



Mission ISRO 2023
(CS/EC/ME)

GENERAL APTITUDE

Numerical Reasoning

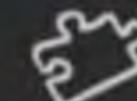
Lecture No. 01



Amulya Ratan Sir



Today's Targets



- 1 Concept of Percentages
- 2 Consecutive Increase and Decrease
- 3 Questions on the Topic

Per | Cent

$$\frac{793}{680}$$



Fraction & Decimal Form



$$\frac{1}{100}$$

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

$$\underline{\underline{130\%}} = 1.3 = \frac{13}{10}$$

$$= \frac{1}{20} = 0.05$$

$$25\% = \frac{1}{4} = 0.25$$

$$5\% = \frac{5}{100} = 0.05$$

$$30\% = \frac{3}{10} = 0.3$$

$$= \frac{1}{10} = 0.1$$

30%

$$= \frac{3}{20} = 0.15$$

$$\underline{\underline{33\frac{1}{3}\%}} = \frac{1}{3} = 0.\bar{3}$$

33⅓%

$$= \frac{1}{5} = 0.2$$

65%

$$66\frac{2}{3}\% = \frac{2}{3} = 0.\bar{6}$$

70%



Consecutive

P
W

$$x + y + z = 100$$

x

50% ↓

$$y$$

$$20\% \downarrow$$

$$z$$

$$60\% \downarrow$$

$$-50 - 20 + \frac{50 \times 20}{100}$$

$$-70 + 10$$

$$-60$$

$$0.5 \times 0.8 = 0.4$$

$$60\% \downarrow$$

$$0.6 \rightarrow$$



Examples:

$$x+y+\frac{xy}{100}$$

X

$$0.03^2$$

$$3.2 \downarrow$$

$$\begin{array}{r} 10 \uparrow \\ 10 \uparrow \\ \hline 20 \uparrow \end{array}$$

$$\underline{1.1 \times 1.1 \times 0.8}$$

$$= 1.21 \times 0.8$$

$$= 0.968$$

Q.

If the side of a square is increased by 20%, then find the percentage change in its area.

P
W

$$A = \underline{s \times s}$$

44
44/4

$$1.2 \times 1.2$$

$$= 1.44$$

Q. In a renovation of a theatre, the ticket rate was increased by 20% and thus the customer decreased by 10%. What would be the percentage effect on revenue?

$$1.2 \times 0.9$$

$$\equiv \underline{\underline{1.08}}$$

8.1

08↓

Q.

A shopkeeper offers three successive discounts of 20%, 10% and 5% to a customer. How much is overall single discount?

~~$$31.6\% \quad 0.8 \times 0.9 \times 0.95$$~~

$$\begin{array}{r} 95 \\ \times 72 \\ \hline 665 \\ + 665 \\ \hline 6840 \end{array}$$

A 30%

B 31.6% ✓

C 68.4%

D 35%

$$= 0.72 \times 0.95$$

$$= 0.684$$

~~$$0.316$$~~

$$1 - 0.684 = 31.6$$

Q.

When the price of mobile reduced by 20%, the number of mobile sold increased by 40%. The effect on the sale was

$$0.8 \times 1.4$$

$$= 1.12$$

$$12\%$$

$$12/14$$

- A 12% increase
- B 12% decrease
- C 32% increase
- D 40% decrease

Q.

8% of the people eligible to vote are between 20 and 25 years of age. In an election 85% of those eligible to vote, who were between 20 and 25 actually voted. In that election number of person between 20 and 25, who actually voted, was what percentage of those eligible to vote?

A 4.2

B 6.4

C 6.8

D 8

100%

$$\begin{aligned} & 0.08 \times 0.85 \\ & = 0.068 \end{aligned}$$

6.8%



Comparision



Slayer \Rightarrow A

Father \Rightarrow B

Q.

If A is 25% more than B, then B is how much percentage less than A?

