

## Ch 1 PT & P

H

## Ratios and proportion

$a:b::c:d$  extremes/ extreme terms.  
mean/ mean terms

Note:

= product of extremes = product of means.

Q1: Find fourth proportion to numbers.

Ans:

$$6:8 :: 9:x$$

$\therefore$  product of extremes = product of means.

$$6 \times 9 = 8 \times x$$

$$54 = 8x$$

$$\therefore x = 12$$

$$\therefore 12 \text{ is } \underline{\text{Ans}}$$

Q2 Find third proportion to no. 3 & 6.

Ans: Given,

$$q:b::b:c$$

$$or, q:6 :: 6:c$$

$$or, 3+2 = 6+6$$

$$8 = 12$$

$$2 = 12$$

$\therefore$  The third proportion is 12.

Ex) 12 Ans

Q3 Two numbers are in ratio of 9:11 if sum of these two no is 660. Find diff both of the numbers.

Ans:

$$9:11 = 20 unit = 660$$

$$+ 4 unit = \underline{\underline{660}} \\ 20$$

= 33

∴ difference : 9:11  $\rightarrow$  2 units different  
 $80, 2 \times 33 = 66$

∴ 66 ans

Q4. A bag contains rupee, 50-paise & 25-paise coins in the ratio 5:7:9. If total amount in bag is ₹430, find no. of coins of each kind.

Ans:

coins(type)  $\rightarrow$  100p 50p 25p

No.  $\rightarrow$  5 : 7 : 9

₹100 50 25  $\rightarrow$  500p 350p 225p

$$500p + 350p + 225p = 43000p$$

$$1075 \text{ unit} = 43000p$$

$$+ \text{unit} = 40$$

$$5x : 7x : 9x$$

$$200, 280, 360$$

∴ 200, 280, 360 ans

Q5. A bag contain an equal no. of 50-p, 25-p & 5-paise resp. if total value is ₹4 how many coins of each type are there

Ans: coins(type) = 50p 25p 20p, 5p :

total p = 50p + 25p + 20p + 5p = 100,000p

or, 100p = 40,000p

$$p = 40.$$

1) H.O.

Q6. One man adds 6 ltr of water to 11 ltr.  
= of milk & another g 1/3 of water to

Ans:

Milk : water

6 : 11 ]   
g : ? ]  $\frac{1}{3}$  water added.

3) 11 : 8 soln

Q7

Ans:

vessel 1

Milk	
8 : 9	= 17

vessel 2

Milk	
10 : 5	= 17

If sum equal then sum of M & N is 100%.

$$\begin{array}{r} \text{so, } 8 : 9 \\ 10 : 5 \\ \hline 28 : 15 \\ 10 : 7 \end{array}$$

4) 10 : 7 soln

Q8

Ans'

Vessel 1

$$\begin{array}{|c|} \hline M:W \\ \hline 9:5 \\ \hline \end{array}$$

Vessel 2

M:W

H:3

$$= 7 \times \frac{9}{2} = 14$$

sum not equal then M &amp; W sum equal

Vessel 2

$$\begin{array}{|c|} \hline M:W \\ \hline 8:6 \\ \hline \end{array}$$

= 14.

Equal then add vessel 1 to vessel 2.

M:W

9:5

8:6

$$\overline{\overline{17:11}}$$

∴ 17:11 ans

Q9Ans'

V1

W:M

$$\begin{array}{|c|} \hline 2:3 \\ \hline \end{array}$$

$$= 5 \times 9$$

V2

W:M

$$\begin{array}{|c|} \hline 4:5 \\ \hline \end{array}$$

$$= 9 \times 5$$



$$\begin{array}{|c|} \hline 18:27 \\ \hline \end{array}$$

$$\begin{array}{|c|} \hline 20:25 \\ \hline \end{array}$$

The two vessels mixed in the ratio 1:2  
so,

1:2
-----

$$\Rightarrow 18:27 :: 40:50$$

$$\Rightarrow 58:77$$

$$2) \underline{58:77 \text{ qrs}}$$

Ans

$$\left| \begin{matrix} V_1 \\ 3:4 \end{matrix} \right| = 7 \times 9$$

$$\left| \begin{matrix} V_2 \\ 5:4 \end{matrix} \right| = 9 \times 7$$

$$\Rightarrow 27:36$$

$$\Rightarrow 35:28$$

Mixed

1:4
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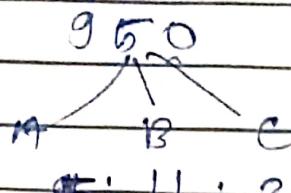
$$\Rightarrow 27:36 :: 140:112$$

$$\Rightarrow 167:148$$

$$3) \underline{167:148 \text{ qrs}}$$

Q11.

