# RATIO, PROPORTION AND PARTNERSHIP

# RATIO:

The comparison between two quantities in terms of magnitude is called ratio.

For example, Mohit has 5 pens and Amit has 3 pens. It means the ratio of number of pens between Mohit and Amit is 5 is to 3. It can be expressed is 5:3.

So the ratio of any two quantities is expressed as a/b or a : b. The numerator 'a' is called the antecedent and denominator 'b' is called as consequent. Rule of Ratio: The comparison of two quantities is meaningless if they are not of the same kind or in the same units (of length, volume or currency etc.) We do not compare 5 girls and 7 toys or 15 kilometers and 3 cows. Therefore, to find the ratio of two quantities (of the same kind), it is necessary to explain them in same units.

Properties of Ratio:

1. The nature of ratio does not change when the numerator and denominator both are multiplied by same quantities.

$$\text{i.e,} \quad \frac{a}{b} = \frac{ka}{kb} = \frac{la}{lb} \text{ etc} \Rightarrow \text{e.g.} \frac{3}{4} = \frac{6}{8} = \frac{9}{12} \ldots \text{ etc have the same ratio.}$$

2. The value of a ratio does not change when the numerator and denominator both are divided by same quantities.

$$\text{i.e,} \quad \frac{a}{b} = \frac{a/k}{b/k} = \frac{a/l}{b/l} \text{ etc,} \Rightarrow \text{e.g.} \frac{3}{4} = \frac{3/2}{4/2} = \frac{3/3}{4/3} \text{. etc are in same ratio}$$

3. The ratio of two fractions can be expressed in ratio of integers.

$$\text{e.g.} \quad \frac{3/4}{5/4} = \frac{3}{4} \times \frac{4}{5} = \frac{3}{5} \Rightarrow \frac{a/b}{c/d} = \frac{a}{b} \times \frac{d}{c}$$

4. When two or more than two ratio are multiplied with each other, then it is called compounded ratio e.g.,

$$\frac{2}{3} \times \frac{4}{5} \times \frac{6}{7} = \frac{16}{35} \text{ is compounded ratio of } \frac{2}{3}, \frac{4}{5}, \frac{6}{7}$$

$$\text{So,} \quad \frac{a}{b} \times \frac{c}{d} \times \frac{e}{f} \ldots = \frac{k}{m} (\text{Compound ratio})$$

5. When the ratio is compounded with itself, it is called as duplicate, triplicate ratio etc.

$$\frac{a}{b} \times \frac{a}{b} = \frac{a^2}{b^2} = \left(\frac{a}{b}\right)^2 \text{ is called duplicate ratio of } \frac{a}{b} \text{ and } \frac{a}{b} \times \frac{a}{b} \times \frac{a}{b} = \left(\frac{a}{b}\right)^3$$

is called triplicate ratio of a/b similarly $\sqrt[2]{\left(\frac{a}{b}\right)} = \left(\frac{a}{b}\right)^{\frac{1}{2}}$ is called as sub-duplicate ratio and $\sqrt[3]{\left(\frac{a}{b}\right)} = \left(\frac{a}{b}\right)^{\frac{1}{3}}$ is called as sub-triplicate ratio of a/b. If four quantities a, b, c and d form a proportion, many other proportions may be deduced by the properties of fraction. The results of these operation are very useful. These operations are

1. Inverterdo: if $\frac{a}{b} = \frac{c}{d}$ the $\frac{b}{a} = \frac{d}{c}$

2. Alternado: if $\frac{a}{b} = \frac{c}{d}$ then $\frac{a}{c} = \frac{b}{d}$

3. Componendo: if $\frac{a}{b} = \frac{c}{d}$, then $\left(\frac{a+b}{b}\right) = \left(\frac{c+d}{d}\right)$

4. Dividendo: if $\frac{a}{b} = \frac{c}{d}$, then $\left(\frac{a-b}{b}\right) = \left(\frac{c-d}{d}\right)$

5. Componendo and Dividendo: if $\frac{a}{b} = \frac{c}{d}$, then $\frac{a+b}{a-b} = \frac{c+d}{c-d}$

Concept 1: If two numbers are in the ratio of a : b and the sum of these number is x, then these numbers will be

Example: Two numbers are in the ratio of 4 : 5. If sum of these two numbers is 810, find the numbers?

Sol. Ratio of two number = 4 : 5

Sum = 810

First Number = $\dfrac{ax}{a+b} = \dfrac{4\times 810}{4+5} = 360$

Second Number = $\dfrac{bx}{a+b} = \dfrac{5\times 810}{4+5} = 450$

Example: a : b = 3 : 4 and b : c = 2 : 5 Find a : b : c ?

**Sol.**

$$a : b = 3 : 4$$
$$b : c = 2 : 5$$

$$a : b : c = 3\times 2 : 4\times 2 : 4\times 5$$
$$= 6 : 8 : 20$$
$$= 3 : 4 : 10$$

Example: a : b = 1 : 2, b : c = 3 : 2, and c : d = 1 : 3. Find a : b : c : d?

