Nidhi Sign

30/04/2021 Ch-2

Ratio, Proportion & Variation

Ques: $a:b = 2:7$. If 10 is added, what is the new ratio?

Ans: $\frac{12}{17}, \frac{14}{24} = \frac{7}{12}, \frac{16}{31}$

$\frac{a}{b} = \frac{2x}{7x}$, when $x = 1 \rightarrow \frac{12}{17}$

$x = 2 \longrightarrow \frac{14}{24}$

$x = 3 \longrightarrow \frac{16}{31}$

★ **Percentage:** is a no. or ratio that represents a fraction of 100.

- 12% of 2400

$\Rightarrow \frac{12}{100} \times 2400 = 288$

- What % of 2400 is 12?

$\frac{x \times 2400}{100} = 12 \Rightarrow x = 0.5\%$

Ques: Two fighters with wt ratio 7:8. Their accessories of 2kg each. What is the new ratio of their wt?

a). 8/9 b). 12/13 c). 9/10 d). 11/9

$\frac{7x}{8x} \longrightarrow \frac{7+2}{8+2} = \frac{9}{10}, (x=1)$

$\therefore$ a, c

new ratio would be $\frac{7x+2}{8x+2}$

$\frac{16}{16} = \frac{8}{9}$ $x=3$ $\frac{23}{26}$ $x=4$ $\frac{30}{34} = \frac{15}{17}$

$x = 2$

P7 Current age of father & son = 7:3
After 5 yrs, ratio = 2:1
What is current age of father & son?

a) 70,35 b) 35,15 c) 15,35 d) None

father = $7x$
son = $3x$

After 5 yrs., $\frac{7x+5}{3x+5} = \frac{2}{1}$

$7x+5 = 6x+10$

$x = 05$

$\therefore$ father = $7x \Rightarrow 7\times5 = 35$
son = $3x \Rightarrow 3\times5 = 15$ } (b)

P8 50 lt of mixture contains 60% Alcohol & rest is water. If 10 lt water is added then what is conc^{n} of Alcohol in mixture?

a) 66.66% b) 60% c) 50% d) 80%

50 lt → 60% $\Rightarrow \frac{60}{100}\times\frac{50}{2} = 30$ lt.
→ 40% = 20 lt.

60 lt → $\frac{60}{100}\times60 =$ 30 lt. Alcohol → 50% of mixture.
→ 30 lt. water

$\therefore$ (b)

P9 $x - y = 10$

$3(x-6) = 3(y-6)$

~~$3x - 18 = 3y - 18$~~

Age of ~~elder~~ younger ~~younger~~ elder
x $x+10$

$3(x-6) = (x+10-6)$

$3x - 18 = x + 4$

$2x = 22$

$x = 11$

$\therefore$ Younger = 11
$\therefore$ Elder = 21

What no. should be subtracted from the terms in the ratio 15/19 to make 3/4?

P10 (a) 6 (b) 3 (c) 4

$\frac{15x}{19x} \rightarrow \frac{3x}{4x}$

$\frac{3}{4} \rightarrow \frac{6}{8} \rightarrow \frac{12}{16}$

$\frac{15x - num}{19x - num} = \frac{3x}{4x}$ ∴ subtract (3)

★ Propertions :-

- $a:b :: c:d$

$\Rightarrow \frac{a}{b} = \frac{c}{d} \Rightarrow ad = cb$

- If $a:b:c$, then $a:b = b:c$

Ques If $a:b = 3:5$ $b:c = 7:9$, what is $a:c$?