P
W

$$A = 125\% B$$

4
 $\frac{100}{125} A = B$

0.2
↓
20% ↓

$0.8 A = B$

Q. If the diesel rate is increased by 60%, then by how much percentage we should decrease our consumption, in order to maintain same budget?

$$37.5\% \Rightarrow 38\%$$

$$\frac{160}{100}$$

$$\frac{160}{100} = \frac{5}{8}$$

$$0.375 = 0.625$$

Q.

If the length of a rectangle increase by 20%, then by how much percent we should decrease the breadth in order to maintain same area?

- A 83.33%
- B 16.66%
- C 42.8%
- D 20%

$$\begin{aligned}
 A &= l \times b \\
 &= \frac{l}{\frac{100}{120}} \times b \\
 &= \frac{120}{100} l \times b \\
 &= 1.2 l \times b \\
 &\text{Let } l \downarrow \frac{x}{y} \quad b \downarrow \frac{y}{z} \\
 &1.2 l \times b = 1.2 \times \frac{x}{y} l \times \frac{y}{z} b \\
 &1.2 \times \frac{x}{y} \times \frac{y}{z} = 1.2 \times \frac{1}{z} = 1.2 \times 0.8333 \dots = 1 \\
 &\frac{1}{z} = 0.8333 \dots \\
 &z = 0.8333 \dots \\
 &\frac{y}{z} = \frac{y}{0.8333 \dots} = 1.2 \\
 &y = 1.2 y \\
 &\frac{y}{y} = 1.2 \\
 &\text{So, } b \downarrow 1.2 \text{ times} \\
 &\text{So, } b \downarrow 16.66\%
 \end{aligned}$$



Direct Change

$$\frac{4}{20} \times 100$$

Error /

20°C 18°C

~~20°C~~

/ increase

/ decrease

$$\frac{\text{diff}}{A.V} \times 100$$

$$= \frac{9}{95} \times 100$$

Q.

Sunil saves 20% of his income. If his income is increased by 20% and expenditure decreased by 10%, then find the percentage change in his savings.

$$\frac{20}{25} \times 100 \stackrel{S}{\overbrace{100}} \quad \text{Income}$$

$$\frac{20}{20} \times 100 \stackrel{E}{\overbrace{80}} \quad \text{Expenditure}$$

$$140\% = \underline{\underline{120}}$$

$$\underline{\underline{480}} \quad \underline{\underline{72}} =$$

Q.

In a test of 80 questions, Shalini answered 75% of first 60 questions correctly. What % of remaining questions she has to answer correctly so that she can secure an overall percentage of 80 in the test?

$$\text{No. of Q} = 80$$

$$\text{Secure} = 80\% \text{ of } 80$$

$$\text{Correct} = 64$$

$$\frac{15}{28} \times 60 = 45$$

$$\begin{array}{r} 60 \\ \hline 45 \\ 15 \\ \hline 15 \\ \hline 0 \end{array}$$

$$\frac{19}{25} \times 100 = 76$$

Q.

The population of a town doubled every 5 years from 1990 to 2005. What is the percentage increase in population in this period?

P
W

700

$$\begin{array}{l} 1990 - 1995 \rightarrow ① \\ 1995 \rightarrow 2000 \rightarrow ② \\ 2000 \rightarrow 2005 \rightarrow ③ \end{array}$$

700 ↑

$$2 \times 2 \times 2$$

= 8

$$\begin{aligned} & | \rightarrow 8 \\ & \overbrace{7}^1 \times 100 \\ & = 700\% \end{aligned}$$

- A 800
- B 400
- C 700
- D 600

Q.

If A is 40% taller than B, by what percent is B shorter than A?

28.57%

$$\frac{140}{100}$$

$$\begin{array}{r} 5 \sqrt{100} \\ + 140 \\ \hline 140 \end{array}$$

$$= 0.7143$$

$$0.2857$$

A 20%

B 25%

C 28.6%

D 71.4%

Q.

A is twice B and B is 200% more than C. By what percent
is A more than C?