**Sol.**

$$\begin{array}{cccc} a & b & c & d \\ 1 & 2\rightarrow 2\rightarrow & 2 \\ 3\leftarrow 3 & 2\rightarrow & 2 \\ 1\leftarrow 1\leftarrow 1 & & 3 \end{array}$$

$$a : b : c : d = 1\times 3\times 1 : 2\times 3\times 1 : 2\times 2\times 1 : 2\times 2\times 3$$
$$= 3 : 6 : 4 : 12$$

**Partnership**

Concept 1: If a group of n persons invested different amount for different period then their profit is the ratio is

$At_1 : Bt_2 : Ct_3 : Dt_4 : ..... : Xt_n$

Here first person invested amount A for $t_1$ period, second persons invested amount B for $t_2$ period and so on.

Example: A starts a business with Rs 2,000, B joins him after 3 months with Rs 4,000. C puts a sum of Rs 10,000 in the business for 2 months only. At the end of the year the business gave a profit of Rs 5600. How should the profit be divided among them?

Sol: Ratio of their profits (A's: B's: C's) = 2 × 12: 4 × 9: 10 × 2 = 6: 9: 5

Now, 6 + 9 + 5 = 20

Then A's share = $\dfrac{5600}{20} \times 6 = Rs\ 1680$

B's share = $\dfrac{5600}{20} \times 9 = Rs\ 2520$

C's share = $\dfrac{5600}{20} \times 5 = Rs\ 1400$

Concept 2: If investments are in the ratio of a: b: c and the timing of their investments in the ratio of x: y: z then the ratio of their profits are in the ratio of ax: by: cz.

Example: A, B and C invested capital in the ratio 2 : 3 : 5, the timing of their investments being in the ratio 4 : 5 : 6. In what ratio would their profit be distributed?

Sol. We should know that if the duration for their investments be in the ratio x : y : z, and investment is in ratio a : b : c then the profit would be distributed in the ratio ax : by : cz.

Thus, following the same rule, the required ratio = 2 × 4 : 3 × 5 : 5 × 6 = 8 : 15 : 30

Concept 3: If investments are in the ratio a : b : c and profits in the ratio p : q : r,

then the ratio of time is

$$\dfrac{p}{a} : \dfrac{q}{b} : \dfrac{r}{c}.$$

Example : A, B and C invested capital in the ratio 5 : 6 : 8. At the end of the business term, they received the profits in the ratio 5 : 3 : 12. Find the ratio of time for which they contributed their capital?

Sol: Using the above formula, we have the required ratio

$$= \dfrac{5}{5} : \dfrac{3}{6} : \dfrac{12}{8} = 1 : \dfrac{1}{2} : \dfrac{3}{2} : 2 : 1 : 3$$

**SOLVED EXAMPLES**

Example 1.    A sum of Rs 9000 is to be distributed among A, B and C in the ratio 4 : 5 : 6. What will be the difference between A's and C's shares ?
Sol. Total amount = Rs 9000 A's share = 4x Þ B's share = 5x and C's share = 6x
Then, 4x + 5x + 6x = 9000 Þ 15x = 9000; \ x = 600
Now, A's share = 4 × 600 = Rs 2400 and
C's share = 6 × 600 = Rs 3600
Difference between A's and C's share = Rs (3600 – 2400) = Rs 1200

Example 2. Rs 6400 are divided among three workers in the ratio 3/5:2:5/3. The share (in Rs) of the second worker is
Sol. Total amount = 6400
    Let first worker's share = 3x/5
    Second worker's share = 2x
    Third worker's share = 5x/3
    Then, 3x/5+2x+5x/3=6400
$$\Rightarrow \quad \frac{9x + 30x + 25x}{15} = 6400 \quad \Rightarrow \quad 64x = 6400 \times 15 = 1500$$
Second worker's share = 1500×2 = 3000

Example 3. A boy, after giving away 80% of his pocket money to one companion and 6% of the reminder to another, has Rs 47 left with him. How much pocket money did the boy have in the beginning ?
Sol. Let the boy had Rs x.
    Money given to first companion = 80% of x = 4x/5
    Remaining money = x-4x/5=x/5
$$\text{Money given to the another companion} = \frac{6}{100} \times \frac{x}{5} = \frac{3x}{250}$$
$$\text{Remaining money} = \frac{x}{5} - \frac{3x}{250} = \frac{50x - 3x}{250} = \frac{47x}{250}$$
$$\therefore \quad \frac{47x}{250} = 47 \quad \Rightarrow \quad x = \frac{47 \times 250}{47} = Rs\,250$$

Example 4. Rs 180 contained in a box consists of Rs 1,50 paise and 25 paise coins in the ratio 2 : 3 : 4. What is the number of 50 paise coins ?
Sol. Ratio of the values of the coins = 2:3/2:4/4= 2:3/2:1 = 4:3:2
    Sum of the ratios = 4 + 3 + 2 = 9
    Values of 50 paise coins = 3/9 * 180 =Rs. 60
    Numbers of 50 paise coins = 120

