

RATIO AND PROPORTION

1. Two numbers are in the ratio 3:5. If each number is increased by 10, the ratio becomes 5:7. The numbers are:
(a) 3, 5 (b) 7, 9 (c) 13, 22 (d) 15, 25
2. 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 what is the second number?
(a) 20 (b) 30 (c) 10 (d) 40
3. One man adds 3 litres of water to 12 litres of milk and another 4 litres of water to 10 litres of milk. What is the ratio of the strengths of the milk in the two mixtures?
(a) 15:25 (b) 25:28 (c) 28:25 (d) none of these
4. Rs. 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?
(a) Rs.34 (b) Rs.24 (c) Rs.44 (d) None
5. 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
6. 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) 21:54 (b) 31:74 (c) 27:74 (d) None of these
7. The monthly salary of A,B,C is in the proportion of 2:3:5. If C's monthly salary is Rs.1200 more than that of A, then B's annual salary is:
(a) RS.14400 (b) Rs.24000 (c) Rs. 1200 (d) Rs.2000
8. Rs. 1050 is divided among P,Q and R. The share of P is $\frac{2}{5}$ of the combined share of Q and R. Thus P gets:
(a) Rs.200 (b) Rs.300 (c) Rs.400 (d) Rs. 420
9. Vinay got thrice as many marks in Math's as in English. The proportion of his marks in Maths and History is 4:3. If his total marks in Math's, English and History is 250 then. What are his marks in English?
(a) 120 (b) 90 (c) 40 (d) 80
10. A certain amount was divided between Kavita and Reena in the ratio 4:3. If Reena's share was Rs.2400, the amount is:
(a) Rs.5600 (b) Rs.3200 (c) Rs.9600 (d) None of these
11. In a class, the number of boys is more than the number of girls by 12% of the total strength. The ratio of the boys to girls is :
(a) 11:14 (b) 14:11 (c) 25:28 (d) 28:25
12. A,B, and C can do a work in 20, 25 and 30 days respectively. They undertook to finish the work together for Rs.2220, then the share of A exceeds that of B by:
(a) Rs.120 (b) Rs.180 (c) Rs.300 (d) Rs.600

Paper Explanation

Proportion

Ratio and

$$\begin{aligned} I &: II \\ &= 3x : 5x \\ &\frac{3x}{5x+10} = \frac{3}{7} \\ 21x &= 15x + 30 \\ 6x &= 30 \\ x &= 5 \\ 3+5 &= 13 \\ 3+5 &= 25 // 15, 25 \\ 3+5 &= 25 // \end{aligned}$$

② I II III

$$\begin{aligned} 2 &: 3 \\ 5 &: 8 \\ 10 &: 13 : 24 \rightarrow 49P \rightarrow 98 \\ P &\rightarrow 2 \end{aligned}$$

$$\begin{aligned} I &= \frac{13}{49} \times 98 \\ &= 301 \end{aligned}$$

③

$$\begin{array}{r} M \\ 12 \\ + 3 \\ \hline 15 \end{array} \quad \begin{array}{r} W \\ 10 \\ + 4 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 12 \times 2 \\ \hline 15 \end{array} : \frac{10 \times 5}{14}$$

$$\frac{2}{5} : \frac{5}{14}$$

$$\frac{2}{5} \times \frac{5}{14} = \frac{28}{25}$$

$$= 28 : 25 //$$

④

$$\begin{array}{r} 4M : 5W : 68 \\ M : W : 13 \\ 4 \times 9 \\ 24 \quad 8 \quad 4 \\ \hline 36 \quad 40 \quad 24 \end{array}$$

$$100P = 428$$

$$\begin{aligned} P &\rightarrow 4.28 \\ W &= 8 \times 4.28 \\ &= 32 + 2 \\ W &= 34 \end{aligned}$$

⑤ G.C : G.C

$$7:2 \rightarrow 9P \quad 7:11 \rightarrow 18P$$

$$\begin{array}{l} G.C \\ \frac{7}{9} + \frac{7}{18} : \frac{2}{9} + \frac{11}{18} \\ \frac{14}{18} : \frac{13}{18} \end{array}$$

$$\begin{array}{l}
 \textcircled{6} \quad M \quad W \quad M : W \\
 \qquad \qquad \qquad 1 : 2 \quad 2 : 3 \\
 & \qquad \qquad \qquad 1 : 4 \\
 & 1 \times \frac{1}{3} + 4 \times \frac{2}{7} + 1 \times \frac{2}{3} + 4 \times \frac{5}{7} \\
 & = \frac{1}{3} + \frac{8}{7} + \frac{2}{3} + \frac{20}{7} \\
 & = \frac{7+24}{21} : \frac{14:60}{21} \\
 & = 31 : 74
 \end{array}$$

