

RATIO

$$A : B$$

$$3 : 1$$

$$A : B : C : D = ?$$

$$B : C$$

$$5 : 7$$

$$C : D$$

$$8 : 9$$

$$\begin{array}{cccc} & 3 & 5 & 8 \\ \hline & 1 & 1 & 1 \\ & 4 & 7 & 9 \end{array}$$

$$P : Q : R$$

$$\begin{array}{cccc} 3 & 4 & 4 & 4 \\ \hline 5 & 5 & 7 & 7 \\ 8 & 8 & 8 & 9 \end{array}$$

$$\frac{3 \times 5 \times 8 : 4 \times 5 : 8 : 4 \times 7 \times 8 : 4 \times 7 \times 9}{2}$$

$$30 : 40 : 56 : 63 \quad \checkmark$$

P : Q : R

P : Q : R : S

$$A : B = 2 : 3$$

$$A : B : C : D$$

$$B : C = 2 : 4$$

$$2 : 3 : 3 : 3$$

$$C : D = 2 : 5$$

$$2 : 2 : 4 : 4$$

$$2 : 2 : 2 : 5$$

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

$$2 : 3 : 6 : 15$$

$$\begin{aligned}
 A : D &= \frac{A}{D} = \frac{A}{B} \times \frac{B}{C} \times \frac{C}{D} \\
 &= \frac{2}{3} \times \frac{3}{4} \times \frac{5}{2} \\
 &= \frac{2}{3} \times \frac{3}{4} \times \frac{5}{2} = \frac{2}{15} = \frac{1}{D}
 \end{aligned}$$

Q. $\frac{a}{b} = \frac{7}{9}$, $\frac{b}{c} = \frac{3}{5}$. $a b c = ?$

$$\begin{array}{r}
 3 : 3 : 5 \\
 \hline
 7 \times 3 : 3 \times 9 : 9 \times 5 \\
 \hline
 7 : 9 : 15
 \end{array}$$

Ans. 2.5 for Jumbled up the ratio of 3:4:5

Q. $A : B = \frac{1}{2} : \frac{3}{8}$, $B : C = \frac{1}{3} : \frac{5}{9}$, $C : D = \frac{5}{6} : \frac{3}{4}$

$$\begin{array}{l}
 = \frac{1}{2} \times \frac{8}{3} \\
 A : B : C : D = ? \\
 \hline
 \frac{1}{2} : \frac{3}{8} : \frac{3}{8} : \frac{3}{8} \\
 \hline
 \frac{1}{3} : \frac{1}{3} : \frac{5}{9} : \frac{5}{9} \\
 \hline
 \frac{5}{6} : \frac{5}{6} : \frac{5}{6} : \frac{3}{4}
 \end{array}
 \quad \left| \begin{array}{l}
 \frac{1}{2} \times \frac{1}{3} \times \frac{5}{6} : \frac{3}{8} \times \frac{1}{3} \times \frac{5}{6} : \frac{3}{8} \times \\
 : \frac{3}{8} \times \frac{5}{9} \times \frac{3}{4} \\
 \hline
 \frac{5}{36} : \frac{5}{48} : \frac{25}{144}
 \end{array} \right.$$

$$Q) \frac{a}{b} = \frac{2}{3}$$

$$\frac{b}{c} = \frac{4}{5}$$

$$Ans: A : B : C$$

$$2 : 3 : 3$$

$$4 : 4 : 5$$

$$\underline{2 \times 4 : 3 \times 4 : 3 \times 5}$$

Ans

a, b, c, d proportional

$$1st \times 4^{th} = 2nd \times 3rd.$$

$$a \times d = b \times c.$$

What is the ratio of the 4th proportional of 2, 5, 6
and the 4th part proportion of 6, 8, 9.

$$6 \times 4^{th} = 8 \times 9.$$

$$= \frac{6 \times 9}{8 \times 8} = \frac{54}{64} = \frac{12}{16}$$

$$15 : 12$$

$$= 5 : 4$$

$$\frac{5}{12} : \frac{4}{12}$$

$$\textcircled{1} \quad 14 : 30 :: 7 : x \quad x = ?$$

$$x = \frac{30 \times 7}{14 \times 2} \quad \textcircled{15}$$

$$\textcircled{2} \quad 36 : 81 :: x : 63$$

$$\frac{36 \times 63}{81} = \textcircled{28}$$

$$\textcircled{3} \quad \frac{51 \times 108}{58} = \frac{54}{34} = \textcircled{81}$$

