

If $a:b = 2:5$, $b:c = 5:6$ then
 $a:b:c$?

$$a:b = 2:5$$

$$b:c = 5:6$$

$$\underline{a:b:c = 2:5:6}$$

another way

$$2) \quad a:b = 2:5 \quad \begin{matrix} 2 \times 5 \\ 5 \times 3 \end{matrix} \quad \begin{matrix} b \\ c \end{matrix} \rightarrow \text{structure}$$

$$b:c = 5:6 \quad \begin{matrix} 5 \times 6 \\ 6 \times 5 \end{matrix}$$

$$\underline{a:b:c = 10:25:30}$$

2 5 6 → same
answ.

If $A:B = 7:5$, $B:C = 9:11$ then

$A:B:C$

$$A:B = 7:5$$

$$B:C = 9:11$$

$$\underline{a:b:c = 63:45:55}$$

If $3A = 4B = 5C$ then $A:B:C$

$$A:B:C = 20:15:12$$

if $a:b = 2:3$, $b:c = 9:8$, $c:d = 4:3$

Then $a:b:c:d$?

$$a:b:c:d \\ 6:9:8:6$$

$$a:b = 2:3 \times 3 \\ = 6:9$$

$$b:c = 9:8$$

which of the following fractions
is the lowest?

$$3/7, 4/11, 5/9, 6/13, 7/12$$

Questions asked in this problem:

→ Find Greater Fraction

→ Find Lower Fraction

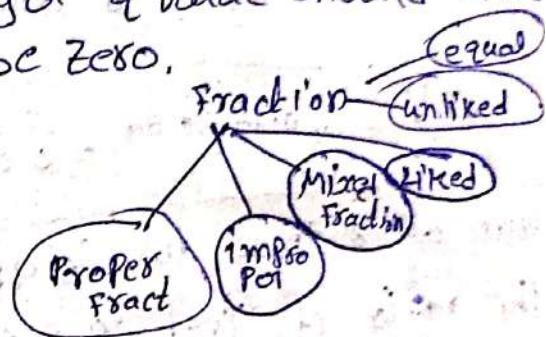
→ II Middle Fraction

= fractions in descending

→ write fractions in ascending order

Fractions

A fraction $\frac{N}{D}$ but in the form of P/Q . P, Q are integers. Q value should not be zero.



Proper Fraction $\rightarrow N < D$
 $\Rightarrow \text{Numerator} < \text{Denominator}$

Improper fraction $\rightarrow N > D$

M.F \rightarrow I + fraction part

Liked \rightarrow Denominator values same

Unliked \rightarrow Denominator values are different

equal fraction

$$\frac{2}{1}, \frac{4}{2}, \frac{6}{3}, \frac{8}{4}, \frac{10}{5}, \frac{12}{6}$$

$$\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{1}{2}, \frac{1}{2}$$

$$\frac{30}{28}, \frac{42}{40}, \frac{56}{52}$$

$\rightarrow G.F$

$$\frac{30}{7}, \frac{40}{11}, \frac{56}{9}, \frac{60}{13}, \frac{70}{12}$$

proper fraction
so add zero.

write descending order

$$\frac{7}{12}, \frac{5}{9}, \frac{6}{13}, \frac{3}{7}, \frac{4}{11}$$

$\rightarrow G.F \rightarrow L.F$

$$\frac{7}{12}, \frac{5}{9}, \frac{6}{13}, \frac{3}{7}, \frac{4}{11}$$

Find fourth proportional to numbers 8, 12 and 18

$$a : d = \frac{bc}{a}$$

$$d = \frac{12 \times 18}{8} = 27$$

(3, 5)

$$5P = 12 \times 18$$

$$5P = 216$$

Third portion of 36 and 6.9

$$c = \frac{36k^2}{a} = \frac{6^2}{36} = \frac{36}{36} = 1$$

mean prop of 0.16 and 0.04

$$\sqrt{ab} = \sqrt{0.16 \times 0.04} = 0.08$$

sum of 3 three num is 98. If

The ratio of first to second is 2:3 that of the second to the third is 5:8, then the second number is 9.

$$a:b = 2:3$$

$$b:c = 5:8$$

$$a:b:c = 10:15:24$$

$$49P = 98 \quad \boxed{30}$$

$$1P = \frac{98}{49} = \boxed{2}$$

$$\begin{aligned} & \frac{1}{2} \times 2 : \frac{2}{3} \times 3 : \frac{3}{4} \times 4 \\ &= 6 : 8 : 9 \end{aligned}$$

$$23P = 782$$

$$6+8+9 = \boxed{23}$$

$$23P = 782$$

$$1P = \frac{782}{23} = \boxed{34}$$

first part is

$$6 \times 34 = \boxed{204}$$

A and B together have 120rs.
if 4/15 of A's amount is equal to 2/5 of B's amount
how much amount does B have?

$$\frac{4}{15}A = \frac{2}{5}B$$

$$A = \frac{3P}{4}$$

$$5P = 120$$

$$5P = 240$$

$$B = 2 \times 240 = \boxed{480}$$

If 482 is be divided into 3 parts, proportional to $\frac{1}{2} : \frac{2}{3} : \frac{3}{4}$. Then the first part is 9.

convert to integer
~~LCM(2, 3, 4) = 12~~
Multiply every factor into 12 to get into

$$\left(\frac{1}{2} : \frac{2}{3} : \frac{3}{4} \right) \times 12$$

$$\frac{1}{2} \times 12 : \frac{2}{3} \times 12 : \frac{3}{4} \times 12$$

$$6+8+9 = \boxed{23}$$

$$23P = 782$$

$$1P = \frac{782}{23} = \boxed{34}$$

first part is

$$6 \times 34 = \boxed{204}$$

marks for Mathematics, Physics, two number are in ratio of 7:13. When 24 is added in the ratio of 5:7:8. Then each number then ratio becomes 11:17. Find difference between is a proposed to increase these both initial numbers.

marks by 40%, 50% and 75% respectively. What will be the ratio of increased seals?

- a) 1:3:4
- b) 4:7:8
- c) 6:8:9
- d) None

4 becomes 11 difference
13 becomes 17 difference is (4)

$$50, \boxed{4P = 24}$$

$$\boxed{1P = 6}$$

a) 24

b) 42

c) 36

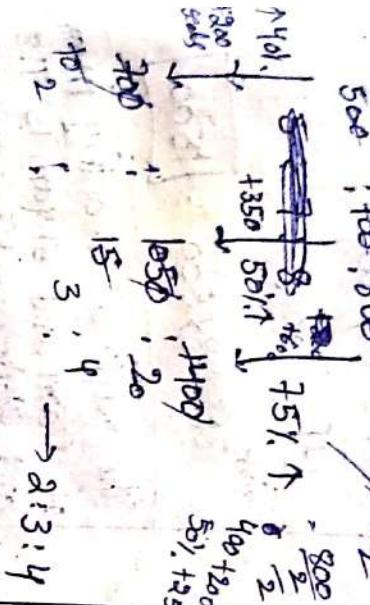
d) 60

M P B

$$500 : 700 : 800$$

$$\frac{100}{2}$$

$$\frac{6P}{36}$$



initial difference 13-7 = 6 difference

$$\frac{6P}{36}$$

Two numbers are in ratio 3:4 if 6 is subtracted from each of them, The ratio becomes 3:5.

The greatest number will be?

$$\frac{18}{2} = 9$$

$$3x - 6$$

$$4x - 6$$

1. The ratio b/w two number is 3:4.
2. If each number is increased by 4. The ratio becomes 5:7. Then first number is?

$$\frac{3x+6}{4x+6} = \frac{3}{5}$$

$$\begin{aligned} 5(3x+6) &= 15(4x+6) \\ 15x + 30 &= 60x + 90 \\ 15x - 60x &= 90 - 30 \\ -45x &= 60 \\ x &= -\frac{60}{45} \\ x &= -\frac{4}{3} \end{aligned}$$

$$P = 4$$

- first part is 4 so $4P = 16$
another way

$$\frac{2x}{3x+4}$$

$$\frac{3x}{3x+4}$$

$$\frac{2x+4}{3x+4} = \frac{5}{7}$$

$$(8) = 16$$

$$\frac{2x+4}{3x+4} = \frac{5}{7}$$

$$\frac{14x+28}{21x+12} = \frac{5}{7}$$

$$14x+28 = 35x+20$$

$$14x - 35x = 20 - 28$$

$$-21x = -8$$

$$x = \frac{8}{21}$$

$$\text{Greatest number} = 4x = 4(\frac{8}{21}) = \frac{32}{21}$$

$$\frac{2x+4}{3x+4} = \frac{6}{12}$$

Monthly income of Ravi and Anurag are in the ratio 5:4 and their expenses are in the ratio 4:3. If each of them save Rs. 1200 at the end of the month, their monthly incomes respectively?

To suppose i take $S+E = I$

$$\begin{cases} I = S+E \\ I-S = E \\ I-E = S \end{cases}$$

1) 800rs, 6400rs
2) 900rs, 7200rs
3) 2000rs, 1600rs
4) 6000rs, 4800rs

$$29P = 14,500$$

$$\boxed{1P = 500}$$

$$3P = 3 \times 500 = \boxed{1500}$$

The ratio of monthly income of Ram and Shyam is 9:8, and their monthly expenditure are in the ratio 7:6. If each of them saves Rs. 800 per month, find the sum of their monthly incomes?

The income of A and B are in ratio 5:3, and their expenses are in the ratio 9:5. If both save respectively 1300rs and 900rs, then find their incomes?

$$1P = 400$$

$$2P = 800$$

$$\boxed{\text{Age 1}}$$

$$\begin{aligned} I - S &= E & ② 1400, 2400 \\ \frac{5x - 1300}{3x - 900} &= \frac{9}{5} \\ 25x &= 1600 \\ x &= 800 \end{aligned}$$

$$\begin{aligned} A &\rightarrow 5x = 5(800) = 4000 \\ B &\rightarrow 3x = 3(800) = 2400 \end{aligned}$$

The ratio of expenses and savings of a person is 26:15 if your monthly income is Rs. 14,500, then what is his monthly saving?