P
W

300%.

$$\Rightarrow A = 2B$$
$$B = 3C$$

A 400

B 600

C 500

D 200

$$A = 2 \times 3C$$

$$A = 6C$$



THANK
YOU!

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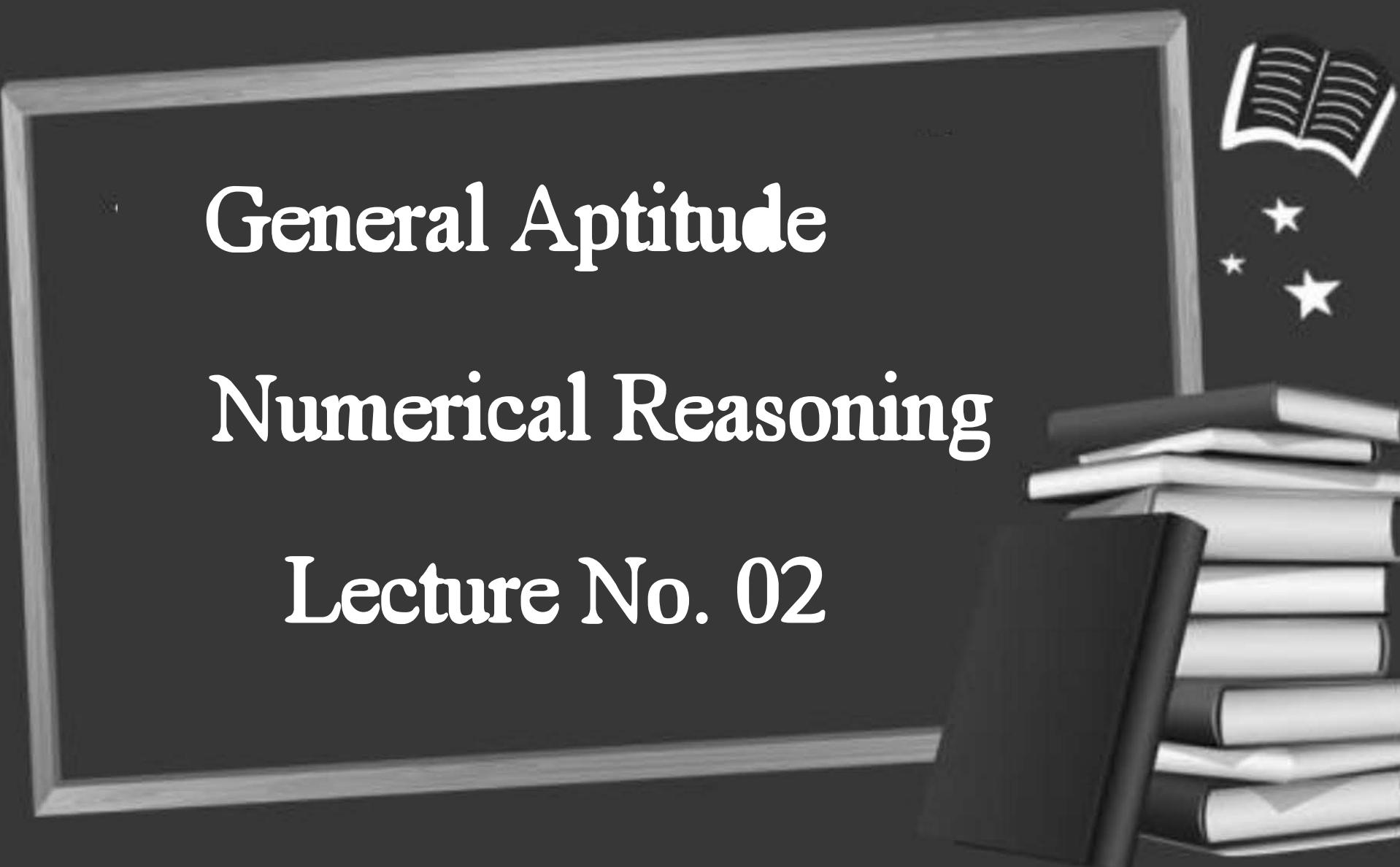


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General Aptitude

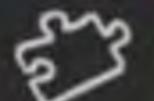
Numerical Reasoning

Lecture No. 02



Amulya Ratan Sir

Today's Targets



- 1 Understanding terms in Profit & Loss
- 2 Percentage concept in Profit & Loss
- 3 Questionnaire on the Topic

Profit & Loss

Investment
C.P.