Ans:



$$\Rightarrow 19 \text{ unit} = 950$$

$$1 \text{ unit} = 50$$

A : B : C

~~5 : 11 : 3~~

~~6990~~

$$6 \times 50 = 300$$

4) 300 gny

Q12

Ans:

Gold

$$\begin{array}{|c|c|} \hline 7 : 2 & = 9 \times 2 = 18 \\ \hline 1u : 4 & \\ \hline \end{array}$$

Copper

$$\begin{array}{|c|c|} \hline 7 : 11 & = 18 \\ \hline & \\ \hline \end{array}$$

Gold + Copper

$$1u : 4 \therefore 7 : 11$$

$$21 : 18$$

$$7 : 5 \rightarrow c (f.h(rd))$$

3) 7:5

Q18

Ans:

$$A:B = 2:3 \quad \& \quad B:C = 4:5$$

$$\text{total sym} = 105 = A:B:C$$

$$\text{so, } A:B:C$$

$$2:3:③$$

$$④:4:5$$

$$8:12:15$$

$$8:12:15 = 85 \text{ unit} = 105$$

$$1 \text{ unit} = \frac{105}{85} = 3$$

$$12 \text{ unit} = 12 \times 3 = 36$$

3) 36 gm

Q19

Ans

$$A:B = 3:7 \quad \& \quad B:C = 2:5$$

$$\text{total sym} = 275 = A:B:C$$

$$A:B:C$$

$$3:7:7$$

$$2:2:5$$

$$6:14:35$$

$$55 \text{ unit} = 275$$

$$1 \text{ unit} = 5$$

$$\text{so, } 14 \text{ unit} = 14 \times 5 = 70$$

3) 70 gm

Q15:

Ans

$$A : B : C : D$$

$$3 : 4 : 4 : 4$$

$$5 : 5 : 7 : 7$$

$$3 : 3 : 3 : 5$$

$$45 : 60 : 84 : 140$$

2)  $45 : 60 : 84 : 140$  any

Q16:

Ans: Let one leap of hare =  $x$

$$\text{One leap of hound} = \frac{6}{5}x$$

# Distance cover:

$$\text{hare} = 7x$$

$$\text{hound} = 6x \cdot \frac{6x}{5} = \frac{36x}{5} = 7.2x$$

$\frac{36}{7.2} = 5$  compare both:

$$\text{hare : hound} = 7x : 7.2x$$

$$\text{hound : hare} = 7.2x : 7x \\ = \frac{72}{70} : \frac{35}{35}$$

1)  $36 : 35$  any

Q17

Ans Let one leap of hair =  $x$

one leap of hound =  $\frac{3x}{2}$

Distance covered:

$$\text{hare} = 4y$$

$$\text{hound} = 3x \frac{3x}{2} = \frac{9y}{2} = \frac{4.5y}{2}$$

$$\begin{array}{r} 3 \\ \times 1 \\ \hline 2 \\ - 3 \\ \hline 3 : 2 \end{array}$$

Then the ratio of hound : hare

$$4.5 : 4y$$

$$\frac{4.5}{4y} = \frac{9}{8}$$

L)  $988 \text{ ml}$

Ans:

Total = 28 liters.

Milk : Water

$$5 : 2$$

$$5x : 2x \Rightarrow 7x = 28$$

$$x = 4$$

So,

$$\text{Milk} = 5x4 = 20$$

$$\text{Water} = 2x4 = 8 + 2$$

Then,

$$\text{or}, \frac{20}{8+x} = \frac{2}{5}$$

$$\text{or}, 100 = 16 + 2x$$

$$\therefore x = 42 \text{ liters}$$

∴ 42 liters.

Ans: total = 60 liter.

Milk : water

$$2x : 1x \Rightarrow 3x = 60 \\ \therefore x = 20$$

$$\text{So, Milk} = 2x \cdot 20 = 40 \\ \text{water} = 1x \cdot 20 = 20.$$

Then,

$$\text{or, } \frac{40}{20+x} = \frac{1}{2}$$

$$\text{or, } 80 = 20+x$$

$$\therefore x = 60 \text{ liter.}$$

Q20.