Mean Proportion

$$a : b :: b : c$$

a, b, c continuous proportion

$$\frac{a}{b} = \frac{b}{c}$$

$$b^2 = ac$$

$$b = \pm \sqrt{ac}$$

$\therefore \Rightarrow$ Equals to

① find the mean proportion between 25 and 225

② The mean proportion between 0.04 and 0.

③ The third proportional of a and $\frac{b^4}{4a}$

④ The third proportional of a and b is c. what is the mean proportional of a^2c and b^2c

⑤ If x is the mean proportional b/w 16 and 64.8 then the value of x is

⑥ The mean proportional of 6 and 54 is _____ more than 15.

⑦ The 4th proportional to 12, 24 and 27 is as same as the 3rd proportional to 1 and 36. What is A?

Ans.

$$\begin{aligned} \text{① } b &= \sqrt{25 \times 225} \\ &= 5 \times 15 \\ &= \underline{75} \end{aligned}$$

$$2x \cdot 6 = \underline{12}$$

$$\frac{a^4}{b^4} = \frac{b^4}{4a}$$

$$ax = \frac{b^4}{4a} \times \frac{b^4}{4a}$$

$$x = \frac{b^8}{16a^2}$$

also known as 16a² and 64a² are both perfect squares.

$x = \frac{b^8}{16a^3}$ is also a perfect square number.

thus b^8 is to be divided by a^3 to get a perfect square number.

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thus b^8 is to be divided by a^3 to get a perfect square number.



$$\textcircled{4} \quad \begin{aligned} 1^{\text{st}} &= a \\ 2^{\text{nd}} &= c \\ 3^{\text{rd}} &= b \end{aligned}$$

$a, b \rightarrow c^{\text{mp}}$

$$(2^{\text{nd}})^2 = a \times b$$

$\downarrow \quad \downarrow$

1st 3rd

$$\textcircled{5} \quad c^2 = a \times b \text{ (given)}$$

$$\begin{aligned} c &= \sqrt{a^2 c \times b^2 c} \\ &= \sqrt{a^2 b^2 c^2} \\ &= \sqrt{(ab)^2 c^2} \\ &= \sqrt{(c)^4 c^2} \\ &= c^2 \times c \\ &= c^3 \end{aligned}$$

\textcircled{5}

$$x = \sqrt{12.8 \times 64.8}$$

$$= \sqrt{\frac{128}{10} \times \frac{648}{10}}$$

$$= \sqrt{4 \times 4 \times 4 \times 2 \times 4 \times 2 \times 9 \times 9}$$

$$10 \times 10$$

$$= \frac{4 \times 4 \times 2 \times 2 \times 9 \times 2}{10} = 28.8$$

\textcircled{6}

$$\text{mean} = \sqrt{6 \times 54}$$

$$= \sqrt{2 \times 3 \times 3 \times 3 \times 3 \times 2}$$

$$= 3 \times 3 \times 2$$

$$= 18$$

A : 36 : 36 : 5

$\therefore \underline{3}$

\textcircled{7}

$$\frac{12}{20} = \frac{24}{24} = x = \frac{24 \times 2}{24 \times 27}$$

$$4^{\text{th}} = 54$$

$$\frac{A}{36} = \frac{36}{54} = A = \frac{36 \times 36}{54} = \underline{\underline{24}}$$