They given saving and expense

$$I = E + S$$

$$= 26 + 15$$

$$= 41$$

$$\begin{cases} I = S+E \\ I-S = E \\ I-E = S \end{cases}$$

1) 800rs, 6400rs
2) 900rs, 7200rs
3) 2000rs, 1600rs
4) 6000rs, 4800rs

$$\begin{aligned} I &\rightarrow 5 : 4 \\ E &\rightarrow 4 : 3 \end{aligned}$$

$$1P = 1800$$

$$5P = 6000, \quad 4P = 4800$$

$$= 4800$$

The ratio of monthly income of Ram and Shyam is 9:8, and their monthly expenditure are in the ratio 7:6. If each of them saves Rs. 800 per month, find the sum of their monthly incomes?

$$1P = 400$$

$$2P = 800$$

$$\boxed{\text{Age 1}}$$

$$\begin{aligned} I - S &= E & ② 1400, 2400 \\ \frac{5x - 1300}{3x - 900} &= \frac{9}{5} \\ 25x &= 1600 \\ x &= 800 \end{aligned}$$

Present ratio of A and B is 5:6. After 7 years their ratio will be 6:7. The present age of A is?

11/15

A : B

~~Milk~~ \rightarrow present \rightarrow 10 : 5 : 6 \rightarrow 1P

~~water~~ \rightarrow 6 : 7 \rightarrow 1P

$$\boxed{1P = 7}$$

present age of A $\frac{5}{5+7} \times 7 = 35$

$m : w$
 $\begin{array}{r} 7 \\ \hline 7 : 12 \end{array}$ $\rightarrow 27 \text{ lit } w$

$$\boxed{3P = 27 \text{ lit}}$$

$$Milk = 7P = 7 \times 9 = 63 \text{ lit}$$

6 years ago, the ratio b/w the age of B's Mother and B's age was 7:3. 8 years hence, the ratio b/w their age will be 7:4. Find the present age of B?

~~Ques~~

B.M. : B

~~7x : 3x~~

~~7x + 6 : 3x + 6~~

$\rightarrow 7x + 6, 3x + 6$ the quantity of water to be further added is?

$$\text{Ques 8} \rightarrow 7x + 6 + 8, 3x + 6 + 8.$$

$$\frac{7x+14}{3x+14} = \frac{7}{4}$$

$$\boxed{2x = 42}$$

$$\begin{array}{r} 2x \\ \hline 2 : 4 \end{array}$$

$$\boxed{3P = 60 \text{ lit}}$$

$$\begin{array}{l} \text{Ques 9} \\ \text{Present } B = 3x + 6 \\ = 3(6) + 6 \\ = \boxed{24} \end{array}$$

water became 1 to 4 difference is 3

$$\boxed{50 / 3P = 60 / 1P}$$

Mixture

$$\frac{\text{milk}}{7} : \frac{\text{water}}{9}$$

Water changes happened in water only added to 3 times the first part milk constant.

Part makes 146. The first part is?

- 1) The ratio of milk to water is 7:9 if 27 litres of water is added, the ratio becomes 7:12 then find the amount of milk in mixture

$$7x - 3x = 26$$

$$24x - 120 = 26$$

$$7x + 5(24-x) = 146$$

$$7x + 120 - 5x = 146$$

$$2x = 26$$

$$x = 13$$

$\frac{24}{3} \text{ Rs}$

$\frac{13}{11} \text{ Rs}$

$13 + 11 = 24 \rightarrow \text{Crt Probs}$

Averages

$$A = \frac{S}{N}$$

$$S = A \times N$$

$$N = \frac{S}{A}$$

- ② $Avg = \text{middle No}$ sequence numbers
- i) consecutive Numbers
 - ii) consecutive Even Nums
odd Nums
 - iv) Two consecutive num
difference is same

If any one of the condition satisfies directly you can take avg as middle num otherwise

* you can take first
First num + last num

③ Avg = equal distribution

* There are 3 boys Their average is 30 it means every boy is 30

$$\frac{30}{1} \quad \frac{30}{2} \quad \frac{30}{3}$$

sum of three boys = 90

④ Missing Number concept

in missing num concept we follow Reverse effect

Avg increase \uparrow take $-$ symbol
Avg decrease \downarrow take $+$ symbol

⑤ Repeating num concept

\rightarrow we are following [direct eff]

$\left\{ \begin{array}{l} Avg \uparrow (+) \\ Avg decreases \downarrow taking (-) \end{array} \right.$

⑥ Replacement concept

Note 1: if avg increases by new person in place of leaving person Then new per weight will also increase.

Avg \uparrow — New person weight \uparrow

Avg \downarrow — in place of leaving person.

if avg \downarrow by coming new person in place of leaving person we can say that the new person weight also decreases

1) Find the average of 10, 12, 15, 18, 11.

$$A = \frac{S}{N}$$

$$A = \frac{66}{5} = 13.2$$

They are no consecutive type numbers
 $A = \frac{S}{N}$

If the avg of 40, 10, 15, 20, 35, x is 25 then the value of x is 9.

$$40, 10, 15, 20, 35, x = 25$$

$$A = \frac{S}{N}$$

$$25 = \frac{120+x}{6}$$

$$25 \times 6 = 120 + x$$

$$150 = 120 + x$$

$$x = 30$$

3) Find the avg of first 25 multiples of 5.

$$\begin{array}{r} 25 \times 5 \\ \hline 125 \end{array}$$

First + last

$$= \frac{5+125}{2} \times \frac{1}{2} = 65$$

Another method

first 25 multiples
 Middle \rightarrow It should be 5 multiples

$$\begin{array}{r} -1 \\ 13 \times 5 \\ \hline 65 \end{array}$$

Another way

There is a formula for this type of problems

$$= \frac{5(25+1)}{2} \times \frac{k(n+1)}{2}$$

$$\frac{5(25+1)}{2} \times \frac{13}{2} = 65$$

4) If the avg of 7 consecutive numbers is 20. The largest of these numbers is?

$$\begin{array}{ccccccc} 17 & 18 & 19 & 20 & 21 & 22 & 23 \\ & & & \downarrow & & & \\ & & & 20 & & & \end{array}$$

largest num

In these type of problem there may be chance to ask six type of questions.

→ Find smallest Num? → ⑦

→ Find largest Num? → ⑧

→ Find sum of smallest num and greatest num → ⑨

→ Find Diff b/w G.N & smallest num (S.N) → ⑩ $23 - 17 = 6$

→ Find Product of greatest Number and smallest number → ⑪ $23 \times 17 = 391$

Find greatest num is divisible by smallest num what result will come

$$\frac{G.N}{S.N} = \frac{23}{17} = 1.35$$

5) If avg of 4 consecutive odd numbers is 60. What is the product of largest and smallest number among these four numbers?

$$\begin{array}{ccccccc} 57 & 59 & 61 & 63 \\ & \downarrow & & & & & \\ & 57 \times 63 & & 60 & & & \\ & & & - 3591 & & & \\ & & & \hline & & & \end{array}$$

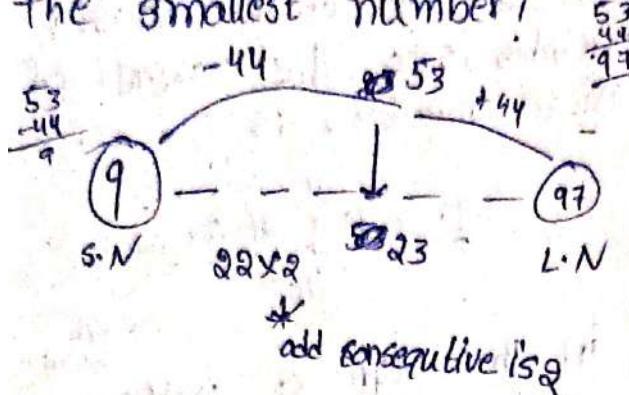
① 3852

② 3254

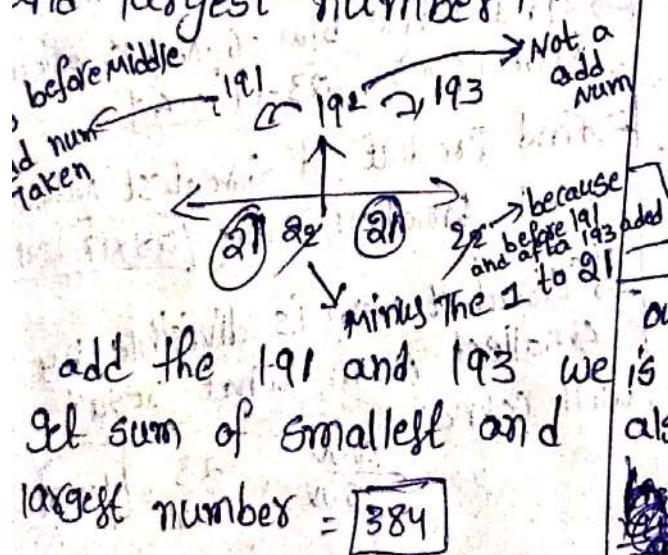
③ 3456

④ 3591 ✓

The avg of 45 consecutive odd numbers is 53 then find the smallest number?