Example 5.  A, B and C enter into a partnership with shares in the ratio $\frac{7}{2}:\frac{4}{3}:\frac{6}{5}$ .After 4 months, A increase his share by 50%. If the total profit at the end of the year was Rs 43200. Then, the B's share in the profit is:
Sol. Ratio of initial shares of A, B and C in the partnership
$$A : B : C = \frac{7}{2}:\frac{4}{3}:\frac{6}{5} = \frac{7\times15}{2\times15}:\frac{4\times10}{3\times10}:\frac{6\times6}{5\times6} = \frac{105}{30}:\frac{40}{30}:\frac{36}{30}$$
    (LCM of 2, 3, 5 = 30) = 105 : 40 : 36
Let the respective shares of A, B and C be Rs 105x, Rs 40x and Rs 36x
New shares of A, B and C in the partnership
A = Rs 105x for 4 months +105x x 150/100 for 8 months
$$= (105x \times 4) + 105x \times \frac{3}{2} \times 8 = 420x + 1260x = 1680x$$
B = 40x for 12 months = 40x × 12 = 480x
C = 36x for 12 months = 36x × 12 = 432 x
A : B : C = 1680 : 480 : 432 = 35 : 10 : 9
It is a type of simple partnership, so the profit or loss of the business is distributed among the investors in the

ratio of their invested money.

B's share in profit

$$= \frac{\text{B's investment}}{\text{(A + B + C)'s investment}} \times \text{Total profit}$$

$$= \frac{10}{35 + 10 + 9} \times 43200 = \frac{10}{54} \times 43200 = 8000$$

Hence, B's share in the profit = Rs 8000.

Example 7. In a business partnership among A, B, C and D, the profit is shared as follows

$$\frac{\text{A's share}}{\text{B's share}} = \frac{\text{B's share}}{\text{C's share}} = \frac{\text{C's share}}{\text{D's share}} = \frac{1}{3}$$

If the total profit is Rs 400000, the share of C is:

Sol. Given, A : B = 1 : 3

B : C = 1 : 3 = 3 : 9

C : D = 1 : 3 = 9 : 27

Now, by joining the above three ratios, we get

A : B : C : D = 1 : 3 : 9 : 27

Sum of the ratios = 1 + 3 + 9 + 27 = 40

C's share in profit = 9/40 * 400000 = Rs 90000

Example 8. A started a business with a capital of Rs 100000. 1 yr later, B joined him with a capital of Rs 200000. At the end of 3 yr from the start of the business, the profit earned was Rs 84000. The share of B in the profit exceeded the share of A by

Sol. Ratio of equivalent capitals of A and B = 100000 × 36 : 200000 × 24 = 36 : 48 = 3 : 4

Profit gained by A = 3/7 ×84000 = 36000

Profit gained by B = 4/7 ×84000 = 48000

Required difference = 48000 − 36000 = Rs. 12000

Example 9. The ratio of income of A and B is 3 : 4 If the ratio of expenditure of both is 2 : 3 and each save Rs 200, find the income of both A and B?

Sol. Income − Saving = Expenditure

According to question

Let the income of A and B be 3x and 4x respectively

$$\frac{3x - 200}{4x - 200} = \frac{2}{3}, \quad x = 200$$

Income of A = 3x = 3 × 200 = 600

Income of B = 4x = 4 × 200 = 800

Example 10. Rs 7800 distributed among A, B, and C. The share of A is 3/4th of the share of B, and share of B is 2/3th of the share of C. Then, find the difference between share of B and C?

Sol. A = 3/4 B  => A : B = 3 : 4 B = 2/3 C => B : C = 2 : 3

A : B : C = 6 : 8 : 12 = 3 : 4 : 6

Share of B = $\frac{4}{13}$ × 7800  = 2400

Share of C = $\frac{6}{13}$ × 7800  = 3600

Difference of share between B and C = Rs. 1200

# Type 1- Foundation

Q1. One year ago the ratio of Ramu and Somu age was 6 : 7 respectively. Four years hence their ratio would become 7 : 8. How old is Somu?
A. 24 years              B. 30 years              C. 32 years              D. 36 years

Q2. If 33% of A is equal to 55% of B then find the ratio of A and B?
A. 3:5              B. 5:3              C. 3:4              D. 5:4

Q3. What is the value of 68% of two fifth of 550?
A. 149.6              B. 150              C. 154              D. 158

Q4.  If 24 is deducted from 45% of a number result becomes 48. What will be 3/8 part of that number?
A. 140              B. 130              C. 145              D. None of these

Q5. 30% of a number is 190.8. What will be 175% of that number?
A. 1113              B. 1115              C. 1502              D. 1002

Q6. What will be 32% of 3/8 th of 1000?
A. 115              B. 125              C. 120              D. 129