When x is to each of 10, 16, 22, 32

The no. obtained in this order are in proportion?
What is the mean proportional between the nos.
 $(x+1)$ and $(3x+1)$

$$10+x : 16+x :: 22+x : 32+x$$

$$\frac{5x}{6} \left(\frac{10+x}{16+x} \right) = \left(\frac{22+x}{32+x} \right)^3 \quad | \text{ LCM of } 6, 10 \\ \text{and } 32 = 30.$$

$$= 50 + 5x = 68x + 3x^2$$

$$2x = 16$$

$$x = 8$$

$$\sqrt{9 \times 25}$$

$$= 3 \times 5$$

$$= \underline{15}$$

$$2+x, 8+x, 26+x$$

$$\therefore \left(\frac{2+x}{8+x} \right)^6 = \left(\frac{8+x}{26+x} \right)^2 \quad | \text{ LCM of } 6, 2$$

$$12 + 6x = 16x + 2x$$

$$\therefore \frac{12 - 4x}{x} = \frac{16 - 4x}{x} \quad | \text{ LCM of } 6, 2$$

$$| \text{ LCM of } 6, 2$$

$$16 - 4x = 12 - 4x$$

$$4x = 4 \quad | \text{ LCM of } 6, 2$$

$$x = 1$$



If x is subtracted from 5, 9, 8 and 15, then the result is proportion?

$$4 \left(\frac{5-x}{9-x} = \frac{8-x}{15-x} \right) \frac{4}{7} = 28$$

$$35 - 7x = 32 - 4x$$

$$3 = 3x$$

$$\cancel{3} \quad x = 1$$

16/05/24

Q1) The ratio b/w the percentages of A and B is 3:5. If the ratio of their ages 5 years hence becomes 13:20, then the present age of B is —

Q2) When x is added to each of 9, 15, 21 and 31 the no so obtained are in proportion. what is the mean proportional b/w the nos. $(3x-2)$ and $(5x+4)$.

Q3) If x is subtracted from each of 19, 28, 55 and the nos. so obtained in this order are in proportion. What is the mean proportional b/w $(x+9)$ and x

Q4) If the sum of three nos. is 79. If the ratio of 1st : 2nd is 4:7, 2nd : 3rd is 4:5 then the second no. is

Q5) The salaries of Vipin and Dinesh are in the ratio of 5:8. If each salary is increased by 6, then the ratio becomes 7:10. Vipin's sal

$$1) \quad 10 \left(\begin{array}{c} 2 \\ 3:5 \\ 13:20 \\ \hline 7 \end{array} \right) \rightarrow x^7$$

$$\rightarrow x^2$$

$$\begin{array}{r} A : B \\ 21 : 35 \\ 26 : 40 \\ \hline 5 \equiv 5 \\ 1 \equiv 1 \end{array} \quad P \rightarrow 5$$

$$5) \quad 2 \left(\begin{array}{c} 5:8 \\ 7:10 \\ \hline 2 \end{array} \right)^2$$

$$2 \equiv 4800$$

$$1 \equiv 2400$$

$$\begin{array}{r} 5 \times 2400 \\ = 12,000 \end{array}$$

$$4) \quad a : b : c$$

$$4 : 7 : 7$$

$$4 \ 4 : 5$$

$$16 : (28) \checkmark 35 \equiv 79 \equiv 79$$

$$1 \equiv 1$$

$$\underline{28 \equiv 28}$$

$$2) \times 5 \\ 6 \left(\frac{9+x}{15+x} = \frac{21+x}{31+x} \right) \times 3 \\ 30$$

$$45 + 5x = 63 + 3x$$

$$2x = -18 \\ x = 9$$

$$\sqrt{25 \times 49} \\ = 15 \times 7 = 35$$

$$3) \times 4 \\ 9 \left(\frac{19-x}{28-x} = \frac{55-x}{91-x} \right) \times 1 \\ 36$$

$$76 - 4x = 55 - x \\ 21 = 3x$$

$$4 \times 7 = 28$$

$$\sqrt{16 \times 49}$$

$$4 \times 7 = 28$$

$$S = P \\ S = 1$$

$$SF(P) = 0.8$$

$$SF = 0.8$$



Q1) The monthly income of two persons are in the ratio of 2:3 and the expenses are 5:9. If each saves ₹ 600; then their monthly income is -

Q2) The ratio of income of two person is 5:3 and their expense is 9:5. If they save ₹ 1300 and 900 resp. Their income are -

