NAME: Muhammad Ramzan
Test: GSA.

28

Question # 2

(A)

Given DATA:

Ratio b/w numbers = 3:5

when 9 is subtracted from each then = 12:23

To Find:

Smallest number = ?

Solution:

Let x, y be the two numbers. Then ratio b/w them is

$$x : y = 3 : 5 \longrightarrow (1)$$

$$x-9 : y-9 = 12 : 23 \longrightarrow (2)$$

From (1)

$$\frac{x}{y} = \frac{3}{5} \longrightarrow x = \frac{3}{5}y \longrightarrow (a)$$

From (2)

$$\frac{x-9}{y-9} = \frac{12}{23} \longrightarrow (b)$$

put eq (a) in (b)

~~$x = \frac{3}{5}y$~~

~~$\frac{5}{y-9} = \frac{12}{23}$~~

~~$5x = 3y$~~

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

$$\frac{3y-45}{5} = \frac{12}{y-9}$$

$$\frac{23}{y-9}$$

$$\frac{3y-45}{5(y-9)} = \frac{12}{23}$$

$$\frac{3y-45}{5y-45} = \frac{12}{23}$$

$$23(3y-45) = 12(5y-45)$$

$$69y - 1035 = 60y - 540$$

$$69y - 60y = 1035 - 540$$

$$9y = 495$$

$$y = \frac{495}{9}$$

$$\boxed{y = 55}$$

23 × 3 = 69; 23 × 45 = 1035; 45 × 12 = 540; 1035 − 540 = 495; 495 ÷ 9 = 55

put this in ⓐ

$$x = \frac{3(55)}{5}$$

$$\boxed{x = 33}$$

Result:

The smallest number = **33**

5

(B)

Given DATA:

Profit ratio = 5:7:8

Partnered for 14 months, 8 months, 7 months respectively.

To Find:

Ratio of their investment = ?

Solution:

Let A, B and C be the three partners, Then ratio of profit

A : B : C = 5 : 7 : 8

EC of A = Amount × 14

EC of C = Amount × 7

EC of B = Amount × 8

Profit

Profit of A = Ratio of A in investment x Total Profit → ①
Sum of ratio's of A, B, C

Profit of B = Ratio of B in investment x Total Profit → ②
Sum of ratio of A, B, C

Profit of C = Ratio of C in investment x Total Profit → ③
Sum of ratio of A, B, C

Dividing ② by ①

Profit of A = Ratio of A in investment x ~~Total Profit~~
Profit of B ~~Sum of ratios of A, B, C~~
Ratio of B in investment x ~~Total Profit~~
~~Sum of ratios of A, B, C~~

Profit of A = Ratio of A in investment → ④
Profit of B Ratio of B in investment

Now, Divide ③ by ①

Profit of B = ~~Ratio of B in investment x Total Profit~~
Profit of C ~~Ratio of C in investment x Total profit~~
~~Sum of ratios of A, B, C~~

Profit of B = Ratio of B in investment → ⑤
Profit of C Ratio of C in investment

Now, Find the combined ratio

Profit of A : Profit of B

Profit of B : Profit of C

5 : 7
7 : 8

= 35 : 49 : 56
= 5 : 7 : 8

Result:

The ratio of their investment = 5 : 7 : 8

(C)

Given DATA:

$\frac{A+B+C}{3} = 45\ Kg \longrightarrow ①$

$\frac{A+B}{2} = 40\ Kg \longrightarrow ②$

$\frac{B+C}{2} = 43\ Kg \longrightarrow ③$

To Find:

weight of B = ?

Solution:

From ①

$\frac{A+B+C}{3} = 45$

$A+B+C = 45 \times 3$

$A+B+C = 135 \longrightarrow ⓐ$

From ②

$\frac{A+B}{2} = 40$

$A+B = 80 \longrightarrow ⓑ$

From ③

$\frac{B+C}{2} = 43$

$B+C = 86$ — ⓒ

put $B+C = 86$ in ⓐ

$A + 86 = 135$

$A = 135 - 86$

$\boxed{A = 49\ Kg}$

$$\begin{array}{r} 135 \\ -\ 86 \\ \hline 49 \end{array}$$

put this in ⓑ

$A + B = 80$

$49 + B = 80$

$B = 80 - 49$

Scanned with CamScanner

5

B = 3115g

Result:

The weight of B = 3115g

(D)

Given DATA:

$x + 17 = 60 \times \frac{1}{x}$ → ①

To Find:

$x = ?$

Solution:

From ①

$x + 17 = \frac{60}{x}$

$x(x+17) = 60$

$x^2 + 17x = 60$

$x^2 + 17x - 60 = 0$

~~$x^2 + 12x + 5x - 60 = 0$~~

~~$x(x+12) + \ldots$~~

By Quadratic formula

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$a = 1, \; b = 17, \; c = -60$

$x = \frac{-17 \pm \sqrt{(17)^2 - 4(1)(-60)}}{2(1)}$

$x = \frac{-17 \pm \sqrt{289 + 240}}{2}$

$x = \frac{-17 \pm \sqrt{529}}{2}$

$x = \frac{-17 \pm 23}{2}$

17
17
119
17x
289
240
529

23
23
69
46x
529

$x = \frac{-17+23}{2}$, $x = \frac{-17-23}{2}$

$x = \frac{6}{2}$, $x = \frac{-40}{2}$

$x = 3$, $x = -20$

Result:

The positive number = 3

Question # 3

(A)

Given DATA:

Profit earned when selling ab = Rs 1920

Loss earned when selling ab = Rs 1280

To Find:

Price to make 25% profit.