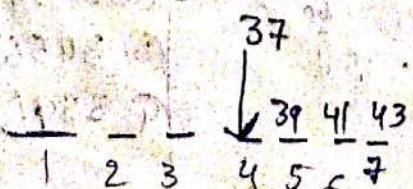


If the avg of 44 consecutive odd number is 1921. Then find the sum of smallest and largest number?



add the 191 and 193 we get sum of smallest and largest number = $\boxed{384}$

The Avg of first 7 integers in a set of 13 consecutive odd integers is 37. What is the average of entire set?



out of 13 odd consecutive avg is the num

of the three numbers, second is twice the first and thrice the third. If the average of the 3 numbers is 44. Find the largest number?

$$\begin{array}{ccc} \text{I} & \text{II} & \text{III} \\ x_2 & 3 : 6 : 2 & \\ & \downarrow x_{12} & \uparrow x_3 \\ & 72 & \end{array}$$

$$3+6+2 = 11 \text{ Parts}$$

$$\text{UP} = 44 \times 3 \text{ numbers avg every number avg } 44$$

$$11P = 132$$

$$1P = 12$$

$$\text{Largest Num is } 6 \times 12 = \boxed{72}$$

out of three numbers, the second is five times the first, and it is also twice the third, if the third number is raised by 8, then the avg of three numbers is 31. what is the smallest number?

$$\begin{array}{ccc} \text{I} & \text{II} & \text{III} \\ +5 \uparrow 2P & : 10P & 5P+8 \uparrow x_2 \\ \end{array}$$

$$\text{sum of three numbers} = 31 \times 3$$

$$= 93$$

sum of three numbers Ratio = 2 : 10 : 5

$$= 17P + 8$$

$$17P + 8 = 93$$

$$17P = 93 - 8$$

$$17P = 85$$

$$1P = \frac{85}{17}$$

$$\boxed{1P = 5}$$

The batting avg for 10 innings of a cricket player is 50 runs. His highest highest score exceeds his lowest score by 172 runs. If these two innings are excluded, the avg of remaining 8 innings is 48 runs. The highest score of the player is?

$$H - L = 172$$

smallest num is 10 so $2 \times 5 = 10$

$$\boxed{= 10}$$

$$40(\text{Inning}) \rightarrow 50(A)$$

$$\left| \begin{array}{l} H(L) \\ \downarrow \\ 38(I) \end{array} \right. \rightarrow 48(A) \left. \begin{array}{l} 2 \downarrow (+) \\ \downarrow \end{array} \right.$$

$$38(I) \rightarrow 48(A)$$

$$H + L = 50 + 50 + (38 \times 2)$$

$$= 176$$

$$H - L = 172$$

$$H + L = 176$$

$$\underline{2H = 348}$$

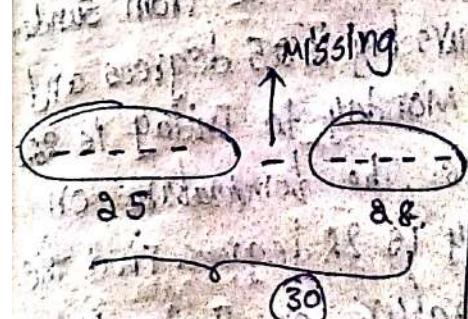
$$H = 174$$

The avg of 11 numbers is 30. The Avg first 5 is 25 and that of the last 5 is 28. The value of the 6th number is?

* Out of 11 nums it given only 10 numbers information

first 5 last five

11 numbers



* This concept is Missing Num concept [Reverse effect]

$$\begin{aligned} 11(\text{Num}) &\rightarrow 30 \text{ Avg} & \text{Avg} \uparrow \oplus \\ 5(\text{Num}) &\rightarrow 25 \text{ Avg} & \text{Avg} \uparrow \oplus \\ 5(\text{last num}) &\rightarrow 28 \text{ Avg} & 2(2 \times 5) = 10 \\ && 2 \times 6 = 12 \end{aligned}$$

$$\boxed{6^{\text{th}} = 30 + 5 + 10 = 45}$$

The Average of 11 numbers is 30. The average of first 6 numbers is 34 and that of last 6 numbers is 28. Find the 6th number is?

* Given Number 11 but in problem Col 12 numbers, so it is Repeating Number concept [direct effect] - Avg $\uparrow \oplus$ Avg $\downarrow \ominus$

$$\begin{aligned} 11(\text{Num}) &\rightarrow 30(\text{Avg}) \\ 6(\text{N}) &\rightarrow 34(A) \\ 6(\text{L.N}) &\rightarrow 28(\text{Avg}) \end{aligned}$$

$4 \times 6 = 24$

$$\boxed{6^{\text{th}} = 30 + 24 - 12 = 42}$$

The Avg of 34 boys in a class is 14 years. If the teacher's age is included, the average becomes 15 years. What is the teacher's age? $35\frac{1}{3}$

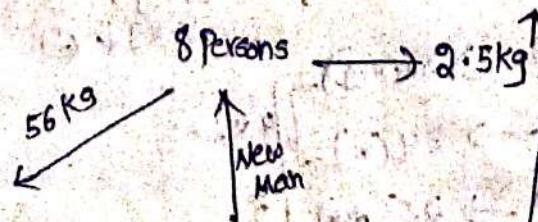
$$T = 14 + 35 = 49$$

~~* Teacher also include 60 Num is 34+1
* include ~~Teacher~~ also avg same it means ~~including Teacher age also~~~~

* after adding teacher also The avg should be 14. but it increased by 1. so 1 for one person.

$$\text{Total} = 35, \text{so } 35 \times 1 = 35$$

The avg weight of 8 persons is increased by 2.5 kgs. when one of them whose weight is 56 kgs is replaced by a new man the weight of the new man is?



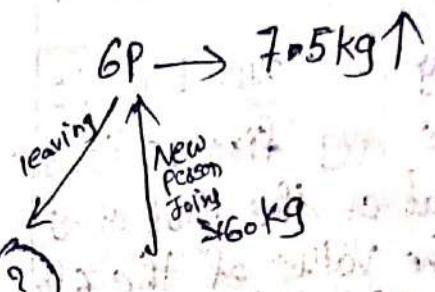
By removing New Man ~~weight~~ increases. Means New Man weight also \uparrow

~~Ans. 1.~~

$$\text{N.M.W} = 56 + (8 \times 2.5) \\ = 76$$

The avg weight of 6 people increases from 24 to 31.5 kg when one of them leaves the group and a new person joins him. If the weight of the person who joined is 60 kg. find the weight of person who left the group?

$$\frac{31.5 - 24}{2} = 7.5$$



$$\text{L.P. weight} = 60 - (6 \times 7.5) \\ = 60 - 45 \\ = 15$$

Average temperature from Sunday to Thursday is 25 degrees and from Monday to Friday is 26.5 degrees. The temperature on Sunday is 28 degrees. Find the temperature on Friday is?

$$\text{S M Tu W Th F} \rightarrow 25 (\text{A}) \\ \text{M T W Th F} \rightarrow 26.5 (\text{A})$$

$$F = S + \uparrow$$

$$= 28 + (5 \times 1.5)$$

$$= 35.5$$

The Avg temperature of Monday, Tuesday and Wednesday was 38 degrees and of Tuesday, Wednesday and Thursday was 35 degree. If the temperature of Monday and Thursday was in a ratio of 7:2 then find the temperature on Monday (in degree)

$$\begin{array}{l} M, T, W \rightarrow 38^\circ(A) \\ T, W, Th \rightarrow 35^\circ(A) \\ \hline M : Th \end{array}$$

$$7 : 2 \quad 5P = 9^\circ \quad 1P = \frac{9}{5} = 1.8$$

decreasing because of the diff b/w Monday (Thursday) $\frac{7}{5}$

Monday is 7 parts

$$7P = 7 \times 1.8 = 12.6$$

The avg daily income of P, Q and R is 80. If P earns 30rs less than R who earns 60rs more than Q. What's daily income of Q?

$$\begin{array}{c} Q \quad \underline{P} \quad \underline{R} \\ \text{2rs} \quad x+30 \quad x+60 \\ \downarrow \quad \quad \quad \downarrow \\ 30 \quad \quad \quad 30 \end{array}$$

$$\begin{aligned} P &= R - 30 \\ R &= Q + 60 \\ &= x + 60 \\ P &= x + 60 - 30 \end{aligned}$$

$$x + 30 = 80$$

$$x = 50$$

one diff 30
middle number
vg that is 80,

The Avg temp of M, T, W and Th is 60 degrees. The avg temp for T, W, Th, F is 63 degrees. If the ratio of temp for Monday and Friday is 21:25 then what is the temp of Friday?

$$\begin{array}{l} M, T, W, Th \rightarrow 60(A) \\ T, W, Th, F \rightarrow 63(A) \\ \hline M : F \end{array}$$

$$21 : 25 \quad 4P = 12 \quad 1P = \frac{12}{4} = 3$$

$$\text{Temp of Friday} = \boxed{25 \times 3 = 75}$$

Compound interest

→ in compound interest principle changes in every year.

→ $P \rightarrow$ changes → Every year

→ first year simple interest

(S.I) and first year compound interest will be same
 $(S.I) = (C.I)$

→ (C.I) changes from second year onwards

→ we can do problems in Three methods

1. Ratio Method

~~Power Two Times~~ → 2¹, 2¹ half year
 2-3 months

in Ratio Method 2 year compound interest (C.I) we have to calculate

Q. 1

$$(C.I)_2 = 2:1$$

3 years, 3 half year
 3-3 months use
 This formula

$$(C.I)_3 = 3:3:1$$

$$(C.I)_4 = 4:6:4:1$$

1 year, 3 half months
 4-3 months, 4-8 months
 4-6 months

It is applicable only on ratio Method.

2. Powers Method

Rate of interest 10% per Annum

$$R.Y. = 10\% PA$$

Rate of interest will be 1 year whether it's simple interest (S.I) or compound interest (C.I).