Q3) The no. of students are in three classes are in the ratio of 2:3:4. If 12 students are increased in each classes, the ratio changes to 8:11:14. The total no. of students in three classes at the beginning was -

$$\begin{array}{rcl}
 & A : B. \\
 & 2 : 3 \times 4 \\
 & 5 : 9 \times 1 \\
 & \hline
 & 4
 \end{array}
 = 8 : 12$$

$$\begin{array}{rcl}
 & 5 : 9 \\
 & \hline
 & 3 \equiv 600
 \end{array}
 \quad
 \begin{array}{rcl}
 & 8 = 200 \times 8 \\
 & \hline
 & = 1600
 \end{array}$$

$$\begin{array}{rcl}
 & 1 \equiv 200 \\
 & \hline
 & 12 = 200 \times 12 \\
 & \hline
 & = 2400
 \end{array}$$

$$\begin{array}{rcl}
 2 : 3 : 4 \times 6 & = & 12 : 18 : 24 \\
 8 : 11 : 14 \times 2 & = & 16 : 22 : 28 \\
 \hline
 & &
 \end{array}$$

$$\begin{array}{l}
 4 \equiv 12 \\
 1 = \textcircled{3}
 \end{array}$$

$$36 : 54 : 72$$

$$= \underline{162}$$

Q2) Income - Savings = Expenditure

$$\frac{5x - 1300}{3x - 900} = \frac{9}{5}$$

$$25x - 6500 = 27x - 8100$$

$$2x = 1600$$

$$x = 800$$

$$5 \times 800 = 4000$$

$$3 \times 800 = 2400$$

Q3) Incomes of A and B are in the ratio 1:3 and their annual expenditure are in the ratio of 3:2. If each save Rs 60,000 at the end of the year, the annual income of A is -

Q2) My grandfather was 9 times older than me now 16 years ago. He will be 3 times of my age 8 yrs from now. 8 yrs ago the ratio of my age : my grandfather was -

Q3) Two nos. are in the ratio 3:5. If 6 is added to both of them, the new ratio becomes 2:3, the nos are -

Q4) Two nos. are in the ratio of 3:5. If 9 be subtracted from each they become 12:23. Find the nos.

$$\begin{array}{rcl} I & 4:3 \\ E & 3:2 \\ \hline \end{array}$$

$$I = 60,000$$

$$240,000, 120,000$$

$$6,20,000, 30,000$$

$$3) \quad \begin{array}{r} \cancel{3:5}^2 \times 1 \\ \cancel{2:3}^1 \times 2 \\ \hline 1 \end{array} = 4:6$$

$$\begin{array}{r} 3 \equiv 6 \times 3 = 18 \\ 5 \equiv 6 \times 5 = 30 \end{array}$$

$$4) \quad \begin{array}{r} 3:5 \times 11 \\ 12:23 \times 2 \\ \hline 24 : 46 \\ 9 \equiv 9 \end{array} \rightarrow 33:55$$

$$2) \quad \begin{array}{r} \cancel{M} : GF \\ \cancel{1} : 9 \times 2 = 2:18 = 8:72 \\ - 16 \end{array}$$

$$+ 8 \quad \begin{array}{r} 1 \times 8 = 8:24 = 32 \\ 24 \quad \cancel{24} \quad \cancel{24} \\ 0:0 \quad 0:6 \equiv 24 \\ 1 \equiv 4 \end{array}$$

of bonds is 8.2.8 different combinations can be formed
 $8 - 24:90 \rightarrow$ Present value was 24.90 for all
 numbers up to Pkt. 8.2.8 to all the left and right 24

diamond or onto

the first 8.2.8 diamond possibilities being

$$\begin{array}{r} 000,00 \equiv 1 \\ 000,01 + 000,02 \\ 000,03 + 000,04 \\ 000,05 + 000,06 \end{array}$$

$$\begin{array}{r} 8:1:1 \\ 8:1:2 \\ 8:1:3 \end{array}$$

$$6) \frac{A}{600} \quad \frac{B}{750} \quad \frac{C}{1000}$$

$$\text{No. } \frac{5}{20} \quad \frac{4}{16} \quad \frac{1}{4}$$

$$10 \equiv 40$$

$$1 \equiv 4$$

$$5 \equiv 20$$

$$12000 \quad 12000 \quad 4000$$

$$= 28000$$

$$\frac{28000}{40} = 700$$

= 21,000 (Ans)