Solution:

Profit or percentage increase = $\frac{\text{New value} - \text{old value}}{\text{old value}} \times 100$

Loss or percentage loss = $\frac{\text{old value} - \text{New value}}{\text{old value}} \times 100$

By condition

$\frac{\text{New value} - \text{old value}}{\text{old value}} \times 100 = \frac{\text{old value} - \text{New value}}{\text{old value}} \times 100$

$1920 - \text{old value} = \text{old value} - 1280$

$1920 + 1280 = \text{old value} + \text{old value}$

$3200 = 2(\text{old value})$

$\text{old value} = \frac{3200}{2}$

old/original value = 1600

1920
1280
3200

Now to make 25% profit

we use

percentage increase = $\frac{\text{New value} - \text{old value}}{\text{old value}} \times 100$

$\frac{25}{100} = \frac{\text{New value} - 1600}{1600}$

$0.25(1600) = \text{New value} - 1600$

$\frac{25}{100}(1600) + 1600 = \text{New value}$

New value = 400 + 1600

New value = 2000 RS

$25 \times 16 = 150 + 25 = 400$

Result:

To make 25% profit the article be sold at = 2000 RS

(B)

Given DATA:

A do work = 15 days

B do work = 20 days

worked together = 4 days

To Find:

Fraction of work left is = ?

Solution:

The work rate of A = $\frac{1}{15}$

The work rate of B = $\frac{1}{20}$

Their combined work rate = $\frac{1}{15} + \frac{1}{20}$

$= \frac{4 + 3}{60}$

$= \frac{7}{60}$

2 | 20, 15
2 | 10, 15
5 | 5, 15
3 | 1, 3
| 1, 1

They work for 4 days, then the fraction of work they do

$= \frac{4 \times 7}{60^{15}}$

$= \frac{7}{15}$

Total amount of work = 1

Fraction of work left = $1 - \frac{7}{15}$

$= \frac{15-7}{15}$

$= \frac{8}{15}$

Result:

The fraction of work left is $\frac{8}{15}$

(c)

Given DATA:

A present age = $\frac{2}{5}$ of mother

After 8 years A = $\frac{1}{2}$ of mother

To Find:

Mother present age = ?

Solution:

Let the present age of A will be x and mother present age is y.

Then from given data-

$x = \frac{2}{5}(y) \longrightarrow (1)$

$x + 8 = \frac{1}{2}(y + 8) \longrightarrow (2)$

Then from (2)

$x+8 = \frac{2}{5}(y+8)$

$2(x+8) = y+8$

$2x+16 = y+8 \longrightarrow (1)$

put $x = \frac{2}{5}y$ in (1)

$2\left(\frac{2}{5}\right)y + 16 = y+8$

$\frac{4y}{5} + 16 = y+8$

$4y + 80 = y+8$

$4y - y = 8 - 80$

$3y = -72$

$y = \frac{-72}{3}$

$y = -24$

Age can never be negative, so $y = 24$ yrs.

Result:

The present age of mother = 24 yrs.

(D)

Given DATA:

Student multiplied a number by $\frac{3}{5}$ instead of $\frac{5}{3}$.

To Find: Percentage error calculation = ?

Solution:

The percentage error is

$= \frac{\text{old value} - \text{New value}}{\text{old value}} \times 100$

put the values

$= \left(\frac{\frac{5}{3} - \frac{3}{5}}{\frac{5}{3}}\right) \times 100$

$$= \left(\frac{25-9}{15}\right) \times 100$$

$$= \left(\frac{3}{5}\right)$$

$$= \left(\frac{16 \times 5}{15 \times 3}\right) \times 100$$

$$= \left(\frac{16}{9}\right) \times 100$$

$$= (1.8) \times 100$$

$$= \left(\frac{25-9}{\frac{15}{\frac{5}{3}}}\right) \times 100$$

$$= \left(\frac{16 \times 3}{15 \times 5}\right) \times 100$$

$$= \frac{48}{75} \times 100$$

$$= \frac{0.6 \times 100}{1}$$

$$= 60\%.$$

3

$$\begin{array}{r} 0.6 \\ 75\overline{)480} \\ 450 \\ \hline 30 \end{array}$$

$$\begin{array}{r} 75 \\ 5\overline{)375} \\ 75 \\ \hline 450 \end{array}$$

Result:

The percentage error in the calculation = 60% = 64%