~~2¹~~ → $R.Y. = 10\% PA \rightarrow \frac{1}{10}$

$$T = 2 \text{ yrs}$$

in power factor increase fraction so $\frac{11}{10} \rightarrow$ numerators as Amount
 $\frac{10}{10} \rightarrow$ denominator take as Principle (P)
 If is greater than 10, Amount always greater than Principle.

$$\begin{aligned} P &: A \\ \times \left(\begin{array}{r} 10 : 11 \rightarrow 1^{\text{st}} \text{ year} \\ 10 : 11 \end{array} \right) &\times \begin{array}{l} 2^{\text{nd}} \text{ year} \\ \hline 100 : 121 \end{array} \rightarrow (A_2) \\ (P_2) \text{ C.S.I. } (21\%) & \end{aligned}$$

when you take difference b/w Principle and amount (C.I) Compound Interest will come.

$$(C.I)_2 = 21P$$

$$\text{Time} = 3 \text{ years}$$

$$10 : 11$$

$$10 : 11$$

$$10 : 11$$

$$1000 : 1331$$

$$\rightarrow A_3$$

$$P_3$$

A principal of 10,000 rs after a years compounded annually, the rate of interest being 10% per annum during the first year and 12% per annum during second year (in rupees) amount to?

$$10,000 \xrightarrow[+1000]{10\%} 11,000$$

$$11,000 \xrightarrow[+1320]{12\%} 12,320$$

What will be the compound interest on a sum of 9800 as for 2 years at $28\frac{4}{7}\%$ p.a compounded annually?

$$28\frac{4}{7}\% = \frac{2}{7}$$

$$9800 \xrightarrow{\frac{2}{7}} 2800$$

$$2800 \xrightarrow{\frac{2}{7}} 800$$

In ratio method 2 years are 21

$$\text{so } 2 \times 2800 = 5600 \text{ and } 800 \times 1 = 800$$

$$\begin{array}{r} 5600 \\ + 800 \\ \hline 6400 \end{array}$$

Another way \rightarrow Power Method

$$\frac{P}{A}$$

$$7 : 9 \times$$

$$7 : 9$$

$$49 : 81$$

$$\downarrow P_1 \quad \downarrow A_2$$

$$49P = 9800$$

$$IP = 200$$

$$(C.I)_2 = \frac{32\frac{9}{10}}{1200} \times 200 \\ = 6400$$

A sum of money become 64800 at compound interest if the rate of interest in three years is 12.5%, 6 $2/3\%$, and 9.09%. respectively. Find C.I?

$$12.5\% \left(\frac{1}{8} = \frac{6}{8} \right)$$

$$6\frac{2}{3} \left(\frac{1}{15} = \frac{16}{15} \rightarrow A \right)$$

$$9\frac{1}{11} \left(+ \frac{1}{11} = \frac{12}{11} \rightarrow P \right)$$

$$P : A$$

$$8 : 9$$

$$5 : 15 : 16 : 2$$

$$11 : 12 : 4$$

~~$55 : 72 \rightarrow A_3$~~

~~P_3~~

$$1P = 900$$

$$64,800$$

$$(C.I)_3 = 17P$$

$$\frac{72}{55} = 17$$

$$\times 900$$

$$= 15,300$$

The compound interest on
4000rs for 4 years at 10%
per annum will be?

$$4000 \xrightarrow{10\%} 400 \xrightarrow{10\%} 40 \xrightarrow{10\%} 4 \xrightarrow{10\%} 1$$

In Ratio Method for 4 Years

~~$4 : 6 : 4 : 1$~~

$$400 \xrightarrow{10\%} 400 \xrightarrow{10\%} 40 \xrightarrow{10\%} 4 \xrightarrow{10\%} 1$$

$$4 \times 400 = 1600, 6 \times 40 = 240, 4 \times 4 = 16$$

$$1 \times 4 = 4$$

$$\begin{array}{r} 1600 \\ 240 \\ 16 \\ \hline 1856.4 \end{array}$$

Sangeeta invested $\text{₹ } 20000$
(per annum), if the interest
is compounded half yearly,
then total interest earned
by Sangeeta at the end of
the year is?

$$20000 \xrightarrow{4\%} 800 \xrightarrow{4\%} 32$$

answer
exists
this

$$800 \xrightarrow{4\%} 32$$

$$\frac{800 + 32}{1600 + 32} = 1632$$

What is the compounded
earnings on $\text{₹ } 80,000$ at 10% ,
per annum in 1 year,
compounded quarterly?

3 years

$\boxed{3 \quad 3 \quad 3}$

$10\% \quad 10\% \quad 10\%$

$12m = 40$

$6m = 20$

$3m = 10$

$8 \xrightarrow{10\%} 8000 \xrightarrow{10\%} 800 \xrightarrow{10\%} 80 \xrightarrow{10\%} 8$

\rightarrow

answ

must end with

$$\begin{array}{r} 4 : 6 : 4 : 1 \\ 8000 \xrightarrow{10\%} 800 \xrightarrow{10\%} 80 \xrightarrow{10\%} 80 \xrightarrow{10\%} 8 \\ \hline 32000 \xrightarrow{10\%} 4800 \xrightarrow{10\%} 320 \xrightarrow{10\%} 8 \\ \hline 37,128 \end{array}$$

what will be the compounded
interest on sum of $\text{₹ } 31,250$ for
2 years at 12% p.a., if the inter-
est is compounded 8-monthly?

$$12 \xrightarrow{3 : 3 : 1} 3 : 3 : 1$$

$$31,250 \xrightarrow{8\%} 2500 \xrightarrow{8\%} 200 \xrightarrow{8\%} 16$$

$$2500 \xrightarrow{8\%} 200 \xrightarrow{8\%} 16$$

$$\frac{7500 + 600 + 16}{8116} = \boxed{8116 \text{ rs}}$$

2 years

$\boxed{8 \quad 8 \quad 8}$

$12m = 18\%$

$1m = 1\%$

$8m = 8\%$

$$10\% \times 1\% \times 1\% \times 1\%$$

$$312.5 \times 62.5 \times 105 \times 105$$

$$1\% \times 36 \text{ times} = 8\%$$

A man invested 10,000 for 3 years at CI at the rate of 20% per annum. If in 1st and 3rd year interest is calculated annually and in 2nd year it was calculated half-yearly, then find the total interest received by him in 3 years.

$$2(10) + \frac{100}{100}$$

$$(CI)_2 = 20+1 = 21\%$$

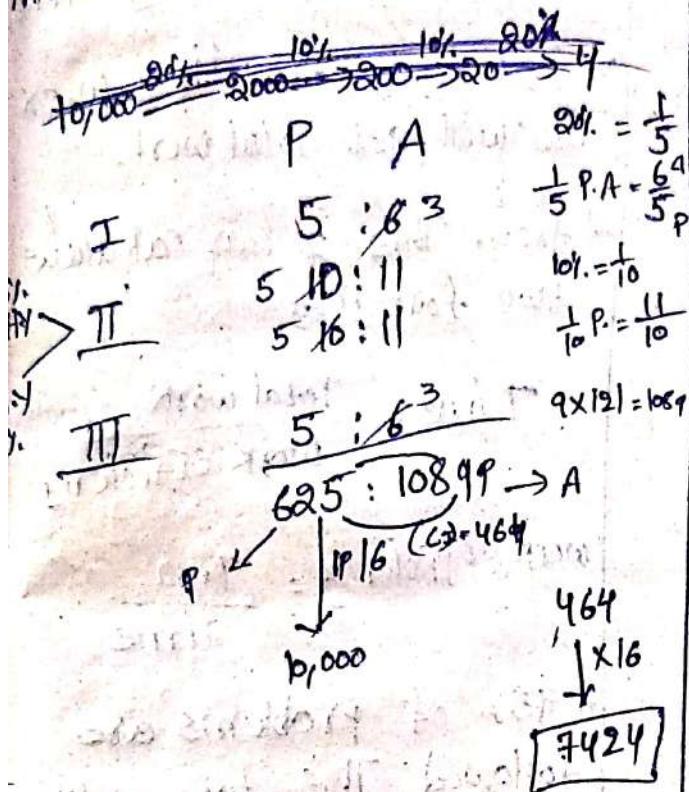
$$\text{formula} \quad (CI)_2 - (SI_2) = D$$

$$P = \frac{100^2 D}{R^2}$$

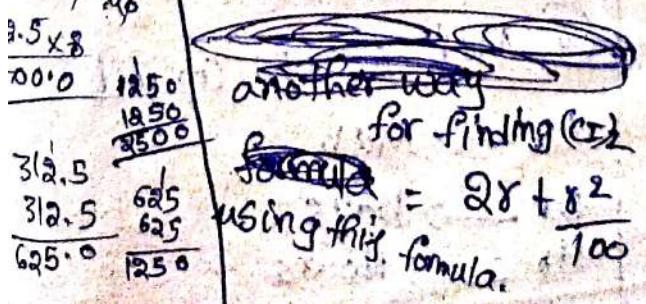
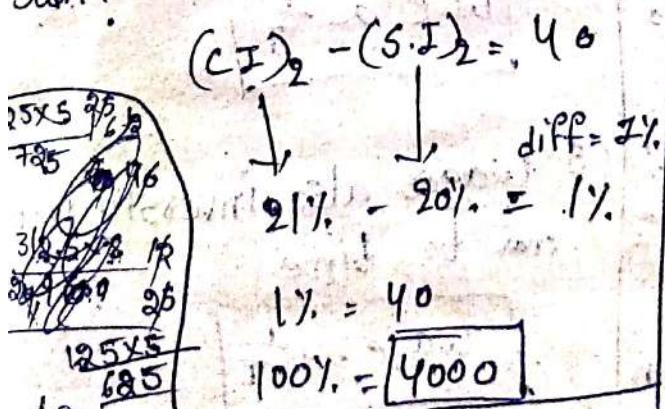
It is the formula for diff' blw 2 year of (CI) and (SI).

$$P = \frac{100 \times 100 \times 40}{100}$$

$$= 4000$$



The diff' blw SI and CI for 2 years at the rate of 10% per annum is Rs 40. Find the sum?



The diff' blw SI and CI for 3 years at the rate of 10% per annum on a sum of money for 3 years is Rs 31. Find the sum?

$$(CI)_3 - (SI)_3 = 31$$

$$100 - 10\% = 90\%$$

another way

$$(CI)_3 - (SI)_3 = D$$

$$P = \frac{100^3 D}{R^2 (300+R)} = \frac{100 \times 100 \times 100 \times 31}{100 (319)}$$

$$= 1000$$

another way
for finding $(CI)_2$
using this formula.

$$= 2R + R^2 \cdot \frac{1}{100}$$

The S.I and C.I as a certain sum of money for 2 years is 1600 and 1680. find the principal and rate of interest?

$$(S.I)_1 = 1600$$

$$I = 800$$

$$II = 800$$

$$(S.I)_2 = 1600$$

$$(C.I)_2 = 1680$$

$$I = 800$$

$$II = \frac{800}{80}$$

$$1680$$

$$20\% = 1600$$

$$1\% \rightarrow 800$$

$$100\% \rightarrow 8000, 10\% \text{ answers}$$

Time and work

1) A can do a work in 10 days.