$$7) A : B .$$

$$\begin{array}{l} I. P. 4 : 3 \\ E. P. \frac{5}{12} : \frac{7}{15} \end{array}$$

$$E + S = I$$

Exp + Savings

$$(5 + 7)(12 - 5) \times 5$$

$$(7 : 8)(15 - 7) \times 4$$

$$A = 25 : 35$$

$$B = 28 : 32$$

$$\underline{3 : 3}$$

$$3 \equiv 4500$$

$$\therefore 1 \equiv \frac{4500}{3} = 1500$$

$$6000 \quad 60 \equiv 1500 \times 60 = 9000$$

$$3P : 2P$$

$$72 \equiv 1$$

$$2P = 3P - 1$$

$$05 = 2 \quad 31 = 17 - 2$$

$$9 - A = 58$$

$$\frac{27 - 38}{12} =$$

$$9 - 9 = 0 \quad 8 - 8 = 0$$

Exp Saving

$$5 : 7 \times 15$$

$$7 : 8 \times 12$$

$$9 \left(\begin{array}{l} 75 : 105 \\ 84 : 96 \end{array} \right)$$

$$9 \equiv 4500$$

$$1 \equiv 500$$

8) $A + D = 8$

$$B + C = 5$$

$$A + D : B + C$$

$$8 : 5$$

$$\frac{A - B = x}{C - D = y}$$

$$\therefore x - y = ?$$

$$\frac{A}{T} = \frac{18400}{46800}$$

$$\frac{92}{234} = \frac{46}{117} \uparrow$$

$$13 \equiv 117$$

$$1 \equiv \frac{117}{13} = 9$$

$$8 = 9 \times 8 = 72$$

$$5 = 9 \times 5 = 45$$

$$72 : 45$$

$$\therefore A = 46$$

$$D = 26$$

$$x = A - B$$

$$= 46 - 25$$

$$= \underline{\underline{21}}$$

$$y = C - D$$

$$= 26 - 20 = \underline{\underline{6}}$$

$$9 \equiv 45$$

$$1 \equiv 5$$

$$B = 25$$

$$C = 20$$

$$117 \equiv 46800$$

$$1 \equiv \frac{46800}{117} =$$

$$15 \equiv \frac{46800}{117} \times 15 = \underline{\underline{6000}} \text{ (Ans)}$$

9) Pen : Pencil

$$5 : 8$$

$$2 \equiv 44$$

$$\text{Ashoke } 2 : 44.$$

$$1 \equiv 11$$

Pen : Pencil

$$\$: \$.$$

$$3 : 5$$

$$2F \quad 3G.$$

$$B \quad 2 \equiv 3G$$

$$\equiv 18$$

$$90 : 54 : 90$$

$$10 : 6 : 10$$

$$3 : 5$$

10) $M : D$ (Age or difference same korar jonne).

$$M : D$$

$$10 : 2$$

$$12 : 4$$

$$2 : 2$$

$$2 \equiv 5$$

$$1 \equiv \frac{5}{2}$$

$$= \frac{5}{2} \times 6$$

$$12 \equiv \frac{5 \times 12}{2}$$

$$= 30$$

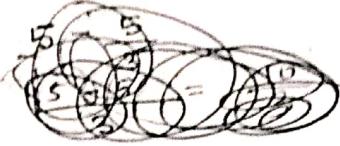
$$+ \frac{41}{71}$$

$$\checkmark \text{ (Ans)}$$

(aged jo andarer) $\rightarrow 1008 = 4 \times 99 = 36 \times 28$

$$11) \quad 2) \quad \begin{array}{r} 5 \\ \diagup \quad \diagdown \\ 17 = 80 \\ \diagup \quad \diagdown \\ 1 \quad 80 \times 5 \end{array}$$