Gain / Profit

g/ / p/

Return
S.P. \Leftrightarrow M.P.

loss

L/

discount

d/

Marked

Labelled

List

Togged



Note:

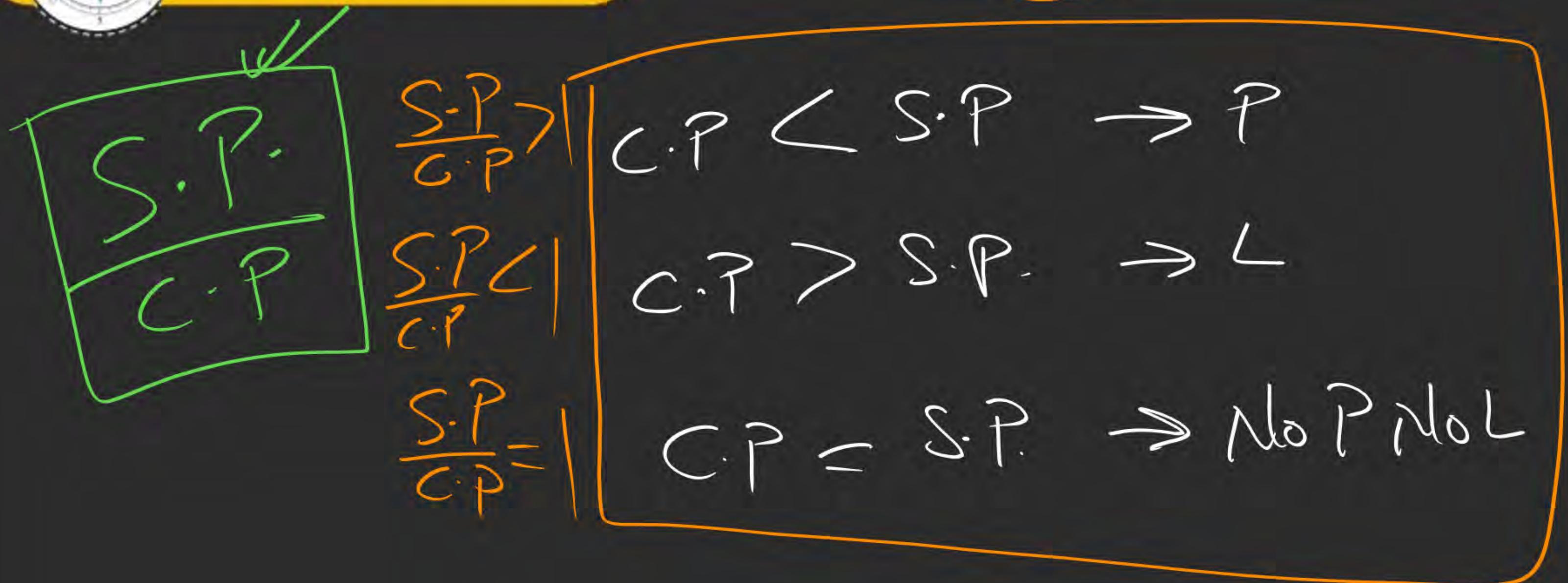
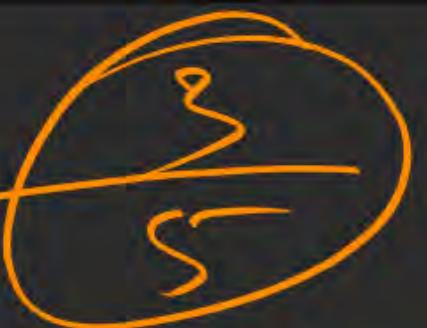
Profit or loss percentage is to be applied always to the Cost Price only.