→ his one day work becomes $\frac{1}{10}$

→ his two day work " $A_2 \rightarrow \frac{2}{10}$

$A_3 \rightarrow \frac{3}{10}$

* $\oplus A_{10} \rightarrow \frac{10}{10} = 1$

$A_{10} \rightarrow \frac{10}{10} = 1$

* one indicates total work.

2) When fraction is given

R.W $\rightarrow \frac{1}{4} \rightarrow$ work done

diff b/w \rightarrow Total work

These we get Remaining work

* This concept is only applicable when fraction is given.

(3) Total Work Concept

$$T.W = \text{work efficiency} \times T$$

when you multiply w.e we will get Total work.

* from this we can calculate two formulas

$$\text{Time} = \frac{\text{Total Work}}{\text{Work Efficiency}}$$

$$\text{Work Efficiency} = \frac{T.W}{\text{Time}}$$

* 95% of problems are followed this type only.

4) Work efficiency is inversely proportional to time.

$$W.E. \propto \frac{1}{T}$$

5) Wages also inversely proportional to time

$$\text{Wage} \propto \frac{1}{T}$$

(6) Men & Days Concept

M \rightarrow Men

D \rightarrow Days

H \rightarrow Hours

$$m_1 D_1 = m_2 D_2$$

$$m_1 D_1 H_1 = m_2 D_2 H_2$$

$$\frac{m_1 D_1 H_1}{w_1} = \frac{m_2 D_2 H_2}{w_2}$$

① A can do a task in 13 days.
How much work is left after
5 days?

$$A_1 = \frac{1}{13}$$

$$A_5 = \frac{5}{13} \text{ R.W. } 8$$

$$A_{\text{remaining work}} = \boxed{\frac{8}{15}}$$

a) $\frac{3}{5}$ th of work completed in
12 days, how many days will
the total work be completed?

~~A~~ ~~12~~

$$\text{R.W. } \boxed{\frac{3}{5}} \rightarrow \text{work done} \rightarrow 12 \text{ days}$$

$$5 \rightarrow T.W.$$

works done is $\frac{3}{5}$ in 12 days

$$3 \times 4 \rightarrow \text{unit } 12 \text{ D}$$

Total work is 5 units

$$\boxed{20 \text{ Days}}$$

another way

$$\frac{3}{5} \text{ convert percentage} = 60\%$$

$$\frac{60\%}{20\%} = \frac{4}{2} \text{ days}$$

tasking Total work that is 100

$$5 + 100\% = 20 \text{ days.}$$

If a person can do 25%
of the work in 12 days, how
many days will the total
work be completed?

$$25\% \rightarrow 12 \text{ days}$$

$$100\% \rightarrow 48 \text{ days}$$

$$\boxed{48 \text{ days}}$$

A can do a task in 10 days,
B can do the same thing in
15 days. But in how many
days will the two of them
do that work together?

$$A \rightarrow \frac{1}{10}$$

$$\begin{array}{c} A \\ \frac{1}{10} \end{array} \quad \begin{array}{c} B \\ \frac{1}{15} \end{array}$$

w.E $\frac{1}{3}$ Lcm(10, 15)
 $\frac{1}{2}$ T.W. = 30

A do 30 units of work in 10 days
B do 30 units of work in 15 days

$$10 \times 3 = 30$$

$$\begin{array}{c} 10 \quad 15 \\ E \rightarrow 3 \quad \frac{1}{2} \\ 30 \end{array}$$

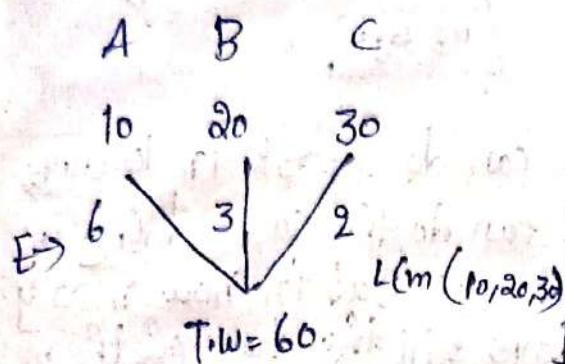
efficiency always based on 1 day

How many day will two of them
together $(A+B)$ $\frac{T.W.}{\text{W.E.}} = \frac{30}{3+2} = 6$

$$= \frac{30}{5} = 6 \text{ days}$$

$$\frac{30}{5} = 6 \text{ days}$$

A can do a task in 10 days, B in 20 days, C in 30 days. How many days can three of them do that work together?

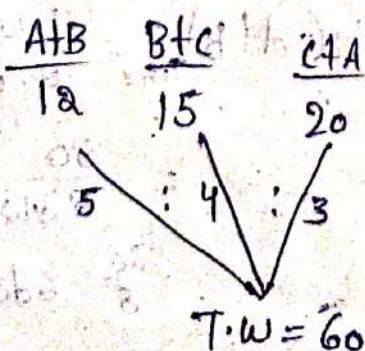


$$(A+B+C)_T = \frac{T \cdot W}{W \cdot E}$$

$$= \frac{60}{6+3+2} = \frac{60}{11} \text{ days}$$

(or)
Simplify
 $\frac{5}{11}$ days

A, B can do a task together in 12 days, B, C together in 15 days, C, A together in 20 days. How many days can the three of them do the work together?



$$(A+B+C)_T = \frac{T \cdot W}{W \cdot E}$$

$$= \frac{60}{5+4+3} = \frac{60}{12}$$

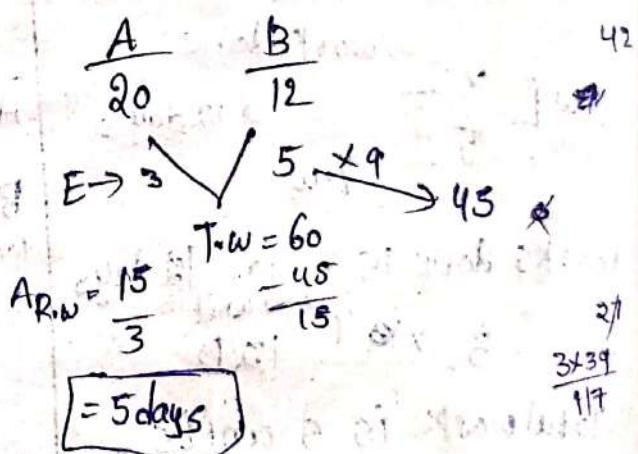
all A, B, C are repeated in 2 times.
So, $2(A+B+C) = 5+4+3 = 12$

$$2(A+B+C) = 12$$

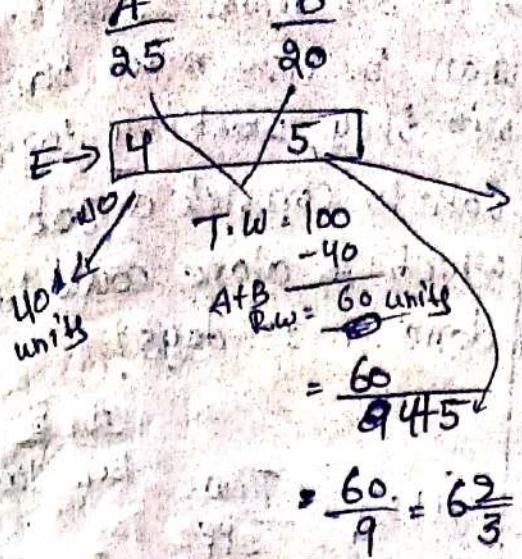
$$A+B+C = 6$$

$$\frac{60}{6} = \boxed{10 \text{ days}}$$

A can do a task in 20 days, B can do the same thing in 12 days, but B worked only 9 days, how many days does A take to do the rest?



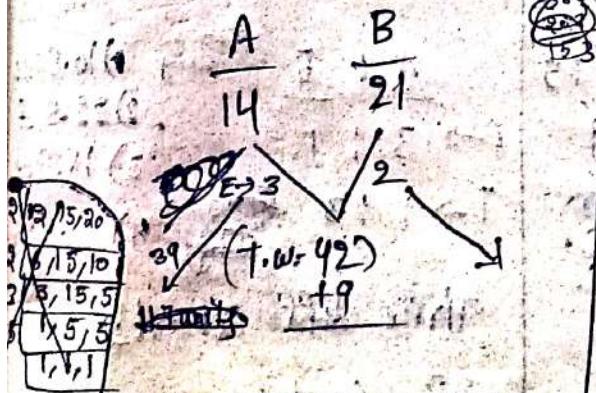
A can do a task in 25 days. B can do the same task in 20 days. A started the work and was joined by B after 10 days. How many days does it take to finally complete the task?



$$A = 10 + 6\frac{2}{3}$$

$$\text{Total days} = 16\frac{2}{3} \text{ days}$$

A can do a task in 14 days and B in 21 days. They started work, 3 days before completion of work A left from the job, in how many days can complete the whole work in?



assume A is not left. A's efficiency is 3 units per day remaining.

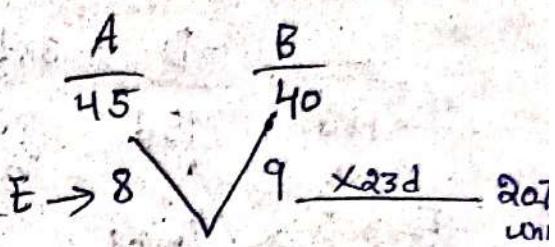
$$3 \text{ days} = 9 \text{ units}$$

$$\text{So, T.W. will be } 42+9=51$$

Then the work completed by both:

$$(A+B) = \frac{51}{5} = 10\frac{1}{5} \text{ days}$$

A and B can do a task in 45 and 40 days respectively. They started working for some days and A left the work. B takes 23 days to complete the rest. How many days does it take to complete the total work?