Q7. Two numbers are respectively 20% and 50% more than a third number. The ratio of the two numbers is:
A. 2:5              B. 3:5              C. 4:5              D. 6:7

Q8. A sum of money is to be distributed among A, B, C, D in the proportion of 5 : 2 : 4 : 3. If C gets Rs. 1000 more than D, what is B's share?
A. Rs. 500              B. Rs. 1500              C. Rs. 2000              D. Rs. 2400

Q9.  If 0.75 : x : : 5 : 8, then x is equal to:
A. 1.12              B. 1.2              C. 1.25              D. 1.30

Q10. The sum of three numbers is 98. If the ratio of the first to second is 2 : 3 and that of the second to the third is 5 : 8, Then the second number is:
A. 20              B. 30              C. 48              D. 58

Q11. If Rs. 872 is divided into three parts, proportional to ½:2/3:3/4 then the first part is:
A. 182              B. 190              C. 196              D. None of these

Q12. The fourth proportional to 5, 8, 15 is:
A. 18              B. 24              C. 19              D. 20

Q13. Two numbers are in the ratio 3 : 5. If 9 is subtracted from each, then new numbers are in the ratio 12 : 23. The smaller number is :
A. 27              B. 33              C. 49              D. 55

Q14. If a number is reduced by 40% it become two third of another number. What is ratio of the second number to first number?
A. 6:10              B. 9:8              C. 8:9              D. None of these

Q15. $\frac{5a+3b}{2a-3b} = \frac{23}{5}$ then the value of a : b is:
A. 1:2              B. 1:3              C. 1:4              D. None of these

Q16. If P : Q = 8 : 15 and Q : R = 3 : 2, then find P : Q : R?
A. 8:15:7              B. 7:15:8              C. 8:15:10              D. 10:15:8

Q17. If P : Q = 8 : 15, Q : R = 5 : 8 and R : S = 4 : 5, then P : S is equal to:
A. 4:15              B. 2:15              C. 3:19              D. 7:15

Q18. Find the 4th proportional to 4, 16 and 7?
A. 28              B. 29              C. 22              D. None of these

Q19. Find the mean proportional between 9 and 64?
A. 25              B. 24              C. 27              D. 35

Q20. What will be the duplicate ratio of 2 : 7 ?
A. 4:49              B. 49:4              C. 4:14              D. 8:343

Q21. Find the sub-duplicate ratio of 81 : 64?
A. 8:9              B. 4:9              C. 9:8              D. 7:8
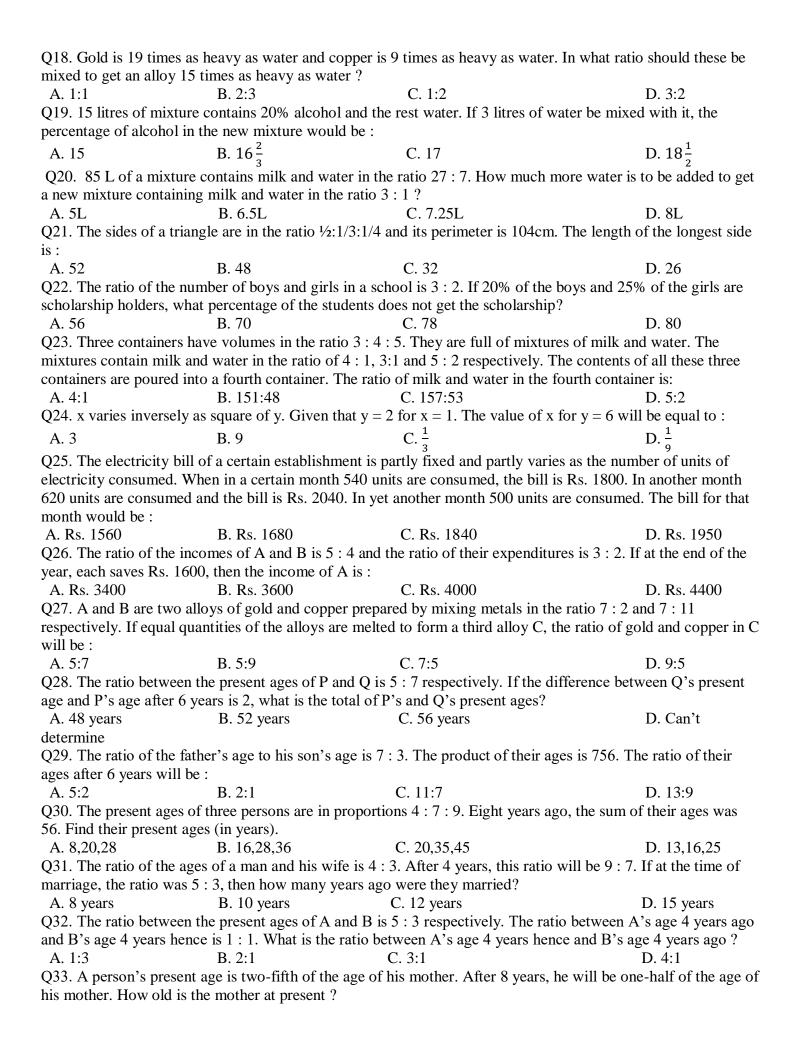
Q22. Find the triplicate ratio of 7 : 5?