Discount percentage is to be applied always to the Marked Price only.





Let's Understand



Q.

If selling price and cost price are in the ratio 8:5, then find the profit% or loss%.

P
W

$$\frac{S.P}{C.P} = \frac{8}{5} = 1\frac{3}{5}$$

60%P

Q.

A Fruit seller purchases 11 orange for Rs. 10 and sells 10 orange for Rs. 11. If he follows the same process, then find his profit or loss%?

P
W

$$C.P = \frac{10}{11}$$

$$S.P = \frac{11}{10}$$

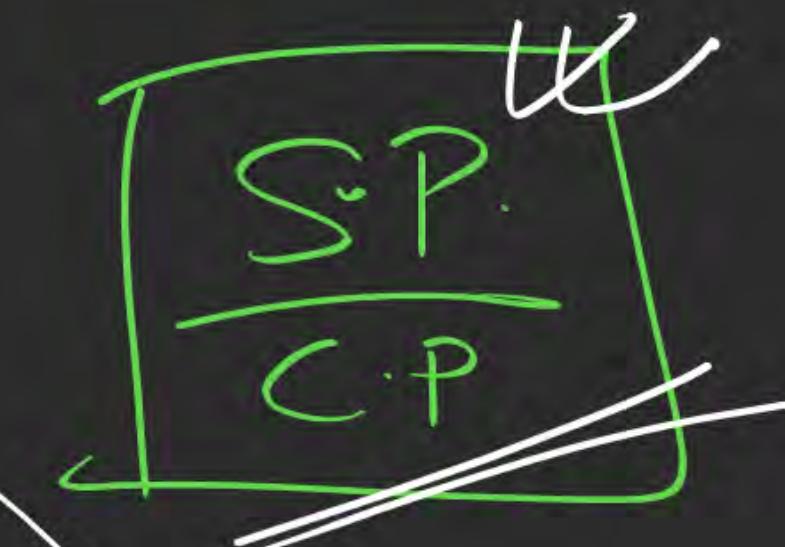
$$\frac{S.P}{C.P} = \frac{11}{10} \times \frac{10}{11}$$

$$= \frac{11}{10} \times \frac{11}{10} = \frac{121}{100} = 1(2)$$

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

$$1 - | \times 1 - |$$

$$= 1(2)$$



$$21\% P$$

? N

Q.

A milk vendor purchases milk at Rs. 72/litre, and sells at Rs. 60/litre. For every 1 litre milk he adds 200ml. of water.

While selling milk he cheats 200ml. in 1 liter measurement.

Find his Profit or Loss percentage.

- A 40% Profit
- B 16.66% Loss
- C 38% Profit
- D 25% Profit

$$\frac{S.P}{C.P} = \frac{60}{72} \times \frac{\frac{5}{8}}{\frac{1200}{1000}} \times \frac{1000}{800}$$

$$= \frac{5}{4} = 1.25$$

25% Profit

Q.

A milk vendor purchases milk at RS. 72/litre, and sells at RS. 60/litre. For every 1 litre milk he adds 200ml. of water. While selling milk he cheats 200ml. in 1 liter measurement.

P
W

S.I.
C.I.

Find his Profit or Loss percentage.

1.S

₹ 90

Demand

1000 ml

1500 ml

Delivery

800 ml

1200 ml

1000 ml \rightarrow ₹ 72

1200 ml

$$\frac{18}{72} \times \frac{1}{4} = 25\% P$$

Q.

A cloth merchant purchases cloth at ₹80/meter and sells at ₹100/meter. As a festive offer, he gives 50% extra free on every demand. Find his profit% or loss%.