$$\begin{array}{l}
 \textcircled{7} \quad A : B : C \\
 \qquad \qquad \qquad 1200 \\
 2 : 3 : 5 \\
 \qquad \qquad \qquad (=) \\
 \qquad \qquad \qquad 3 \\
 3P \rightarrow 1200 \\
 P \rightarrow 400 \\
 = 3 \times 400 \\
 = 1200 \\
 = 1200 \times 12 \\
 = 14,400
 \end{array}$$

$$\begin{array}{l}
 \textcircled{8} \quad 1050 \\
 P \swarrow \uparrow R \\
 P : Q : R \\
 2 : 5 \\
 P = \frac{2}{5} (Q+R) \\
 P : (Q+R) \\
 2 : 5 \\
 P = \frac{2}{5} \times 1050 \\
 P = 300
 \end{array}$$

(9) $\frac{E}{M} : \frac{3}{1} : \frac{3}{1}$

$\frac{E}{H} : \frac{9}{12} : \frac{9}{10}$

$E = \frac{4}{25} \times 250$

$= 40\text{P}$

$P = 10$

(10) $\frac{H}{L} : \frac{3}{1}$

$L = \frac{800}{3200} \times 800$

$= 2000$

amount $\rightarrow 8156.00\%$

(11) $B = G + \frac{12}{100}(B+G)$

$2B = 28G$

$B : G$

$= 28 : 22$

$= 14 : 11$

(12) Time & Work Problem

A B C

Days 20 25 30

Capacity $15 : 12 : 10$

efficiency $\frac{15}{3P} \rightarrow 180/-$

$\frac{12}{3P} \rightarrow 37P \rightarrow 2220$

$P \rightarrow 60/-$

(13)

25P

10P

5P

1 : 2 : 3

Gains

Amount value ratio 25 : 20 : 15
 $\oplus 60P \rightarrow 300\%$
 $P \rightarrow 50$

$$\frac{750P}{5}$$

$$= 150$$

(16)

20%
10%
0%

(14)

I II III

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

(12)

$$6 : 8 : 9$$

$$23P \rightarrow 782$$

$$\begin{cases} \times 34 \\ 204 \end{cases}$$

$$P \rightarrow 34$$

(18)

(15)

$$3 : 5$$

(19)

$$\frac{3x-9}{5x-9} = \frac{12}{23}$$

$$9x = 99$$

$$x = 11$$

$$3 \times 11 = 33,$$

(16)

$$\begin{aligned}
 R &: G \\
 f &: g \quad \frac{0.7}{0.8} \\
 g.u &: g.g \\
 gu &: gg \\
 21 &: 22 //
 \end{aligned}$$

(17)

$$\begin{array}{ccc}
 I & II & III \\
 120 & : 150 & : 100 \\
 120 & : 150 \\
 u & : 5 //
 \end{array}$$

(18)

$$\begin{aligned}
 A + B &= 1210 \\
 \frac{4^2}{153} \times A &= \frac{x}{B} \times B \\
 A &: B \\
 B &: 2 \\
 &\rightarrow 5P
 \end{aligned}$$

$$\begin{aligned}
 B' &= \frac{2}{5} \times 1210 \\
 &= 202 \times 2 \\
 &= 404kN
 \end{aligned}$$

(19)

$$\begin{aligned}
 2H30 &\rightarrow (A+B+C) \\
 -5 &-10 -B = -30 \\
 2400 & \\
 3:4:5 & \\
 | \times 200 & \rightarrow 2000 \\
 & P \rightarrow 200 \\
 800 // &
 \end{aligned}$$

(20) 60

$$\begin{matrix} M & W \\ 2 : 1 \\ \frac{1}{2+2} & \sqrt{3} P = 60 \\ 1 & 3 \\ 2 & P = 20 \end{matrix}$$

$$\frac{40}{20+W} = \frac{1}{2}$$

$$W = 60$$

(21) Income

A : B

B : 4

EXP

3 : 2

Savings 1600

$$\frac{5x - 1600}{4x - 1600} = \frac{3}{2}$$

$$2x = 1600$$

$$x = 800$$

~~x~~

$\times 3$

4000

(21)

B G

4 : 5

$\frac{4000}{1200}$

$$\frac{4x}{5x - 100} = \frac{6}{7}$$

$$2x = 600$$

$$x = 300$$

1200 B //

(22)

$$B = \frac{124}{108} \times G$$

~~x~~ B : G

31 : 25

(23) Speed \rightarrow 5 : 4 : 6 $\rightarrow 60$

Time \rightarrow 12 : 15 : 10,

$S \propto \frac{1}{T}$