Count coins



$$\text{No. of coins} \quad \begin{array}{r} 22 : 25 : 10 \\ \hline 5 : 4 : 1 \\ \hline 10 : 20 : 10 = 40 \end{array}$$

$$\therefore 40 = 80$$

$$1 = 2 \times 4 = 8 \quad (\text{Ans})$$

$$12) \quad \frac{3}{8} = \frac{G_1}{3} \quad \frac{B}{5} \quad \begin{array}{l} \text{Boys} \\ \text{Girls} \end{array} \quad \begin{array}{l} \text{Below 10 years} = 5 \times \frac{1}{3} = \frac{5}{3} \\ \text{Above 10 years} = 5 \times \frac{2}{3} = \frac{10}{3} \end{array}$$

$$\begin{array}{l} \text{Boys} \\ \text{Girls} \end{array} \quad \begin{array}{l} \text{Below 10 years} = 8 \times \frac{2}{3} = 2 \\ \text{Above 10 years} = 8 \times \frac{1}{3} = 1 \end{array}$$

$$\frac{10}{3} + 1 = \frac{13}{3}$$

$$\frac{13}{3} = 260$$

$$1 = \frac{260 \times 3}{13} = 60$$

$$5 = 60 \times 5 = 300 \quad (\text{Total no. of boys})$$

$$13) \frac{N+3}{D+5} = \frac{2}{3} . \quad @) \frac{5}{7} \quad \frac{5+3}{7+5} = \frac{3}{12} = \frac{2}{3} .$$

$$(b) \frac{6}{10} = \frac{2}{5} .$$

$$\frac{N-1}{D+3} = \frac{2}{5}$$

I. A : B .

$$I. 5 : 7 .$$

$$S. 4000 : 5000 .$$

$$E. \frac{2}{7} : \frac{3}{5} .$$

A B .

$$\begin{array}{c} 5 \\ \diagdown \quad \diagup \\ 2 \quad 3 \end{array}$$

$$4000 : 5000 .$$

$$4 : 5 .$$

$$\frac{2}{7} : \frac{3}{5} .$$

$$\textcircled{5} = \frac{14}{5} : \textcircled{6} .$$

$$S = 6 : 8 .$$

$$(5x3) - (7x2) = 4000 \times 3 - 5000 \times 2 .$$

$$12x = 2000 .$$

$$12 = 24,000 .$$

$$\text{or } \frac{5x - 4000}{7x - 5000} = \frac{2}{3}$$

$$12x = 12 \times 2000 \\ = 24000 .$$

$$x = 2000 .$$

19) A B C

E 80% 85% 75%

9 $\frac{80}{100}$ $\frac{85}{100}$ $\frac{75}{100}$

1 100 100 100

S 20 15 25

E 80 85 75

9 : 9 : 20

A B C = 9 : 9 : 20

Ratio = In = Ex + S.

$$\frac{80}{100} \div 4 \quad 5 = 4 + 1$$

$$20 = 17 + 3 \text{ (Ex)} + 9 \text{ (S)}$$

$$4 = 3 + 1 = 20$$

$$2000 \times 20 = 40000$$

$$40000 \div 5 =$$

$$2 \div 0.0017 \times 2 = 2000$$

$$8 \div 0.008 = 1000$$

$$= 20000 = 20$$

E S I.

A	4	1	5×8	32	8	<u>40</u>
B	17	3	20×3	51	9	<u>60</u>
C	3	1	4×20	60	20	<u>20</u>

$$(80 - 40) \cdot 40 \equiv 18000.$$

$$\begin{aligned} 1 &= \frac{1800\phi}{4\phi} \\ &= 450. \end{aligned}$$

$$A's \text{ Income} = 40 \times 450.$$

$$\begin{aligned} A B's \text{ "} &= \cancel{40} \times 60 \times 450 \\ &= \cancel{28000} \\ &= \underline{27,000} \end{aligned}$$

$$18) R = \frac{3}{5}.$$

$$R : S .$$

$$\begin{array}{l} 3 : 5 = 8 \\ 2 \cancel{1} \left(\begin{array}{l} 3 \\ 5 \end{array} \right) + 2 \end{array}$$

$$8 \equiv 32.$$

$$1 \equiv 4.$$

$$\begin{aligned} 2 &= 4 \times 2 \\ &= \underline{8} \end{aligned}$$

HW
21, 22, 24