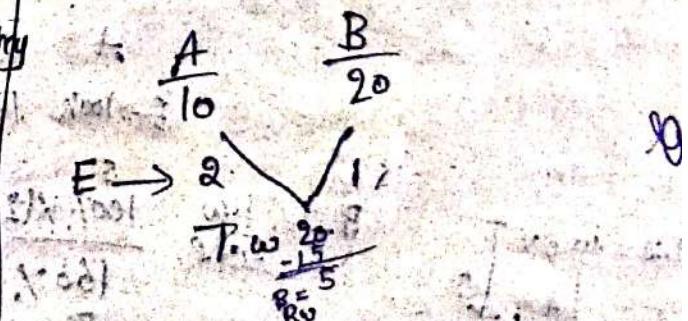


$$(A+B) = \frac{153}{17} = 9d$$

$$B = 9+23$$

$$= 32 \text{ days}$$

A can do a task in 10 days and B in 20 days. A left two days after the two of them started working together. How many days does B take to do the rest of the work?



$$(A+B) \times 5d = 3 \times 5 = 15 \text{ units}$$

$$B_{R.W} = \frac{5}{1 \text{ per day}} = 5d$$

C takes 6 days to do complete the half of the work, and D takes 5 days to complete the $33\frac{1}{3}\%$ of the work. If C worked for first 4 days, then rest of work done by D in how many days?

$$\begin{array}{c} \text{C} \\ \hline 12 \text{d} \end{array} \quad \begin{array}{c} \text{D} \\ \hline 15 \text{d} \end{array} \quad 33\frac{1}{3}\% = \frac{1}{3}$$

$\frac{1}{3} \xrightarrow{\text{W.D}} \frac{1}{5} \text{d}$

$T \cdot w = 1.5 \text{ days}$

$E \rightarrow 5 \quad \checkmark 4 \times 100$

$T \cdot w = \frac{60}{40} = 1.5$

$D_{R.W} = \frac{40}{4} = 10$

$F \boxed{10 \text{ days}}$

A can do a task in 12 days. How many days does it take for B alone to do that task if B is 60% more efficient than A?

$$\begin{array}{c} \text{A} \quad \text{B} \\ \hline 12 \quad ? \end{array}$$

~~60% $\xrightarrow{3}$~~

~~5 $\xrightarrow{5}$~~

~~Tw $\xrightarrow{1}$~~

$$\begin{array}{c} \text{A} \quad \text{B} \\ \hline E \rightarrow 100\%, 160\% \end{array}$$

$$T \cdot w = w \cdot e \cdot T$$

$\downarrow A \quad \downarrow \textcircled{1}$

$100\% \times 12 \text{d}$

$B \cdot T = \frac{T \cdot w}{\text{eff}} = \frac{100\% \times 12}{160\%}$

$= \frac{15}{2} = 7.5 \text{ d}$

A is 30% more efficient than B. How much time will they, working together, take to complete a job which A alone could have done in 23 days?

$$\begin{array}{c} \text{A} \quad \text{B} \\ \hline 130\% \quad 100\% \end{array}$$

$$(A+B)_{T} = \frac{T \cdot w}{\text{eff}}$$

$$= \frac{130\% \times 23}{30\%}$$

$\boxed{= 13 \text{ days}}$

A is thrice as efficient as B and he takes 60 days less than B. How many days will it take for the two of them to do the work together?

$$\begin{array}{c} \text{A} : \text{B} \\ \hline \text{Coding} \quad 1) 10.5 \text{d} \\ 2) 22.5 \text{d} \\ 3) 18.5 \text{d} \\ 4) 30 \text{ d} \end{array}$$

$E \rightarrow 3 : 1$

$T \rightarrow 1 : 3$

Time diff 2 parts

$$2P = 60 \text{ days}$$

$$1P = 30 \text{ days}$$

$$T \rightarrow 1 : 3$$

$\frac{30}{30} : \frac{90}{90} \times 30$

$(A+B) = \frac{\text{Product}}{\text{Sum}} = \frac{1}{36} \times \frac{45}{42}$

$\frac{45}{2} = \boxed{22.5}$

A is twice as efficient as B and they completed work in 16 days. In how many days can A alone complete the work?

$$E \rightarrow 2 : 1 \quad \frac{A}{16} \text{ days}$$

$\Delta T.W = W \cdot ext$

$$\therefore 24 \times 16 = 3 \times 16 = 48 \text{ d}$$

$$A_T = \frac{T.W}{eff} = \frac{48}{2} = 24 \text{ days}$$

A and B separately can do a piece of work in 6 and 12 days respectively. If they work alternately A beginning the work, the work will be completed in?

→ This is Day Alternative concept

$$\frac{A}{6} \quad \frac{B}{12}$$

$$E \rightarrow 2 : 1$$

$$T.W 18$$

$$A \rightarrow 1^{\text{st}} \rightarrow 2 \text{ units}$$

$$B \rightarrow 2^{\text{nd}} \rightarrow 1 \text{ units}$$

$$A \rightarrow 3^{\text{rd}} \text{ day} \rightarrow 2 \text{ units}$$

$$B \rightarrow 4^{\text{th}} \text{ day} \rightarrow 1 \text{ unit}$$

shortcut

$$\text{In } 2 \text{ days } (A+B) = \frac{1}{3} \quad 4 \times 2 = 8d$$

I will take comparison in 2 days so the answer multiply with 2 so the answer is 8.

A and B working separately can do a piece of work in 24 and 36 days respectively. If they work alternately, B beginning the work, the work will be completed in?

$$\frac{A}{24} \quad \frac{B}{36}$$

$$E \rightarrow 3 : 2$$

$$T.W = 72$$

$$\text{In } 2 \text{ days } (B+A) = \frac{72}{3+2} = \frac{72}{5} = 14 \frac{2}{5} = 28 \text{ d}$$

It takes 28 day for completing 70 units.

The 2 units are remaining 14/5 is 14 times canceled by 72 and 2 is remaining

→ The last unit

* In question B is beginning the work.

B completes 2 units per day so add 1 day.

$$28 \text{ d} + 1 \text{ day}$$

Men and days concept

45 people can do one job in 12 days at the rate of 12 hours per day. How many days can 60 people do the same thing at the rate of 10 hours per day?

$$m_1 D_1 H_1 = m_2 D_2 H_2$$

$$45 \times 12 \times 12 = 60 \times D_2 \times 10$$

$$\frac{108}{10} = D_2$$

$$D_2 = 10.8$$

18 people can build a 140m long wall in 42 days. In how many days does it take to build 30 people a 100m long wall?

$$\text{men } m_1 = 18$$

$$\text{work } W_1 = 140$$

$$\text{days } D_1 = 42$$

$$\text{days } D_2 = ?$$

$$\text{men } m_2 = 30$$

$$\text{work } W_2 = 100$$

$$\frac{m_1 D_1 H_1}{W_1} = \frac{m_2 D_2 H_2}{W_2}$$

$$18 \times 42 = \frac{30 \times D_2}{100}$$

$$D_2 = 18 \text{ days}$$

Solve people complete a task in 10 days. But with the addition of 10 people, the work will be completed 2 days earlier. What is the number of those who are first?

$$m_1 D_1 = m_2 D_2$$

$$x \times 10 = (x+10) \times 8$$

~~$$10x = 8(x+10)$$~~

$$10x = 8x + 80$$

$$2x = 80$$

$$x = 40$$

Percentages



Percent for every 100.

You can take x (or) 100 you can solve every problem.

1) 25% of a number is 80. What is the number?

$$x \times \frac{25}{100} = 80 \rightarrow \text{using } x$$

$$\frac{x}{4} = 80$$

$$x = 320$$

another way \rightarrow using 100%.

$$25\% = 80 \quad | \times 4$$

$$\frac{100}{4}\% = 320$$

Fraction Method
25% also used as $\frac{1}{4}$ \rightarrow original number

1 Part 50

4 Parts 320

convert fraction into %.

$$\frac{1}{2} \times 100 = 50\%$$

$$\frac{1}{6} \times 100 = 16\frac{2}{3}\%$$

$$\frac{1}{4} \times 100 = 25\%$$

$$\frac{1}{8} \times 100 = 12.5\%$$

$$\frac{1}{5} \times 100 = 20\%$$

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

$$\frac{1}{1} \times 100 = 100\%, \quad \frac{1}{6} = 16\frac{2}{3}\%$$

$$\frac{1}{2} \times 100 = 50\%, \quad \frac{1}{7} = 14\frac{2}{7}\%$$

$$\frac{1}{3} = 33\frac{1}{3}\%, \quad \frac{1}{8} = 12\frac{1}{2}\%$$

$$\frac{1}{4} = 25\%, \quad \frac{1}{9} = 11\frac{1}{9}\%$$

$$\frac{1}{5} = 20\%, \quad \frac{1}{10} = 10\%$$

$$\frac{1}{11} = 9\frac{1}{11}\%, \quad \frac{1}{19} = 5\frac{5}{19}\%$$

$$\frac{1}{12} = 8\frac{1}{3}\%, \quad \frac{1}{20} = 5\%$$

$$\frac{1}{13} = 7\frac{9}{13}\%$$

$$\frac{1}{14} = 7\frac{1}{7}\%$$

$$\frac{1}{15} = 6\frac{2}{3}\%$$

$$\frac{1}{16} = 6\frac{1}{4}\%$$

$$\frac{1}{17} = 5\frac{15}{17}\%$$

$$\frac{1}{18} = 5\frac{5}{9}\%$$

convert % into frac

$$25\% = 25 \times \frac{1}{100} = \frac{25}{100}$$

$$50\% = 50 \times \frac{1}{100} = \frac{50}{100} = \frac{1}{2}$$

$$75\% = \frac{75}{100} = \frac{3}{4}$$

$$100\% = \frac{1}{1}$$

$$50\% = \frac{1}{2}$$

$$25\% = \frac{1}{4}$$

$$12.5\% = \frac{1}{8}$$

$$6.25\% = \frac{1}{16}$$

$$10\% = \frac{1}{10}$$

$$20\% = \frac{1}{5}$$

$$30\% = \frac{3}{10}$$

$$40\% = \frac{2}{5}$$

$$50\% = \frac{1}{2}$$

$$60\% = \frac{3}{5}$$

$$70\% = \frac{7}{10}$$

$$80\% = \frac{4}{5}$$

$$90\% = \frac{9}{10}$$

$$100\% = 1$$

$$110\% = \frac{11}{10}$$

$$120\% = \frac{6}{5}$$

$$130\% = \frac{13}{10}$$

$$140\% = \frac{7}{5}$$

$$150\% = \frac{3}{2}$$

$$\star xy\% \text{ of } y = y\% \text{ of } x$$

$$\frac{x}{100} \times y = \frac{y}{100} \times x$$

$$\boxed{\frac{xy}{100} = \frac{xy}{100}}$$

Suppose 50% of 400 = 400%
of 50 = 200 only.