A. 125:343                    B. 343:125                    C. 344:125                    D. 343:126

Q23. What will be the inverse ratio of 17 : 19?
   A. 19:17                    B. 18:17                    C. 17:18                    D. 19:5

Q24. Find the compound ratio of 2 : 7, 5 : 3 and 4 : 7?
   A. 147:40                  B. 40:147                  C. 147:30                  D. 30:147

Q25. If A : B = 3 : 4 and B : C = 8 : 9, then find the value of A : B : C?
   A. 3:4:5                   B. 1:2:3                   C. 7:12:17                 D. 6:8:7

Q26. If a : b = 3 : 5 and b : c = 4 : 7, then a : c is equal to:
   A. 11:35                   B. 35:11                   C. 35:12                   D. 12:35

Q27. If P : Q : R = 2 : 3 : 4 , then find P/Q:Q/R:R/P ?
   A. 8:9:24                  B. 9:8:24                  C. 24:8:9                  D. 8:24:9

Q28. If a/3=b/8, then (a + 3) : (b + 8) is equal to:
   A. 3:8                     B. 8:3                     C. 5:8                     D. 3:5

Q29. The ratio of $4^{3.5}:2^5$ is same as:
   A. 2:1                     B. 4:1                     C. 7:5                     D. 7:10

Q30. If 2 x : : 5 :; 7, then x is equal to:
   A. 1.12                    B. 2.80                    C. 1.25                    D. 1.30

Q31. The salaries of A, B, C are in the ratio 2 : 3 : 5 . If the increments of 15%, 10% and 20% are allowed respectively in their salaries, then what will be the new ratio of their salaries?
   A. 3:3:10                  B. 10:11:20                C. 23:33:60                D. 25:27:29

Q32. If Rs. 782 be divided into three parts, proportional to ½:2/3:3/4 then the first part is
   A. Rs. 182                 B. Rs. 190                 C. Rs. 196                 D. Rs. 204

Q33. Two numbers are in the ratio 1 : 2. If 7 is added to both, they changes to 3 : 5. The greatest number is:
   A. 24                      B. 26                      C. 38                      D. 32

Q34. The ratio of three numbers is 3 : 4 : 5 and the sum of their squares is 1250. The sum of the numbers is :
   A. 30                      B. 50                      C. 60                      D. 90

Q35. Sachin is younger than Rahul by 4 years. If their ages are in the respective ratio of 7 : 9, how old is Sachin?
   A. 16 years               B. 18 years               C. 14 years               D. 15 years

Q36. At present, the ratio between the ages of Arun and Deepak is 4 : 3. After 6 years. Arun's age will be 26 years. What is the age of Deepak at present?
   A. 12 years               B. 15 years               C. $19\frac{1}{2}$ years        D. 21 years

Q37. Present ages of X and Y are in the ratio 5 : 6 respectively. Seven year hence this ratio will become 6 : 7 respectively. What is X's present age in years?
   A. 35                      B. 42                      C. 49                      D. Can't determine

Q38. Present ages 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. Can't determine

Q39. The total of the ages of Jayant, Prem and Saransh is 93 years. Ten years ago, the ratio of their ages was 2 : 3 : 4. What is the present age of Saransh?
   A. 24 years               B. 32 years               C. 34 years               D. 38 years

Q40. Hitesh is 40 years old and Ronnie is 60 years old. How many years ago was the ratio of their ages 3 : 5?
   A. 5 years                B. 10 years               C. 20 years               D. 37 years

## Type 2 – Moderate

Q1. The difference between a two-digit number and the number obtained by interchanging the digits is 36. What is the difference between the sum and the difference of the digits of the number if the ratio between the digits of the number is 1 : 2 ?

A. 4               B. 8               C. 16               D. 20

Q2. Seats for Mathematics, Physics and Biology in a school are in the ratio 5 : 7 : 8. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of increased seats?

     A. 2:3:4           B. 6:7:8           C. 6:8:9           D. 4:8:9

Q3. In a mixture 60 litres, the ratio of milk and water is 2 : 1. What quantity of water should be added so that the ratio becomes 1 : 3?

     A. 80L           B. 100L           C. 120L           D. 60L

Q4. The ratio of the number of boys and girls in a college is 7 : 8. If the percentage increase in the number of boys and girls be 20% and 10% respectively, what will be the new ratio?

     A. 8:9           B. 17:18           C. 21:22           D. Can't determine

Q5. Salaries of Ravi and Sumit are in the ratio 2 : 3. If the salary of each is increased by Rs. 4000, the new ratio becomes 40 : 57. What is Sumit's salary?