Ans:

total milk

$$9x : 4x + 4$$

Now,

$$\text{or, } \frac{9x}{4x+4} = 3/2$$

$$\text{or, } 9x \cdot 2 = 12x + 12$$

$$\text{or, } 18x - 12x = 12$$

$$\text{or, } 6x = 12 \\ x = 2$$

then, total quality of original mixture :-

$$7x \Rightarrow 7 \times 0 = 18$$

$$4x = 4 \times 2 = 8$$

$$\Rightarrow \text{total} = 26 \text{ litres. (original mixture)}$$

Ques 2) 26 litres QD

Q21.

Ans:

total mixture

$$4x : 3x + 2$$

Now,

$$\text{ori} - \frac{4x}{3x+2} = \frac{3}{7}$$

$$\text{ori}, 28x = 24x + 16$$

$$\text{ori}, 4x = 16$$

$$x = 4$$

$$\therefore \text{total quality of mixture} = 4x + 3x$$

$$= 4 \times 4 + 3 \times 4$$

$$= 16 + 12$$

$$= 28 \text{ litres (original mixture)}$$

$\therefore$  final mixture  $\Rightarrow 28 + 2 = 30 \text{ litres.}$

Q22.

Ans:

Let  $N_1 : N_2$

$$15x : 7x$$

$$\text{Q1, } \frac{15x - 2}{7x - 2} = \frac{7}{3}$$

$$\text{Q1, } 45x - 6 = 49x - 14$$

$$\text{Q1, } -4x = -8$$

$$x = 2$$

$\therefore$  The numbers are:  $15x_2 : 7x_2$   
 $\Rightarrow 30 : 14$

2)  $30, 14$  qn,

Q23

Ans A : B income =  $9x : 4x$

$\because$  Income - Save = expenditure

$$\text{so, } \frac{9x - 2000}{4x - 2000} = \frac{7}{3}$$

$$\text{Q1, } 27x - 6000 = 28x - 14000$$

$$\text{Q1, } -x = -14000 + 6000$$

$$\therefore +x = +8000$$

$\therefore$  Their income is,  $9x8000 : 4x8000$   
 $\Rightarrow 72000 : 32000$

4)  $72000 : 32000$  qn.

Q24

Ans

Total Mixture.

$$9x : 4x + 8$$

M.W. 1

$$\text{or, } \frac{9x}{4x+8} = \frac{3}{2}$$

$$\text{or, } 18x = 12x + 24$$

$$\text{or, } 6x = 24$$

$$x = 4$$

∴ total quantity of original mixture is:

$$9x 4 : 4x 4$$

$$\therefore 36 : 16 = 52 \text{ litres}$$

∴ 52 litres are

Q28Ans

Total Mixture

$$4x : 3x + 6$$

M.W. 1

$$\text{or, } \frac{4x}{3x+6} = \frac{2}{7}$$

$$\text{or, } 28x = 24x + 48$$

$$\text{or, } 4x = 48$$

$$x = 12$$

∴ total quantity of final mixture is:

$$\Rightarrow 4x 12 : 3x 12 + 6$$

$$\Rightarrow 48 : 36 + 6$$

$$\Rightarrow 48 : 42 \Rightarrow 90 \text{ litres}$$

3) None of those qns

Q25

Ans: Let number be  $x$ ,

$$\text{On } \frac{13+x}{28+x} = \frac{1}{2}$$

$$\text{Or, } 26 + 2x = 28 + x$$

$$\text{Or, } 2x - x = 28 - 26$$

$$\text{Or, } x = 2$$

3) 2 qns

Q26

Ans Let number be  $x$ ,

$$\text{On } \frac{11-x}{25-x} = \frac{4}{11}$$

$$\text{On } 121 - 11x = 100 - 4x$$

$$\text{On } -11x + 4x = 100 - 121$$

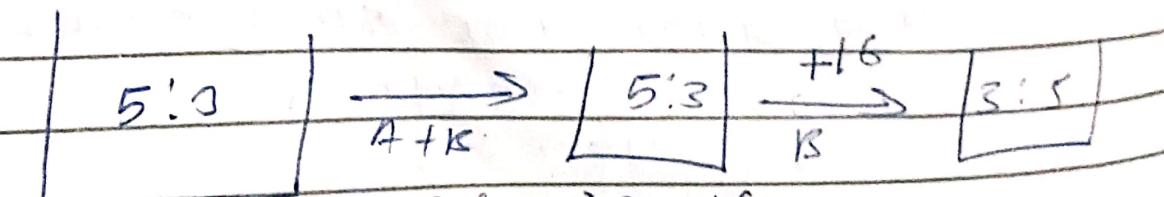
$$\text{Or, } -7x = -21$$

$$\text{Or, } x = 21/7$$

$$x = 3$$

Q28

Ans



$$5x : 3x \Rightarrow 8x = 16$$

$$\underline{x} \quad \underline{x} \quad \boxed{x=2}$$

$$\text{so, } \frac{5x - 10}{3x - 18 + 18} = \frac{3}{5}$$

$$\text{or } 25x - 50 = 9x$$

$$\text{or } 25x - 9x = 50$$

(D1)

