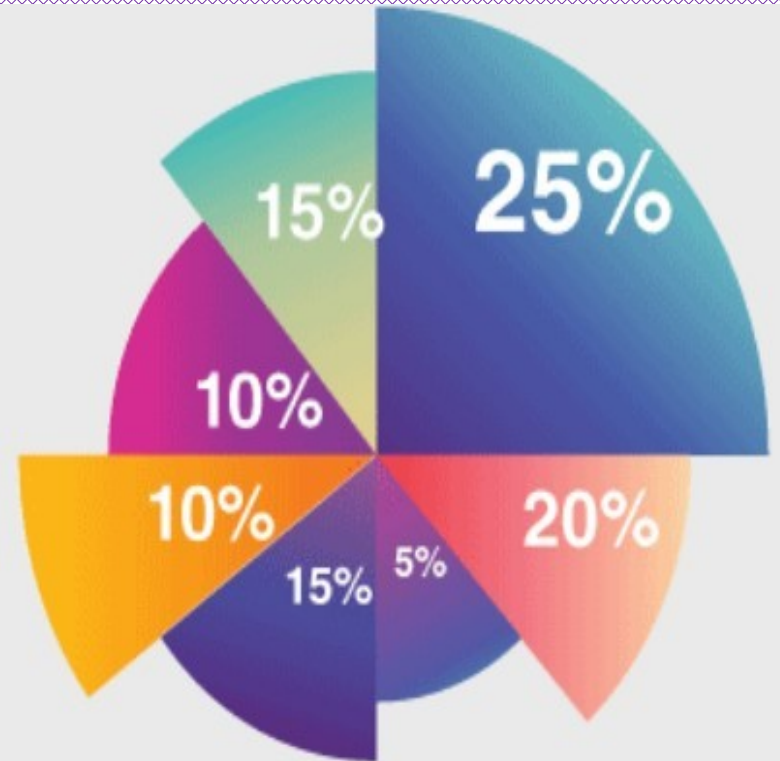


RATIOS AND PROPORTION



In the ratio $a : b$, we call a as the first term or **antecedent** and b , the second term or **consequent**.

E.g. The ratio $5 : 9$ represents with antecedent = 5, consequent = 9

Rule: The multiplication or division of each term of a ratio by the same non-zero number does not affect the ratio

Proportion:

The equality of two ratios is called proportion.

If $a : b = c : d$, we write $a : b :: c : d$ and we say that a, b, c, d are in proportion. Then,

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

Here a and d are called **extremes**, while b and c are called **mean terms**.

Product of means = Product of extremes.

Thus, $a : b :: c : d \implies (b \times c) = (a \times d)$

Question: If $0.75 : x :: 5 : 8$, then x is equal to:

[A] 1.12

[B] 1.2

[C] 1.25

[D] 1.30

Fourth Proportional:

If $a : b = c : d$, then d is called the fourth proportional to a, b, c .

Third Proportional:

$a : b = b : c$, then c is called the third proportion to a and b .

Mean Proportional:

Mean proportional between a and b is $(ab)^{1/2}$.

Question: The fourth proportional to 5, 8, 15 is:

[A] 18

[B] 24

[C] 19

[D] 20

Question: The third proportional to 9 and 12 is:

[A] 18

[B] 16

[C] 15

[D] 20

Question: The mean proportional to 36 and 25 is:

[A] 35

[B] 20

[C] 30

[D] 32

Duplicate Ratios:

Duplicate ratio of $(a : b)$ is $(a^2 : b^2)$.

Sub-duplicate ratio of $(a : b)$ is $(a^{1/2} : b^{1/2})$.

Triplicate ratio of $(a : b)$ is $(a^3 : b^3)$.

Sub-triplicate ratio of $(a : b)$ is $(a^{1/3} : b^{1/3})$.

Question: Find the duplicate ratio of 3:4?

[A] 3:4

[B] 4:3

[C] 9:16

[D] 27:64

Question: Find the sub-triplicate ratio of 64:125?

[A] 8:25

[B] 4:5

[C] 5:4

[D] 4:25

Compound Ratio:

✓ If the ratios are-- 4:3, 9:13, 26:5, 2:15

Then Ratio compounded = $(4 \times 9 \times 26 \times 2) / (3 \times 13 \times 5 \times 15) = 16:25$;

Combined Ratio:

✓ If the ratios are- A:B= 1:2, B:C= 3:4, C:D= 6:9, and D:E= 12:16

Then A:B:C:D:E = 3:6:8:12:16

✓ Speed ratio - A:B:C:D then Time ratio- $(1/A) : (1/B) : (1/C) : (1/D)$

Question: If $x:y = 5:4$ and $x+y = 135$, find “y”?