$$100\% = 600$$

↓

$$10\% = 60$$

$$1\% = 6$$

$$0.1\% = .6$$

$$0.01\% = .06$$

If 20% of A = 50% of B

then what percent of A
is B?

$$\frac{20}{100} \times A = \frac{50}{100} \times B$$

$$2A = 5B$$

$$\frac{A}{B} = \frac{5}{2} \text{ or } 2.5$$

$$250\% \text{ of } A = B$$

$$\frac{9}{100} \times 5 = 2$$

$$\frac{?}{20} = 2$$

$$? = 40\%$$

another way

if 20% of A = 50% of B,

$$\frac{A}{B} \times 100 = \frac{2}{5} \times 100 \\ = 40\%$$

2) 860% of 50 + 50% of 860

$$\boxed{xy\% y = y\% x}$$

$$430 + 430 = 860$$

3) A Number increased by
37 1/2% gives 33. The num
is ?

$$\begin{array}{c} 37\frac{1}{2}\% \\ \downarrow \\ 25\% + 12.5\% \end{array}$$

$$\frac{2}{8} + \frac{1}{8} = \frac{3}{8}$$

Increased number so $(\frac{3}{8}) \times 100 = \frac{11}{8}$

→ Increased num.

$$\frac{11}{8} \rightarrow 33$$

Original Num

$$100\% = 33 \quad (1P = 3)$$

Then $8P = 8 \times 3$

$\boxed{24}$

another way.

$$5 \overline{)137.5\%} \quad \begin{array}{l} \text{remove decimal} \\ \text{and make} \\ 1000 \text{ place} \end{array}$$
$$5 \overline{)1375} = 33$$
$$\begin{matrix} 1 \\ 1000 \\ 40 \\ = 24 \end{matrix}$$

A number decreased by $27\frac{1}{2}\%$ gives 87. The number is?

$$\begin{array}{c} 27\% \\ \diagdown \\ 25\% + 2.5\% \end{array}$$

$$\frac{11}{40}$$

$$\frac{10}{40} + \frac{1}{40} = \frac{11}{40} \text{ decreased number}$$

So \rightarrow decreased num.

$$\frac{11}{40} = 29 \rightarrow 87$$

$$\frac{40 \times 3}{40} = 120$$

original num.

$$29 P = 87$$

$\boxed{1P = 3}$

$$40 \times 3 = \boxed{120}$$

another way

decreased by $27\frac{1}{2}\%$.

29

$$\frac{72}{40} \times 5\% = \frac{3}{87}$$

$$\begin{matrix} 1000 \\ 40 \\ = 120 \end{matrix}$$

The diff b/w a number and its two-fifth is 5%. What is 10% of that number?

diff b/w a number and its two-fifth is 5%

$$\begin{array}{l} 100\% - 100\% \times \frac{2}{5} \\ 100\% - 40\% \end{array}$$

$$60\% = 5\% \times 85$$

$$10X = 85$$

Percentage increase, %.
Decrease and % change

$$\text{Percent increase} = \frac{\text{Increase}}{\text{Initial Value (Base value)}} \times 100$$

$$\text{Percentage decrease} = \frac{\text{Decrease}}{\text{Initial Value (Base value)}} \times 100$$

$$\text{Percentage} = \frac{\text{Change}}{\text{Initial Value (i.e. Base value)}} \times 100$$

$$\text{Savings \%} = \frac{\text{Savings}}{\text{Initial Value}} \times 100$$

$$\text{Expenditure \%} = \frac{\text{Exp}}{\text{I.V.}} \times 100$$

Rent of the house is increased from ₹7000 to ₹7700. Express the increase in price as a percentage of the original rent.

(J.V)

7000

7700

$$\begin{array}{r} 700 \\ \hline 7000 \end{array} \times 100$$

10%.

The cost of the bike last year was ₹19000. Its cost this year is ₹17000. Find the percent decrease in its cost?

L.Y

19000

This year

17000

$$\begin{array}{r} 2000 \\ \hline 19000 \end{array} \times 100$$

$$2 \times \frac{100}{19}$$

$$= 10 \frac{10}{19}\%$$

If 12% of 75% is greater than 5% of a number by 75, the number is.

12% of 75%.

$$12 \times \frac{3}{4} = 5\% \text{ of } 100\%$$

$$9\% - 5\%$$

$$4\% = 75$$

$$100\% = 1875$$

$$25$$

If 30% of A is added to 40% of B, the answer is 80% of B. What percentage of A is B?

$$30\% A + 40\% B = 80\% B$$

$$30\% A = 40\% B$$

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

$$= 75\%$$

When 40 is subtracted from 40% of the same number the result is 40. The number is?

$$40\% - 40 = 40$$

$$100\% = ?$$

$$40\% = \overbrace{80}^{\times 9}$$

$$100\% = \overbrace{200}^{\times 9}$$

A person saves every year 20% of his income. If his income increases every year by 10%. Then his savings increases every year by?

$$\begin{array}{ccc}
 I & S & E \\
 100 & \xrightarrow{20\%} 20\text{rs} & 80\text{rs} \\
 \downarrow 10\% &) 21 & \\
 110\text{rs} & \xrightarrow{20\%} 22\text{rs} & 88\text{rs} \\
 \frac{2}{20} \times 100 = 10\%
 \end{array}$$

A person saves 20% of his income. His income increased by 30%. but his savings remains the same. find the hike in his expenditure?

$$\begin{array}{ccc}
 I & S & E \\
 100 & \xrightarrow{20\%} 20\text{rs} & 80 \\
 \uparrow 30\% & & \curvearrowright 30 \\
 130\text{rs} & \xrightarrow{20\%} 20\text{rs} & 110\text{rs}
 \end{array}$$

$$\text{EXP hike} = \frac{30}{80} \times 100 = 37.5\%$$

If the income of Ram is 25% more than that of Shyam, the income of Shyam is less than that of Ram by?

$$\begin{array}{ccc}
 R & & S \\
 125\text{rs} & & 100\text{rs} \\
 \frac{25}{125} \times 100 & & = 20\%
 \end{array}$$

The monthly income of a person was 13500rs and his monthly expenditure was 9000rs. next year his income increased by 20% and his expenditure increased by 15%. the percent increase in his savings was?

$$\begin{array}{ccc}
 I & E & S \\
 13500 & 9000 & 4500 \\
 \downarrow 20\% & +15\% & \uparrow 12.5\% \\
 16200 & 10350 & 5850 \\
 \frac{30}{1350} \times 100 & & = 30\%
 \end{array}$$

A woman has a certain number of mangoes of which 13% are rotten. She gives 75% of the remainder in charity and then has $\frac{1}{8}$ left, the number of mangoes were?

~~Ques 201~~

Ques 201.

$$\begin{array}{r} x \\ \downarrow \\ 100\% \end{array} \quad \begin{array}{r} x \cdot 87 \\ \hline 100 \end{array} \quad \begin{array}{r} 1 \\ \downarrow \\ 100\% \end{array} \quad \begin{array}{r} 3 \\ \downarrow \\ 100\% \end{array}$$

\rightarrow rotation

$$x = 1200$$

The women having Total 1200 mangoes.

In a school of 850 girls, 14% are muslims, 28% are hindus, 10% are sikhs, and the remaining are other communities, ~~girls~~ belonging to other communities?

$$850 = 100\% \quad \frac{17 \times 9}{153}$$

$$\begin{array}{l} 44\% \text{ (M)} \\ 28\% \text{ (H)} \\ 10\% \text{ (Sikh)} \\ 18\% \rightarrow \text{other communities} \end{array} \quad \left. \begin{array}{l} 17 \\ 82\% \end{array} \right\}$$

$$100\% \rightarrow 850$$

$$18\% \rightarrow 153$$

out of 2500 people, only 60% have the saving habit if 30% saves with bank, 32% with post office and rest with shares, the number of share holders are?

$$2500 = 100\% \quad \begin{array}{l} 60\% \text{ (B)} \\ 30\% \text{ (Pofice)} \\ 32\% \rightarrow \text{Shares} \end{array}$$

consider 100%

$$2500 \times \frac{60}{100} \times \frac{38}{100} = 570$$

15
100%
60%
60% (Saving habit) \rightarrow 38 share holders
30% (B)
32% (Pofice)

$$15 \times 38 = 570$$

The share holder count is 570
In an examination, there were 640 boys and 360 girls. 60% of boys and 80% of girls were successful. The percentage of failure was?

$$640 = 100\% \quad 360 = 100\%$$

40% \downarrow 20% \downarrow

(82.56) \downarrow (72.9) \downarrow

Failure $\frac{82.56 - 72.9}{82.56} \times 100 = 11.7\%$

$$\frac{328}{640+360} \times 100$$

$$\frac{328}{1000} \times 100$$

$$= 32.8\%$$

The percentage of a company is decreased by 20% and afterwards increased by 20%. Find the overall percentage change in?