Q28

Ans

two liquid mixture:

$$5x : 3x$$

$$8x = 16$$

$$x = 2 \text{ unit}$$

$$\text{so, } 2 \times 4 \text{ unit} = 16$$

$$\downarrow 4 \text{ unit} = 8$$

$$\text{total: } 5 \times 4 \text{ unit} = 8 \times 5 = 40$$



$$5 : 3$$

$$5x : 3x$$

$$8x = 40$$

$$x = 5$$

$$\text{so, } 5x : 3x$$

$$\Rightarrow 5 \times 5 : 3 \times 5$$

$$\Rightarrow 25 : 15$$

2) 15 lth

Q2 g

Date: 20/2  
Page:

Ans.

total

$$8x : 5x$$

$$11x = 33$$

$$\cancel{x} \cancel{x} x = 11$$

$$6 : 5 = 11x 7 = 77$$

$$3 : 4 = 7x 11 = 77$$

then

$$\rightarrow \text{total}$$
  
$$(42, 35)$$

$$33 : 44 \rightarrow 99\% \rightarrow 9$$

$$9 \text{ unit} = 33$$

$$1 \text{ unit} = 11/3$$

$$\therefore 42 \text{ unit} = 42 \times 11/3$$

$$= 11 \times 14$$

total

11x14	:	..
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$$6x : 5x : 11x = 15y$$
$$x = 14$$

84 sqm

∴ 84 sqm

Q.30

Ans:

Total

A

$$\begin{matrix} 3 : 1 & \leftarrow & 1 : 3 \\ \downarrow & & \downarrow \\ \textcircled{6} & & \textcircled{7} \end{matrix}$$

$$\therefore 3 : 1 = 4$$

$$1 : 3 = 4 \rightarrow 99\text{lt} = 2 \text{ unit}$$

$$\therefore 2 \text{ unit} = 8$$

$$\therefore 1 \text{ unit} = 4$$

$$\text{Total } 3 \text{ unit} = 4 \times 3 = 12 \text{ liters/liter.}$$

L) 12 liters. Ans.

Q.21

Ans:

total liquid A &amp; B

first to be

$$\begin{matrix} 7x : 6x \rightarrow 1.99\text{lt} \\ 6x : 7x \end{matrix}$$

$$\text{so, } 1 \text{ unit} = 21$$

$$\text{then, total is } 7x = 7 \times 21 = 147 \text{ liters.}$$

H) 147 liters

A.m.

Employer reduces employer wages increased in ratio = 5:5  
wages > 0:1

# Assume initial wagle.

$$\begin{cases} \text{No. of emp. init} = 9 \\ \text{Initial weight} = 2 \end{cases}$$

$$\therefore \text{Initial total weight} = 9 \times 2 = 18.$$

# After change.

$$\text{No. of emp} = 4$$

$$\text{Initial weight per emp} = 5$$

$$\text{Final weight} = 4 \times 5 = 20$$

$$\text{Ratio} = 18 : 20 \Rightarrow 9 : 10.$$

(ii) In part (i) to QM.

Q3b

First burns completely in 7hr.  
Second burns completely in 6hr.

$$\text{ratio} = 2:1$$

Assume initial height

$$\text{Let init. height of each candle} = 42 \text{ cm (7 units)} \\ = 42 \text{ units.}$$

Burning rate.

$$\text{1st candle burn } 7 \text{ hr} \rightarrow 42/7 = 6 \text{ units per hour}$$

$$\text{Second candle burn } 6 \text{ hr} \rightarrow 42/6 = 7 \text{ units}$$

Remaining height after  $t$  hr:

$$\text{1st candle} = 42 - 6t$$

$$\text{2nd candle} = 42 - 7t$$

$$\text{ratio: } \frac{42 - 6t}{42 - 7t} = \frac{6}{7}$$

$$\text{or, } 42 - 6t = 126 - 21t$$

$$15t = 84 \text{ or } t = 5.6 \text{ hr.}$$

$$\text{hour into min: } 0.6 \times 60 = 36 \text{ min}$$

so, 5 hour 36 min.

L) 5 hour 36 min.