[A] 75

[B] 60

[C] 50

[D] 90

Question: If $p:q = 9:7$ and $p - q = 40$, then find value of “p”?

- A. 90
- B. 140
- C. 180
- D. 320

Question: If $p:q = 2:3$, $q:r = 2:3$ then find $p:q:r$?

A. $2:3:3$

B. $2:2:3$

C. $2:6:3$

D. $4:6:9$

Question: If $p:q = 1:2$ $r:q = 2:3$ then find $q:r:p$?

A. 1:2:3

B. 3:1:2

C. 6:4:3

D. 4:3:6

Question: If $x:y = 3:4$ and $y:z = 8:9$, $z:a$ is $15:16$, find $x:y:z:a$?

A. 78:82:65:45

B. 30:40:45: 48

C. 76:90:56:80

D. None of these

Question: If $p:r=3:5$ the which of the following is the possible value of “p”?

A. 10

B. 11

C. 12

D. 13

Question: If $a:b=2:3$, $b:c=4:5$ and $c:d=3:2$ then find $a:d$.

A. 5:4

B. 4:5

C. 24:45

D. None

Question: If A is 60% of B and B is 40% of C then find A:C.

A. 2:5

B. 5:2

C. 6:25

D. 3:2

Question: If $x:y$ is $2:3$, find the value of $(3x + 2y) : (2x + 5y)$

A. $12/25$

B. $11/27$

C. $12/19$

D. $11/23$

Question: If $2A = 3B = 4C$, then $A : B : C$ is equal to:

A. 2:3:4

B. 3:4:6

C. 4:3:2

D. 6:4:3

Question: If Rs.2000 is divided among three person x, y and z in the ratio $x:y:z = 2:3:5$, then find the share of y.

- A. Rs.400
- B. Rs.600
- C. Rs.800
- D. Rs.1000

Question: A sum of money is to be distributed among A, B, C and D in the proportion of 5:2:4:3. If C gets Rs.1000 more than D then find the share of B.

- A. Rs.500
- B. Rs.1500
- C. Rs.2000
- D. None

Question: If Rs.782 be divided into three parts, proportional to $(1/2 : 2/3 : 3/4)$, then the first part is:

- A. Rs.182
- B. Rs.190
- C. Rs.196
- D. Rs.204

Question: A sum of Rs.1240 is distributed among A, B and C such that the ratio of amount received by A and B is 6:5 and that of B and C is 10:9 respectively. Find the share of C.

- A. Rs.480
- B. Rs.360
- C. Rs.400
- D. Rs.630

Question: A sum of money is to be divided among A, B, C such that A's share is equal to twice B's share and B's share is 4 times C's share then their share are in the ratio:

A. 1:2:4

B. 1:4:1

C. 8:4:1

D. 2:4:1

Question: 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. Cannot be determined

Question: The ratio of Boys & Girls is 10:3, when 36 girl more joined the ratio becomes 10:7. Find the no. of boys?

- A. 90
- B. 60
- C. 100
- D. None

Question: The income ratio of A & B is 5:8, if income of A increases by 60000, then the new ratio is 5:4, Find current income of A.

A. 120000

B. 240000

C. 360000

D. None

Question: In an alloy ratio of Cu and Zn is 4:3. when 4 kg Zn is mixed into that alloy then the ratio of Cu and Zn becomes 6:5. Find the initial amount of Zn.

- A. 50 kg
- B. 36 kg
- C. 48 kg
- D. None

Question: In an alloy ratio of Cu and Zn is 5:2. when 15 kg Cu is extracted from the alloy then the ratio of Cu and Zn becomes 5:3. Find the initial amount of Zn.

- A. 18 kg
- B. 6 kg
- C. 45 kg
- D. None

Question: In a bag, there are coins of 25 p, 10 p and 5 p in the ratio of 1 : 2 : 3. If there is Rs. 30 in all, how many 5 p coins are there?

- A. 50
- B. 100
- C. 150
- D. 200

Question: A bag contains Rs. 600 in the form of one-rupee, 50 paisa and 25 paisa coins in the ratio 3 : 4 : 12. The number of 25 paisa coins is

- A. 600
- B. 900
- C. 1200
- D. 1400

Question: The ratio of income of A and B is 5:6 and their expenditure is 3:4. If their savings are 1800 and 1600 then find income of A.

A. 5000

B. 7200

C. 6000

D. 5400

Question: In 28 liter mixture of milk and water the ratio of Milk and water is 5:2. How much quantity of water is to be added so that the ratio of milk and water becomes 2:5.

