x = 72$$

$$2\text{nd No.} = 8x = 96$$

$$3\text{rd No.} = 9x = 108$$

12.1; Let incomes are $5x$ and $3x$ and expenditures are $9y$ & $5y$.

According to question

$$5x - 9y = 2600 \quad (1)$$

$$3x - 5y = 1800 \quad (2)$$

$$3\{5x - 9y = 2600\}$$

$$5\{3x - 5y = 1800\}$$

$$\underline{15x - 27y = 7800}$$

$$\underline{-15x + 25y = -9000} \text{ (on subtracting)}$$

$$-2y = -1200$$

$$y = 600$$

Putting the value of y in equation (1)

$$x = 1600$$

\therefore Incomes are ₹8000 and ₹4800.

Short-cut Method

	A	B	Saving
Income	$5x$	$3x$	2600
Expenditure	$9y$	$5y$	1800

$$x = \frac{\text{difference of savings}}{(9 \times 3 - 5 \times 5)} \times (9 - 5)$$

$$= \frac{(2600 - 1800)}{2} \times 4 = 1600$$

So, incomes are ₹8000 & ₹4800

13.3; Initial Ratio $2 : 3 : 5$

After increment $4 : 5 : 7$

diff. of Ratio $2 : 2 : 2$

2 part = 20

1 part = 10

Sum of students = $10(2 + 3 + 5) = 100$

13.3; Short cut:

$2 : 3 : 5$ becomes $4 : 5 : 7$ (after 20 students were increased in each class i.e 60 students)

$$2x + 3x + 5x + 60 = 4x + 5x + 7x$$

$$\Rightarrow 6x = 60$$

Originally $10x$ were in the class $10 \times 10 = 100$ students

14. 1; Let the numbers be x and y
According to the question,

$$\frac{75}{100} \times x = \frac{3}{7} \times y$$

$$\text{or, } \frac{x}{y} = \frac{3}{7} \times \frac{100}{75} = \frac{4}{7} = 4 : 7$$

15. 3; Let the number of boys and girls be $6x$ and $5x$ respectively.
According to the question,

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

$$\Rightarrow 42x + 56 = 55x - 22$$

$$\Rightarrow 55x - 42x = 56 + 22$$

$$\Rightarrow 13x = 78$$

$$\Rightarrow x = \frac{78}{13} = 6$$

\therefore Number of boys in the class = $6x+8 = 6 \times 6 + 8 = 44$

16. 4; Let the number be x and y .
According to the question

$$\frac{4}{7}x = \frac{40}{100}y$$

$$\text{or, } \frac{x}{y} = \frac{40}{100} \times \frac{7}{4} = \frac{7}{10}$$

$$\text{or, } x:y = 7:10$$

17. 4; Let the numbers of existing male and female employees in an organisation be $7x$ and $3x$

Total number of new recruits = 240

Ratio of male and female of new recruits = 5 : 7

Number of male new recruits

$$= \frac{5}{12} \times 240 = 100$$

Number of female new recruits
 $= 240 - 100 = 140$

ratio between male and female employees after the recruits join the organization

$$= \frac{7x + 100}{3x + 140}$$

So, option (4) is best choice.

18. 1; Let the numbers be x and y . According to question

$$\frac{40}{100} \times x = \frac{3}{5} \times y$$

$$\frac{x}{y} = \frac{3}{5} \div \frac{40}{100}$$

$$= \frac{3}{5} \times \frac{100}{40} = \frac{3}{2}$$

Ratio between the 1st number and the 2nd number = 3 : 2

19. 1; Share of two friends = $1 - \frac{1}{4} = \frac{3}{4}$

$$\text{Required ratio} = \frac{1}{4} : \frac{3}{4} = 1 : 3$$

20. 4; Total number of trees = 121
 Ratio of the number of coconut trees to that of mangoes trees
 $= 5 : 6$

\therefore Total number of coconut trees

$$= \frac{5}{11} \times 121 = 5 \times 11 = 55$$

$$\frac{C}{M} = \frac{5}{6}$$

$$11x = 121$$

$$x = 11$$

$$C = 5x = 5 \times 11 = 55$$

21. 1; Let the number of students in x be $5x$ and that in y be $8x$. Number of students in x increases to

$$= \frac{120}{100} \times 5x = 6x$$

Number of students in y increases

$$\text{to} = \frac{110 \times 8x}{100} = 8.8x$$

$$\therefore \text{Required ratio} = 6x : 8.8x = 60 : 88 = 15 : 22$$

Paramount concept:-

Let No. of students initially

After increment
 No. of students

x	y
500	800
600	880
15 : 22	

- 22.1; Let the number of passed student and that of failed students be $25x$ and $4x$ respectively

According to the question, if 5 more had appeared i.e. $25x + 4x + 5 = 29x + 5$, number of failure was 2

less i.e. $4x - 2$, then $\frac{\text{passed}}{\text{failures}} = \frac{22}{3}$

Passed = appeared - failed

$$\frac{(29x + 5) - (4x - 2)}{4x - 2} = \frac{22}{3}$$

$$\Rightarrow \frac{29x - 4x + 5 + 2}{4x - 2} = \frac{22}{3}$$

$$\Rightarrow \frac{25x + 7}{4x - 2} = \frac{22}{3}$$

$$\Rightarrow 75x + 21 = 88x - 44$$

$$\Rightarrow 21 + 44 = 88x - 75x$$

$$\Rightarrow 13x = 65$$

$$x = 5$$

No. of Students who appeared = $29x$

$$= 29 \times 5$$

$$= 145$$

22.1; Short cut:

$$\frac{P}{F} = \frac{25x}{4x}$$

$$\text{Total} = 29x$$

$y = 5$ more had appeared the number of students would have been

$$29x + 5$$

$$\text{Now, appeared} = \frac{25x + 3x}{3x}$$