$\frac{a}{b} = \frac{3}{5}$ $\frac{b}{c} = \frac{7}{9}$

$a:c = 7:15$

$a:c = \frac{a}{b} \times \frac{b}{c} = \frac{3}{5} \times \frac{7}{9_3} = \frac{7}{15}$

$a:c = \frac{3}{35_5} \times \frac{7}{9_3} = \frac{1}{15}$ {If $a:b = 3:35$, $b:c = 7:9$}

Trick

a:b	b:c
3:5	7:9

3:5 → LCM = 35

7:9

7 × 3 → 21 : 35 ← 5 × 9 = 45

∴ ratio $= \frac{21}{45} = \frac{7}{15}$

Ques a : b : c : d find a:d

3 : 5 5 5
7 7 : 9 9
3 3 3 : 7

a:d = 3/5 × 7/9 × 3/7 = 21/105 = 1/5

Tricks:

① Fill the blanks with no. close to it.
② Now cancel the elements column wise
③ Now, multiply row wise.

3 5 5 5
7 7 9 3
3 3 3 7

∴ a:d = 21:105 = 1:5

21 : 35 : 45 : 105

Ques Rs 1066 is divided into p, q, r, s such that
p:q = 3:4 ; q:r = 5:6 ; r:s = 7:5
who gets max^m ? (a) p (b) q (c) r (d) s

p	q	r	s
3	4	4	4
5	5	6	6
7	7	7	5

∴ (c)
↳ max^m.

Ques P12

younger x, elder x+27

4(x−6) = 4(x+27−6)

x − 6 = 4(x + 21)
x − 6 = 4x + 84
4x − 24 = x + 21
3x = 45
x = 15

∴ Elder = 15 + 27 = 42 (c)

o/w 289 & 361

Ques P13 M:N = 25 times N:M then what is the value of M:N.

(a) 1:25 (b) 25:1 (c) 1:5 (d) 5:1

$M:N = x:y$

$N:M = y:x$

$\frac{y}{x} = \frac{1}{25}\frac{x}{y}$

$\frac{25}{1} = \frac{x^2}{y^2}$

$\therefore \frac{x}{y} = \frac{5}{1}$ → (a)

P14 What minimum no. should be added to terms in ratio 8:17 to make it 2:3?

(a) 10 (b) 5 (c) 3 (d) 13

go with options

If 10, $\frac{y}{6}$ $\frac{16}{34}$ ~~$\frac{12}{26}$~~ $\frac{18}{27} = 2/3$

$\therefore$ (a)

If 5, $\frac{13}{22}$ ×

If 3, $\frac{11}{20}$ ×

If 13, $\frac{21}{30} = \frac{7}{10}$ ×

P15 500 lt. of mixture contains 40% milk & rest water. If 100 lt water is added to it then what is the ratio of milk & water in new mixture?

(a) 12:17 (b) 7:5 (c) 5:6 (d) None

500 → $\frac{40}{100} \times 500 = 200$ lt milk

→ water = 300

600 → milk = 200

→ 400 lt = water

$\therefore$ ratio of milk : water $= \frac{200}{400} = (1/2)$

$\therefore$ none

P16 300 lt of mix → 55% spirit & rest water.
50 lt water is added → ~~matt~~ ratio of spirit & water?

(a) 37:33 (b) 23:42 (c) 55:101 (d) 33:37

300 → $\frac{55}{100} \times 300$ = 165 = spirit
→ water = 135

350 → spirit = 165 ∴ spirit : water
→ water = 185 ⇒ $\frac{165}{185} = \frac{33}{37}$ ∴ d

P17 2520 → $\frac{48}{21} \times 2520$ = 1134 soda.
→ 1386 water

2520 + 880 = 3400

3400 → soda = 1134 ∴ $\frac{\text{soda}}{\text{water}} = \frac{1134}{2266}$
→ 2266 = water $= \frac{567}{1133}$

P18 M:N = 2:5 N:O = 10:11 M:O = ?

M	N	O
2	5	5
2 10	10	11
4	10	11

∴ 4:11

P19 What is mean proportional b/w 289 & 361?
a) 173 b) 325 c) 253 d) 323

mean proportional = $\sqrt{a \times b}$ should be b/w a & b

∴ $17 \times 19 = \sqrt{323}$ → (d)

only opt^n b/w 289 & 361 and ends with 3.

(a) 2:5 (b) 8:45 (c) 45:8 (d) 5:2

P20 $2x = 9y$ & $4y = 5z$ What is $z:x$?