     A. Rs. 17000           B. Rs. 20000           C. Rs. 25500           D. Rs. 34000

Q6. The salaries of A, B and C are in the ratio 2 : 3 : 5. If the increments of 15%, 10% and 20% are allowed respectively in their salaries, then what will be new ratio of their salaries?

     A. 3:3:10           B. 10:11:20           C. 23:33:60           D. 3:4:5

Q7. In a bag, there are coins of 25 p, 10 p and 5 p in the ratio of 2 : 3 : 4. If there is Rs. 50 in all, how many 5 p coins are there?

     A. 50           B. 100           C. 50           D. 200

Q8. A sum of money is divided among C, A and B in ratio of 4 : 5 : 6 and another sum of money is divided between M and N equally if B got 2000 more than M then how much C get?

     A. Rs. 1000           B. Rs. 500           C. Rs. 4000           D. Can't determine

Q9. Three number A, B and C are in ratio of 12 : 15 : 25. If sum of these numbers be 364 find the ratio between difference of B and A and the difference of C and B?

     A. 3:2           B. 3:10           C. 3:5           D. 4:2

Q10. 625/x=x/1156 then what will be the value of x

     A. 800           B. 850           C. 900           D. 950

Q11. A mixture contains alcohol and water in the ratio 4 : 3. If 5 liters of water is added to the mixture, the ratio becomes 4 : 5. Find the quantity of alcohol in the given mixture.

     A. 5L           B. 7.5L           C. 10L           D. 12L

Q12. 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

Q13. If Rs. 510 be divided among A, B, C in such a way that A gets 2/3 of what B gets and B gets 1/4 of what C gets, then their shares are respectively:

   A. Rs. 120, Rs. 240, Rs. 150 B. Rs. 60, Rs. 90, Rs. 360   C. Rs. 150, Rs. 300, Rs. 60    D. Rs. 70, Rs. 90, Rs. 350

Q14. Rs. 366 are divided among A, B and C so that A may get 1 2 as much as B and C together, B may get 2 3 as much as A and C together, then the share of A is :

   A. Rs. 122           B. Rs. 129.60           C. Rs. 146.60           D. Rs. 183

Q15. Ratio of the earnings of A and B is 4:7. If the earnings A increase by 50% and those of B decrease by 25%, the new ratio of their earnings becomes 8:7. What are A's earnings?

   A. Rs. 21000           B. Rs. 26000           C. Rs. 28000           D. Can't determine

Q16. An amount of Rs. 735 was divided between A, B and C. If each of them had received Rs. 25 less, their shares would have been in the ratio of 1 : 3 : 2. The money received by C was :

   A. Rs. 195           B. Rs. 200           C. Rs. 225           D. Rs. 245

Q17. An amount of Rs. 2430 is divided among A, B and C such that if their shares be reduced by Rs. 5, Rs. 10 and Rs. 15 respectively, the remainders shall be in the ratio of 3 : 4 : 5. Then, B's share was :

   A. Rs. 605           B. Rs. 790           C. Rs. 800           D. Rs. 810

Q18. Gold is 19 times as heavy as water and copper is 9 times as heavy as water. In what ratio should these be mixed to get an alloy 15 times as heavy as water ?

A. 1:1               B. 2:3               C. 1:2               D. 3:2

Q19. 15 litres of mixture contains 20% alcohol and the rest water. If 3 litres of water be mixed with it, the percentage of alcohol in the new mixture would be :

A. 15               B. $16\frac{2}{3}$               C. 17               D. $18\frac{1}{2}$

Q20.  85 L of a mixture contains milk and water in the ratio 27 : 7. How much more water is to be added to get a new mixture containing milk and water in the ratio 3 : 1 ?

A. 5L               B. 6.5L               C. 7.25L               D. 8L

Q21. The sides of a triangle are in the ratio ½:1/3:1/4 and its perimeter is 104cm. The length of the longest side is :

A. 52               B. 48               C. 32               D. 26

Q22. The ratio of the number of boys and girls in a school is 3 : 2. If 20% of the boys and 25% of the girls are scholarship holders, what percentage of the students does not get the scholarship?

A. 56               B. 70               C. 78               D. 80

Q23. Three containers have volumes in the ratio 3 : 4 : 5. They are full of mixtures of milk and water. The mixtures contain milk and water in the ratio of 4 : 1, 3:1 and 5 : 2 respectively. The contents of all these three containers are poured into a fourth container. The ratio of milk and water in the fourth container is:

A. 4:1               B. 151:48               C. 157:53               D. 5:2

Q24. x varies inversely as square of y. Given that y = 2 for x = 1. The value of x for y = 6 will be equal to :

A. 3               B. 9               C. $\frac{1}{3}$               D. $\frac{1}{9}$

Q25. The electricity bill of a certain establishment is partly fixed and partly varies as the number of units of electricity consumed. When in a certain month 540 units are consumed, the bill is Rs. 1800. In another month 620 units are consumed and the bill is Rs. 2040. In yet another month 500 units are consumed. The bill for that month would be :

