

GOUR INSTITUTE

PSC, Bank (Clerk/PO), SSC, Railways, S.I., Classes

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F – 12, City Bazar, Thatipur, Gwalior (M.P.) www.gourinstitute.in

RATIO, PROPORTION & MIXTURE

INTRODUCTION

1. Ratio:

The ratio of two quantities a and b in the same units, is the fraction $\frac{a}{b}$ and we write it as $a : b$. In the ratio $a : b$, we call a as the first term or **antecedent** and b , the second term or **consequent**.

Eg. The ratio $5 : 9$ represents $\frac{5}{9}$ 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. Eg. $4 : 5 = 8 : 10 = 12 : 15$. Also, $4 : 6 = 2 : 3$.

2. 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.

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

Product of means = Product of extremes.

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

3. Fourth Proportional:

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

Third Proportional:

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

Mean Proportional:

Mean proportional between a and b is ab .

4. Comparison of Ratios:

We say that $(a : b) > (c : d) \Leftrightarrow \frac{a}{b} > \frac{c}{d}$.

5. Compounded Ratio:

6. The compounded ratio of the ratios: $(a : b), (c : d), (e : f)$ is $(ace : bdf)$.

7. Duplicate Ratios:

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

Sub-duplicate ratio of $(a : b)$ is $(a : b)$.

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

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

If $\frac{a}{b} = \frac{c}{d}$, then $\frac{a+b}{a-b} = \frac{c+d}{c-d}$. [componendo and dividendo]

8. Variations:

We say that x is directly proportional to y , if $x = ky$ for some constant k and we write, $x \propto y$.

We say that x is inversely proportional to y , if $xy = k$ for some constant k and

we write, $x \propto \frac{1}{y}$.

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EXERCISE

01. If $a : b = 7 : 4$, then $(5a - 6b) : (3a + 11b)$ is -
(a) 24 : 19 (b) 11 : 18 (c) 13 : 24 (d) 11 : 65 (e) None
02. In a mixture of 20 liters, 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 (in liters) to be further added is -
(a) 20 (b) 30 (c) 40 (d) 60 (e) None
03. .043 and .00129 will be in ratio -
(a) 10 : 3 (b) 3 : 1000 (c) 1000 : 3 (d) 100 : 3 (e) None
04. Sum of A, B and C present ages is 90 years. 6 years before, ratio of their ages were 1 : 2 : 3. the present age of C is -
(a) 45 Years (b) 36 Years (c) 42 Years (d) 40 Years (e) None
05. Divide Rs.5600 among A, B, C in the ratio 7 : 4 : 3, the share of A is more then of C by -
(a) 800 Rupees (b) 1200 Rupees (c) 1600 Rupees (d) 2800 Rupees (e) None
06. Ram, Shyam and Kamal invested capital in the ratio 3 : 4 : 7. If they earn Rs.21000. Kamal's share will be -
(a) 15000 (b) 12500 (c) 1000 (d) 10500 (e) None
07. If $4 : 65 :: x : 344$, Value of x is -
(a) 7 (b) 8 (c) 9 (d) 10 (e) None
08. If $A : B = 5 : 7$ and $B : C = 6 : 7$, then $A : B : C$ is -
(a) 30 : 42 : 49 (b) 35 : 49 : 42 (c) 42 : 35 : 49 (d) 55 : 77 : 66 (e) None
09. A Bag contains 5paise, 10paise and 50 paise in equal number. If the total amount is Rs.130. Find the total number of coins of different types -
(a) 175 (b) 150 (c) 200 (d) 220 (e) None
10. If $5 : 25 :: 56 : x$, value of x is -
(a) 220 (b) 175 (c) 102 (d) 112 (e) None
11. If $1.2 : 3.9 :: 2 : x$, Value of x is -
(a) 5.6 (b) 6.5 (c) 1.8 (d) 4.5 (e) None
12. If $2 : (\sqrt{1} + \sqrt{3}) :: \sqrt{6} : x$, Value of x is -
(a) 85 Rupees (b) 50 Rupees (c) 40 Rupees (d) 20 Rupees (e) None
13. The sum of three numbers is 98. If the ratio between the first and second be 2 : 3 and that between the second and third be 5 : 8 then find the second number -
(a) 30 (b) 20 (c) 58 (d) 48 (e) None
14. If $A : B = 3 : 4$, and $B : C = 8 : 9$ then $A : B : C$ is equal to -
(a) 8 : 6 : 9 (b) 6 : 8 : 9 (c) 9 : 8 : 6 (d) 3 : 32 : 9 (e) None
15. Praveen and Vijay got the marks in 4 : 5. If Vijay and Suresh marks are in 3 : 2. Find the Praveen and Suresh marks ratio -
(a) 5 : 3 (b) 6 : 5 (c) 4 : 5 (d) 5 : 6 (e) None
16. Kamal's $\frac{1}{3}$ part of music marks is equal to English. If sum of both subjects marks are 160. Find the marks of music -
(a) 120 (b) 60 (c) 30 (d) 90 (e) None

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ANSWER SHEET

RATIO AND PROPORTION EXERCISE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	D	D	C	C	D	E	A	C	B	B	D	A	B	B	A