- A. 60
- B. 42
- C. 40
- D. 36

Question: In a mixture of 25 L the ratio of acid to water is 4:1. Another 3 L of water is added to the mixture. The ratio of acid to water in the new mixture is:

- A. 5:2
- B. 2:5
- C. 3:5
- D. 5:3

Question: The price of diamond is directly proportional to the square of its weight. Diamond was broken into 4 parts. The ratio of wt. of each part is 1:2:3:4 and the price of diamond decreased by 140000. Find the initial price of diamond.

- A. 240000
- B. 300000
- C. 200000
- D. 350000

Question: A cat takes 5 leaps for every 4 leaps of a dog, but 3 leaps of the dog are equal to 4 leaps of the cat. What is the ratio of the speed of the cat to that of the dog?

- A. 13:14
- B. 16:15
- C. 17:15
- D. 15:16

Question: Time taken by A to take 5 steps is equal to time by B to take 6 steps and by C to take 7 steps. But distance covered in 6 steps of A are equal to 7 steps of B and 8 steps of C. Ratio of their steps is?

- A. 77: 144: 156
- B. 9: 14: 11
- C. 140: 144: 147
- D. 15: 21: 28

Question: By mistake instead of dividing RS. 117 among A, B and C in the ratio $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$ it was divided in the ratio of 2:3:4. Who gains the most and by how much.

A. A, Rs.28

B. B, Rs.3

C. C, Rs.20

D. C, Rs.25

Question: The milk and water in a mixture are in the ratio 7:5. When 15 L of water are added to it, the ratio of milk and water in the new mixture becomes 7:8. The total quantity of water in new mixture is:

- A. 35 L
- B. 40 L
- C. 60 L
- D. 96 L

*Partnership and Problems
on ages*

What is Partnership?

Important Concepts

Ratio of Divisions of Gains:

Suppose A and B invest Rs. x and Rs. y respectively for a year in a business, then at the end of the year:

$$(\text{A's share of profit}) : (\text{B's share of profit}) = x : y.$$

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Suppose A invests Rs. x for p months and B invests Rs. y for q months then,

$$\text{(A's share of profit) : (B's share of profit)} = xp : yq$$

Question: A and B started a business with Rs.20000 and Rs.30000 respectively for 1 year. If they had profit of Rs.4000. What is the ratio of A in this profit?

- A. Rs.800
- B. Rs.1600
- C. Rs.2400
- D. Rs.1200

Question: A and B started a business with Rs.60000 and Rs.80000 respectively. What is the ratio of their profits after 3 years?

A. 1:2

B. 1:1

C. 4:3

D. 3:4

Question: A, B, C Started a business with capitals Rs.60,000, Rs.50,000 and Rs.40,000 respectively. After 9 months C left them. If profit after one year is Rs.14,000 then profit of C is:

- A. Rs.5000
- B. Rs.4000
- C. Rs.6000
- D. Rs.3000

Question: A, B, C subscribe Rs. 50,000 for a business. A subscribes Rs. 4000 more than B and B Rs. 5000 more than C. Out of a total profit of Rs. 35,000, A receives:

- A. Rs.8400
- B. Rs.11900
- C. Rs.13600
- D. Rs.14700

Question: Pradeep opened a shop investing Rs.30,000. Priyanka joined him 2 months later, investing Rs.45,000. They earned a profit of Rs.76,000 after completion of 2 year. What will be Priyanka's share of profit? :

- A. Rs.27000
- B. Rs.44000
- C. Rs.32000
- D. Rs.40000

Question: A and B invest in a business in the ratio 3 : 2. If 5% of the total profit goes to charity and A's share is Rs. 855, the total profit is:

- A. Rs.500
- B. Rs.1000
- C. Rs.1500
- D. Rs.2000

Question: Kiran is younger than Bineesh by 7 years and their ages are in the respective ratio of 7 : 9, how old is Kiran?

- A. 25
- B. 24.5
- C. 26
- D. 26.5

Question: The Ratio of Mona and Vikas's present age is 9:10. After 4years the ratio will become 11:12. What is the present age of mona?

- A. 20
- B. 18
- C. 15
- D. 24

Question: The Ratio of Ram and Shyam's present age is 2:1. After 5years the ratio will become 3:2. What is the present age of both?

- A. 10, 5
- B. 12, 8
- C. 15, 18
- D. 15, 10

Question: At present age of father is 5 times the age of the son. 3 years hence the father would be 4 times that of the son. What is present age of father?

- A. 40
- B. 45
- C. 50
- D. 35