A 16.66% loss

B 12% profit

C 32% loss

D No Profit No Loss

$$\frac{S.P}{C.P} = \frac{\cancel{100}}{\cancel{80}} \times \frac{\cancel{60}}{\cancel{90}} = \frac{5}{6}$$

$$= 0.\overline{83}$$

$$\frac{1}{1.5} = \frac{2}{3}$$

$$\frac{6}{9} = \frac{100}{150} = 0.\overline{16}$$

Q.

Due to downfall in the market, 'A' sells mangoes to 'B' saying "FOR EVERY 12 MANGOES, COUNT AS 8". Due to overnight demand, 'A' took his mangoes back from 'B' saying " FOR EVERY 8 MANGOES, COUNT AS 12". Find the profit or loss percent of 'A'.

$$\frac{2}{\cancel{8}} \times \frac{\cancel{8}^2}{\cancel{12}^3} = \frac{4}{9} = 0.\overline{4}$$
$$= 0.\overline{5}$$

55.55% loss



Note:

A trader may sometimes have multiple profits or losses simultaneously. This is equivalent to having multiple changes and so all individual changes are to be multiplied to get the overall effect.

Q.

A man sells an article at a profit of 20%. If he had bought it at 10% less and sold it for Rs. 18 more, he would have gained 40%. Find the cost price of the article.

P
W

$$C.P. = 300$$

$$\frac{S.P}{C.P} = 1.2 \Rightarrow S.P = 1.2 C.P$$

A 450

B 300

C 250

D 900

$$\frac{S.P + 18}{0.9 C.P} = 1.4$$

$$1.2 C.P + 18 = 1.26 C.P$$

$$0.06 C.P = 18$$

$$C.P = \frac{18}{0.06}$$

Q.

5kg of ghee was bought by Venu for Rs.300. One kg from spoilt. He sells the remaining in such a way that on the whole he incurs a loss of 10%. At what price per kg does he sell the ghee?

P
W

$$\frac{300}{5} = 60$$

A 46.25

B 45.70

C 67.50

D 69.50

$$\frac{S.P}{C.P} = \frac{x}{60} \times \frac{4}{5} = 0.9$$

$$\Rightarrow 4x = 270$$

$$x = \frac{270}{4} = 67.5$$

Q.

A sells an article to B at a gain of 20%. B sells it to C at a gain of 25% and C in turn sells it to D at a loss of $33 \frac{1}{3}\%$. If D paid Rs.1,000 for it, then what is the cost price of A.

P
W

$$\frac{2}{3} \times \frac{125}{100} \times \frac{120}{100} x = 1000$$

- A ₹1000
- B ₹3000
- C ₹4000
- D ₹2500

$$x = 6000$$

Q.

Sunil bought 15 apples for Rs.10 and sold them at the rate of 12 apples for Rs.12. What is the percentage of profit made by him?

P
W

$$\frac{S.P}{C.P} = \frac{12}{10} = \frac{10}{15}$$

$$= 1 \times \frac{15}{10} = 1.5$$

A 100%

$$C.P = \frac{10}{15}$$

B 150%

$$S.P = \frac{12}{10}$$

C 125% ~~✓~~

D None of these

$$\underline{\underline{SOL.P}}$$

Q.

A shopkeeper advertises for selling cloth at 4% loss. However by using a false meter scale he actually gains 25%. What is actual length of scale?