Q24

Ans

LCM of 3 & 1 is 3

Burn rate:

$$\text{1st candle} = 3 \text{ units in } 1 \text{ hr} = 1 \text{ unit/hr.}$$

$$\text{2nd candle} = 3 \text{ units in } 1 \text{ hr} = 3 \text{ units}$$

Remaining after  $t$  hr

$$1st = 3 - 1t$$

$$2nd = 3 - 3t$$

Required

$$3 - t = \frac{2}{1}$$

$$t = 0.6 \text{ hr.}$$

$$\text{convert: } 0.6 \text{ hrs} \times 60 = 36 \text{ min.}$$

3) 36 minutes.

Q35

Ans Let parts be  $4a$ ,  $5b$  &  $7c$   
take LCM of this, is  $140$ .

$$\frac{4a}{140} = \frac{5b}{140} = \frac{7c}{140}$$

$$35 : 28 : 20$$

$$9 : 6 : c$$

so,

$$35x + 28x + 20x = 1162$$

$$x = 14$$

∴ value of smallest part =  $20x = 20 \times 14 = 280$

4) 280 gm.

Q36

Ans A gets  $\frac{2}{3}$  of B

B gets  $\frac{1}{4}$  of C.

If A's shares =  $x$

Then,

$$B = 1/4x$$

$$A = \frac{2}{3}B = \frac{2}{3} \times \frac{1}{4}x = \frac{1}{6}x$$

PQTY

$$A + B + C = 680$$

$$\frac{1}{6}x + \frac{1}{4}x + x = 680.$$

$$\frac{17}{12}x = 680.$$

$$\therefore x = 680 \times \frac{12}{17}$$

$$x = 480 \text{ qm}$$

3) 480 qm

P37

If 1st no. =  $x$

second no. =  $y$

50% of 1st =  $\frac{1}{2}x$

condn,

$$y + \frac{1}{2}x = \frac{4}{3}y$$

$$x = \frac{2}{3}y$$

$$A \times \frac{50}{100} + B = \frac{4}{3}B$$

$$A \times \frac{1}{2} + B = \frac{4}{3}B$$

$$A = \frac{4}{3}B \times 2 - B$$

$$A = \frac{8}{3}B$$

$$x:y = \frac{2}{3}y:y = 2:3 \text{ qm}$$

3) 2:3 qm

P38

Ans Let A/B/C shows K.

(7 min)

$$\begin{array}{l|l} \frac{2}{5}A + 40 = K & \frac{2}{7}B + 20 = K \\ A = \frac{5}{2}(K - 40) & B = \frac{7}{2}(K - 20). \end{array}$$

Let  $\frac{9}{17}C + 10 = K$

$$C = \frac{17}{9}(K - 10)$$

$\therefore$  The res sum is 600.

$$A + B + C = 600.$$

$$\therefore K = 100.$$

then,

$$\begin{aligned} A &= \frac{2}{5}(100 - 40) \\ &= 120. \end{aligned}$$

3) 150 ans

Q39

$$\text{Al} \quad 50\text{g} = 1\text{g} \Rightarrow 1\text{g} - 15 = 4$$

$$\text{Mixture} = 15$$

$$\text{Copper} = 9 \Rightarrow 15 - 9 = 6.$$

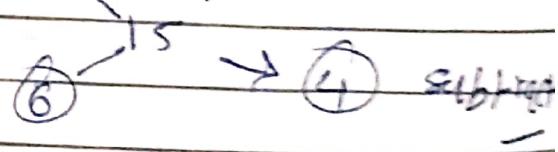
Ratio:

$$\text{Gold : Copper} = 6 : 4 = 3 : 2$$

3) 3:2 ans



Q40



Ans last year ratio (Laxman : VIMAL) = 3 : 4  
growth ratio,

$$\text{Laxman} = 4 : 5$$

$$VIMAL = 2 : 3$$

$$\text{present total} = 4160.$$

Assume last yr salary,

$$\text{Laxman} : VIMAL.$$

$$3x : 4x$$

\* Find present salary,

$$\text{Laxman} = 3x \times \frac{5}{4} = 1.5x.$$

$$VIMAL = 4x \times \frac{3}{2} = 6x$$

\* total present salary

$$\Rightarrow \frac{15}{4}x + 6x = 4160.$$

$$\Rightarrow \frac{16640}{39} \text{ } \cancel{x}$$

$$\Rightarrow x = 427.642$$

\* Find Laxman salary now

$$\frac{15}{4}x = \frac{15}{4} \times \frac{16640}{39}$$

$$= 1600.$$

∴ 1600 gm