A. Rs. 1560               B. Rs. 1680               C. Rs. 1840               D. Rs. 1950

Q26. The ratio of the incomes of A and B is 5 : 4 and the ratio of their expenditures is 3 : 2. If at the end of the year, each saves Rs. 1600, then the income of A is :

A. Rs. 3400               B. Rs. 3600               C. Rs. 4000               D. Rs. 4400

Q27. A and B are two alloys of gold and copper prepared by mixing metals in the ratio 7 : 2 and 7 : 11 respectively. If equal quantities of the alloys are melted to form a third alloy C, the ratio of gold and copper in C will be :

A. 5:7               B. 5:9               C. 7:5               D. 9:5

Q28. The ratio between the present ages of P and Q is 5 : 7 respectively. If the difference between Q's present age and P's age after 6 years is 2, what is the total of P's and Q's present ages?

A. 48 years               B. 52 years               C. 56 years               D. Can't determine

Q29. The ratio of the father's age to his son's age is 7 : 3. The product of their ages is 756. The ratio of their ages after 6 years will be :

A. 5:2               B. 2:1               C. 11:7               D. 13:9

Q30. The present ages of three persons are in proportions 4 : 7 : 9. Eight years ago, the sum of their ages was 56. Find their present ages (in years).

A. 8,20,28               B. 16,28,36               C. 20,35,45               D. 13,16,25

Q31. The ratio of the ages of a man and his wife is 4 : 3. After 4 years, this ratio will be 9 : 7. If at the time of marriage, the ratio was 5 : 3, then how many years ago were they married?

A. 8 years               B. 10 years               C. 12 years               D. 15 years

Q32. The ratio between the present ages of A and B is 5 : 3 respectively. The ratio between A's age 4 years ago and B's age 4 years hence is 1 : 1. What is the ratio between A's age 4 years hence and B's age 4 years ago ?

A. 1:3               B. 2:1               C. 3:1               D. 4:1

Q33. A person's present age is two-fifth of the age of his mother. After 8 years, he will be one-half of the age of his mother. How old is the mother at present ?

A. 32 years    B. 36 years    C. 40 years    D. 48 years

Q34. Four years ago, the father's age was three times the age of his son. The total of the ages of the father and the son after four years, will be 64 years. What is the father's age at present?

 A. 32 years    B. 36 years    C. 44 years    D. None of these

Q35. The present ages of Reena and Usha are 24 and 36 yr, respectively. What was the ratio between the ages of Usha and Reena respectively 8 yr ago?

 A. 7:4    B. 4:7    C. 11:8    D. 8:11

Q36. At present Anil is 1.5 times of Purvi's age. 8 yr hence, the respective ratio between Anil and Purvi's ages will be 25 : 18. What is Purvi's present age?

 A. 50 yr    B. 28 yr    C. 42 yr    D. 36 yr

Q37. The difference between the ages of Meena and Seema is 3 yr and the ratio between their ages is 7 : 8. What is the sum of their ages?

 A. 43 years    B. 41 years    C. 45 years    D. 48 years

Q38. The ratio of the present age of Manoj to that of Wasim is 3 : 11. Wasim is 12 yr younger than Rehana. Rehana's age after 7 yr will be 85 yr. What is the present age of Manoj's father, who is 25 yr older than Manoj?

 A. 43 years    B. 67 years    C. 45 years    D. 69 years

Q39. The ratio between the present ages of Indira and Lizzy is 3 : 8, respectively. After 8 yr, Indira's age will be 20 yr. What was Lizzy's age 5 yr ago?

 A. 37 years    B. 27 years    C. 28 years    D. 38 years

Q40. At present, Kavita is twice Sarita's age. 8 yr hence, the respective ratio between Kavita's and Sarita's ages will be 22 : 13. What is Kavita's present age?

 A. 26 years    B. 18 years    C. 42 years    D. 36 years

## PREVIOUS YEARS(MEMORY BASED)

Q1. The prices of a refrigerator and a television set are in the ratio 5 : 3. If the refrigerator costs Rs. 5500 more than the television set. Then, the price of the refrigerator is :

 A. Rs. 27500    B. Rs. 82500    C. Rs. 13750    D. Rs. 16500

Q2. An amount of money is to be distributed among P, Q and R in the ratio of 2 : 7 : 9. The total P's and Q's share is equal to R's share. What is the difference between the shares of P and Q?

 A. Rs. 5000    B. Rs. 7500    C. Rs. 9000    D. Data inadequate

Q3. If two-third of A is four-fifth of B, then A : B = ?