Let assume production be

$$\frac{4 \text{ units}}{4 \text{ units}} = 100 \text{ units}$$

$$\frac{4}{100} \times 100$$

↓ initial value

A student has to secure 35% marks to pass. He got 650 marks and fails by 50 marks. The maximum marks is?

~~100% - 700~~

$$\text{Max marks} = 100\%$$

$$35\% = 700$$

$$100\% = 2000$$

A scored 30% marks and failed by 15 marks.

B scored 40% marks

and passed with 35 marks. Find the minimum percentage of marks required

max marks let assume = x

$$30\% x + 15 = 40\% x - 35$$

$$10\% x = 50$$

$$\frac{10}{100} x = 50$$

$$\frac{x}{10} = 50$$

$$x = 500 \rightarrow \text{Total marks}$$

$$x = 500$$

$$30\%$$

$$150 + 15$$

$$= 165$$

for pass

$$\frac{165}{500} \times 100$$

$$= 33\%$$

The present value of a machine is 32,400. It decreases annually at the rate of 10% p.a. What was the value of a machine 2 years ago.

$$\boxed{100 \times \frac{90}{100} \times \frac{90}{100}} = 32,400$$

$$\frac{100}{100} = \frac{100}{90}$$

$$400 \times 100 = 40,000$$

[another way]

$$100\% \xrightarrow{-10\%} 90\% \xrightarrow{-10\%} 81\%$$

$$81\% \rightarrow 32,400$$

$$100\% \rightarrow 40,000$$

The population of a town is 32000. It increases 15% annually, what will it be in 9 years?

$$\begin{array}{c}
 80 \\
 \boxed{32,000} \times \frac{23}{100} \times \frac{23}{100} \\
 \downarrow \\
 100\% \\
 + 15\% \\
 \hline
 115\%
 \end{array}$$

$$23 \times 23 \times 80$$

$$529 \times 80 = 42,320$$

In a town, 80% of the population are adults of which the men and women are in the ratio of 9:7 respectively. If the number of adult women is 4.2 lakhs, what is the total population of village?

$$\begin{array}{c}
 100\% \\
 80\% (\text{Adults}) \\
 \downarrow \\
 9 : 7 \\
 0.9M : 0.7W \\
 0.7W = 4.2 \text{ lakhs} \\
 W = 6 \text{ lakhs} \\
 0.9M + 6 = 4.2 \\
 M = 5.4 \text{ lakhs} \\
 1P = 0.6 \\
 80\% = 9.6 \text{ lakhs} \\
 100\% = 12 \text{ lakhs}
 \end{array}$$

$$80\% = 9.6 \text{ lakhs}$$

$$100\% = 12 \text{ lakhs}$$

$$2 \times 9 \times 5$$

Two candidates fought an election, one of them got 62% of the total votes and won by 432 votes. What is the total number of votes polled?

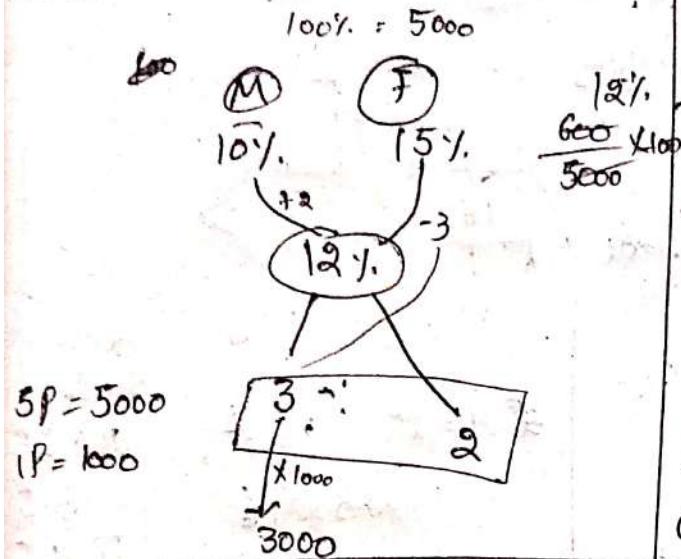
$$\begin{array}{c}
 100\% \\
 \swarrow \quad \searrow \\
 62\% \quad 38\% \\
 \downarrow \quad \downarrow \\
 \text{won by} \\
 432 \\
 38\% - 62\% = 24\% \\
 24\% = 432 \\
 100\% = 1800
 \end{array}$$

There are some coins and rings of either gold or silver in a box. 60% of the coins are gold, 40% of the rings are of gold and 30% of the coins are silver. What is the percentage of gold articles?

$$\begin{array}{c}
 100 (\text{coins & rings}) \\
 \downarrow \\
 60\% \quad 40\% \\
 \downarrow \quad \downarrow \\
 60 (\text{coins}) \quad 40 (\text{Rings}) \\
 \downarrow \quad \downarrow \\
 30\% \quad 40\% \\
 18 (\text{silver}) \quad 16 (\text{Gold}) \\
 92 (\text{gold}) \quad 24 (\text{silver})
 \end{array}$$

$$\frac{58}{100} \times 100 = 58\%$$

The total population of a village is 5000. The number of males and females increases by 10% and 15% respectively and consequently the population of the village becomes 5600. What was the number of males in village?



another way

Reverse Method

$$\text{diff} = 600$$

assume. No. ~~Males~~ are there

$$10\% - 15\% = 5\%$$

only females considering so $15\% = \frac{750}{600}$

$$\begin{array}{c} 600 \ 750 \\ \text{diff} = 150 \end{array}$$

$$5\% = 150$$

$$1\% = 30$$

$$100\% = 3000$$

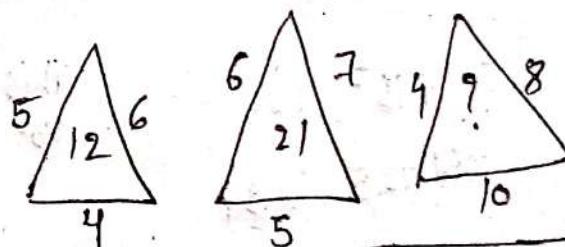
Suppose in question asked num of females

$$\begin{array}{l} \text{diff} = 600 \\ \text{No females } \times \text{ there} \\ 10\% = 500 \\ 500 \quad 600 \\ \hline 5\% = 100 \\ 1\% = 20 \\ 100\% = 2000 \end{array}$$

Number Puzzles (01)

Missing Characters

find the missing character from among the given alternatives.



$$\frac{5 \times 6 \times 4}{10} = 12$$

$$\frac{6 \times 7 \times 5}{10} = 21$$

$$\frac{4 \times 8 \times 6}{10} = 32$$

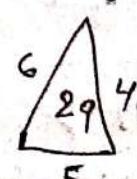
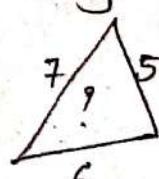
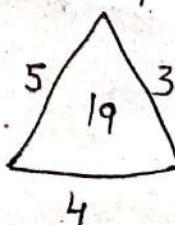
A) 22

B) 30

C) 32

D) 41

2) Find missing characters



$$5 \times 3 + 4 = 19$$

~~$$7 \times 4 + 5 = 29$$~~

$$6 \times 7 + 5 = 47$$

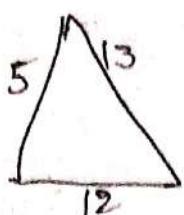
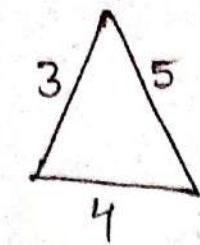
A) 25

B) 37

C) 41

D) 47

3) Find the missing character



- A) 2
- B) 6
- C) 8 ✓
- D) 64

There is a triple X method from Pythagoras Theorem.

$$\text{So, } 3^2 + 4^2 = 9 + 16 = 25$$

$$4^2 = 16$$

$$16 + 9 = 25$$

$$5^2 + 12^2 = 25 + 144 = 169$$

$$x^2 + 15^2 = 17^2$$

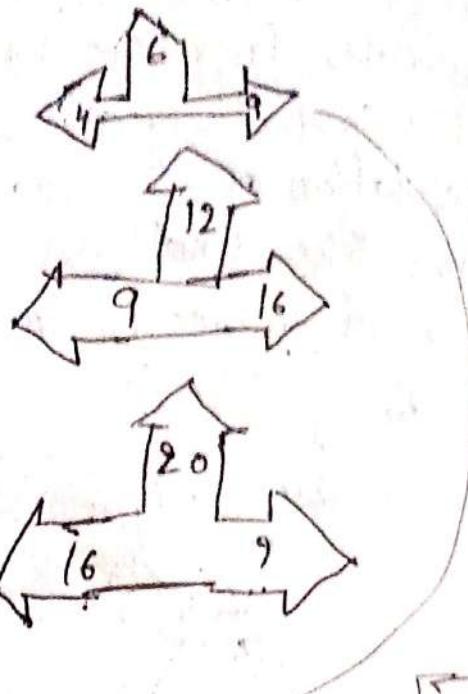
$$x^2 + 225 = 289$$

$$x^2 = 64$$

$$\Rightarrow x = 8$$

This is an 13^2 value

Missing character



$$4 = 2^2 \quad 9 = 3^2$$

$$2 \times 3 = 16$$

$$9 = 3^2 \quad 16 = 4^2$$

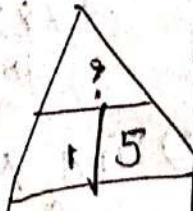
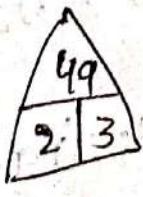
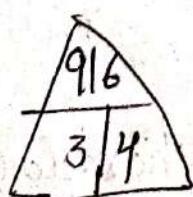
$$3 \times 4 = 12$$

$$16 = 4^2 \times \sqrt{2}$$

~~$$4 \times 5 = 20$$~~

$$4 \times 5 = 20 = 5^2 = 25$$

4) Find missing character



- A) 1251
- B) 215
- C) 251
- D) 512