$2x = 9y$ $\quad 4y = 5z$

$x = \frac{9y}{2}$ $\quad z = \frac{4y}{5}$

$\therefore z:x = \frac{4y}{5} \times \frac{2}{9y} = \frac{8}{45}$

OR

$\frac{x}{y} = \frac{9}{2}$ $\quad \frac{y}{z} = \frac{5}{4}$

$\therefore$ x y z

9 2 2

5 5 4

45 8

$\therefore z:x = 8/45$

P21 A box has 7 pieces of glass. If box falls, which CAN'T be the ratio of broken to unbroken glass?

(a) 1:6 (b) 2:5 (c) 3:4 (d) 8:9

↓ not possible

∵ Only 7 pieces are possible

P37 10000 → 150 grds

8400 → 120 grds

330 grds → ?

(a) 19600 (b) 16900

(c) 22500 (d) 28900

$\frac{10000}{150} = \frac{8400}{120} = \frac{?}{330}$

$\frac{330 \times 10000}{150} \quad \frac{8400 \times 330}{120} = 23100$

22000

P37. The expense of girl's hostel are partly constant & partly vary as the no. of girls in hostel. The expenses were 10000 for 150 girls & 8400 for 120 girls. Find the expenses for 330 girls.

(a) 19600 (b) 16900 (c) 22500 (d) 28900

Let constant expense = x
partly varying exp = y

$\therefore x + 150y = 10000$ — (i)
$x + 120y = 8400$ — (ii)

$10000 - 150y = 8400 - 120y$
$1600 = 30y$
$y = 160/3$

$\therefore$ Expense $x = 8400 - \frac{120}{3} \times \frac{160}{3}$

$= 8400 - 6400 = 2000$

$\therefore$ Expense for 330 girls :-

$2000 + \frac{330}{110} * \frac{160}{3} = 2000 + 17600 = 19600$ (a)

P38 x y = 18 A lump of two metals weighing 18 gms is Rs 90 but if wts are interchanged, it would worth Rs 72. If price of metal is Rs 6/gm then find the price of other metal in mixture?

(a) Rs 4/gm (b) Rs 3.25/gm (c) Rs 5/gm (d) Rs 3/gm

$x + y = 5$/gm
$y + x = 72$
$72/18$
$= 4$/gm

price

Wt. of 1st metal = a ⟶ 6/gm

∴ 2nd metal = 18−a ⟶ x/gm

Eqⁿ $6a + (18-a)x = 90$

$ax + (18-a)6 = 72$

$\Rightarrow 6a + 18x - ax = 90$

$ax + 108 - 6a = 72$

$18x + 108 = 162$

$x = 126/82 = 81/41$ → (d)

$18x = 54 \Rightarrow x = 54/18 = (3)$

P39 If 10 Lt. are drawn from a cask full of alcohol & replaced by soda and this process is repeated, the ratio of alcohol to soda becomes 16:9. Find the capacity of the cask.

a). 50 Lt b) 48 Lt. c) 40 Lt. d) 46 Lt.

Ans a).

x → 10 Lt = Soda ⟶ 20 Lt = Soda

x → 10 Lt = Alcohol ⟶ (x−20) Lt = Alcohol

$\frac{x-20}{20} = \frac{16}{9}$

$x - 20 = \frac{16 \times 20}{9}$

$x = \frac{320}{9} + 20$

$= \frac{320 + 180}{9}$

$= \frac{500}{9}$

$\frac{x-10}{10} = \frac{4}{3}$

$x = \frac{40}{3} + 10 = \frac{70}{3}$

M-1

Soln. 1st time → 4:3 ratio

difference b/w soda & alcohol is 1 part
that means 10 Lt = 1 part.

Now, 4 parts of alcohol we already have
& 1 part was removed earlier.

So, 5 parts → 50 Lt.

M-2 16:9 ⇒ 16+9 = 25

so any multiple of 25 is ans.

So (50). (does not always work).