 A. 5:6    B. 6:5    C. 10:9    D. 9:10

Q4. Three numbers are in the ratio of 3 : 4 : 5. The sum of the largest and the smallest equals the sum of the second and 52. The smallest number is :

 A. 20    B. 27    C. 39    D. 52

Q5. If $x : y = 2 : 1$, then $(x^2 - y^2) : (x^2 + y^2)$ is :

 A. 3:5    B. 5:3    C. 4:5    D. 5:6

Q6. If $a : b : c = 3 : 4 : 7$, then the ratio $(a + b + c) : c$ is equal to :

 A. 2:1    B. 14:3    C. 7:2    D. 1:2

Q7. Three numbers are in the ratio 1/2:2/3:3/4 The difference between the greatest and the smallest numbers is 36. The numbers are :

 A. 72, 84, 108    B. 60, 72, 96    C. 72, 84, 96    D. 72, 96, 108

Q8. If $m : n = 3 : 2$, then $(4m + 5n) : (4m - 5n)$ is equal to :

 A. 4:9    B. 9:4    C. 11:1    D. 9:1

Q9. A milkman makes 20% profit by selling milk mixed with water at Rs. 9 per litre. If the cost price of 1 L pure milk is Rs. 10, then the ratio of milk and water in the given mixture is :

 A. 3:1    B. 4:1    C. 3:2    D. 4:3

Q10. If 78 is divided into three parts which are in the ratio of 1:1/3:1/6 the middle part is :

 A. $9\frac{1}{3}$    B. 13    C. $17\frac{1}{3}$    D. $18\frac{1}{3}$

Q11. The sum of two numbers is equal to 25 and their difference is 20. The ratio of the two numbers is:

A. 9:1          B. 7:9          C. 3:5          D. 2:7

Q12. 94 is divided into two parts in such a way that the fifth part of the first and the eight part of the second are in the ratio 3 : 4. The first part is :
A. 30          B. 36          C. 40          D. 28

Q13. Two numbers are such that the ratio between them is 4 : 7. If each is increased by 4, the ratio becomes 3 : 5. The larger number is :
A. 36          B. 48          C. 56          D. 64

Q14. Three numbers are in the ratio 5 : 6 : 7. If the product of the numbers is 5670, then the greatest numbers is :
A. 15          B. 18          C. 21          D. 28

Q15. Three numbers are in the ratio of 3 : 2 : 5 and the sum of their squares is 1862. The smallest of these numbers is:
A. 24          B. 21          C. 14          D. 35

Q16. The ratio of two numbers is 10 : 7 and their difference is 105. The sum of these numbers is
A. 595          B. 805          C. 1190          D. 1610

Q17. A, B, C and D purchase a gift worth Rs. 60. A pays 1/2 of what others are paying, B pays 1/3rd of what others are paying and C pays 1/4th of what others are paying. What is the amount paid by D?
A. 14          B. 15          C. 16          D. 13

Q18. Annual incomes of Amit and Varun are in the ratio 3:2, while the ratio of their expenditures is 5 : 3. If at the end of the year each saves Rs. 1000, the annual income of Amit is:
A. Rs. 9000          B. Rs. 8000          C. Rs. 7000          D. Rs. 6000

Q19. If the annual income of A, B and C is in the ratio 1 : 3 : 7 and the total annual income of A and C is Rs. 800000, then the monthly salary of B (in Rs.) is :
A. 20000          B. 25000          C. 30000          D. 15000

Q20. The monthly salaries of A, B and C are in the ratio 2 : 3 : 5. If C's monthly salary is Rs. 12000 more than that of A, then B's annual salary is
A. Rs. 120000          B. Rs. 144000          C. Rs. 180000          D. Rs. 240000

# Answer Key

Type 1

| 1. D | 2. B | 3. A | 4. D | 5. A | 6. C | 7. C | 8. C | 9. B | 10. B |
|------|------|------|------|------|------|------|------|------|-------|
| 11. D | 12. B | 13. B | 14. D | 15. D | 16. C | 17. A | 18. A | 19. B | 20. A |
| 21. C | 22. B | 23. A | 24. B | 25. D | 26. D | 27. A | 28. B | 29. B | 30. C |
| 31. C | 32. D | 33. C | 34. C | 35. C | 36. B | 37. A | 38. A | 39. D | 40. B |

Type 2

| 1. B | 2. A | 3. B | 4. C | 5. D | 6. C | 7. D | 8. D | 9. B | 10. B |
|------|------|------|------|------|------|------|------|------|-------|
| 11. C | 12. C | 13. B | 14. A | 15. D | 16. D | 17. D | 18. D | 19. B | 20. A |
| 21. B | 22. C | 23. C | 24. D | 25. B | 26. C | 27. C | 28. A | 29. B | 30. B |
| 31. C | 32. C | 33. C | 34. D | 35. A | 36. B | 37. C | 38. A | 39. B | 40. D |

# Previous year questions

| 1. C | 2. D | 3. B | 4. C | 5. A | 6. A | 7. D | 8. C | 9. A | 10. C |
|------|------|------|------|------|------|------|------|------|-------|
| 11. A | 12. A | 13. C | 14. C | 15. C | 16. A | 17. D | 18. D | 19. B | 20. B |