P
W

A 76.8 cm

B 77.8 cm

C 74.8 cm

D 75.8 cm

$$0.96 \times \frac{100}{x} = 1.25$$

$$\frac{384}{96} = x$$

$$\frac{1.25}{5} = x$$

$$x = 76.8 \text{ cm}$$

$$\frac{SP}{CP} = 0.96$$



DISCOUNT



$$\text{Discount} = \frac{S.P - C.P}{C.P} \times 100\%$$

**THANK
YOU!**

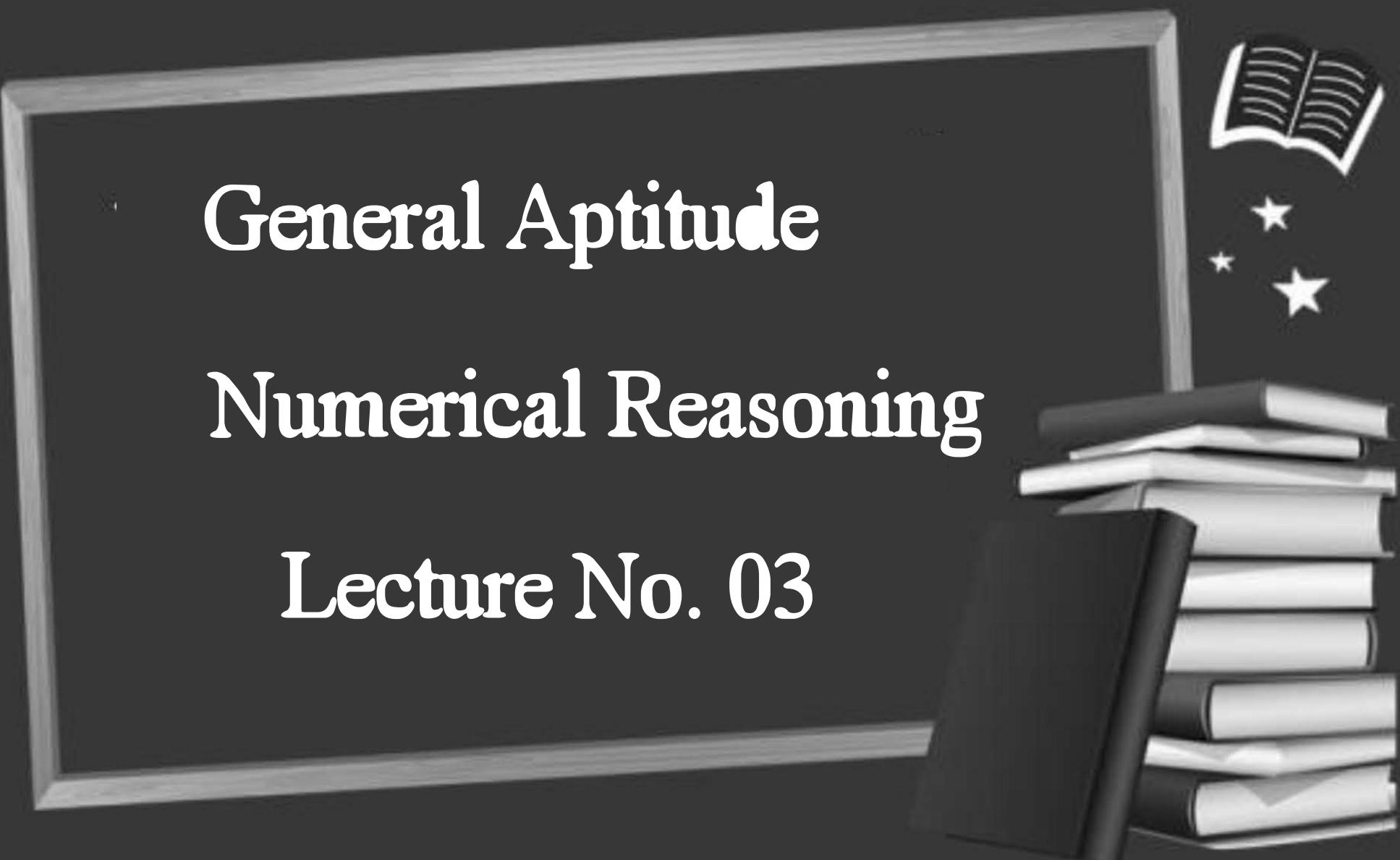


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General Aptitude

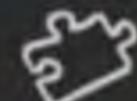
Numerical Reasoning

Lecture No. 03



Amulya Ratan Sir

Today's Targets



1 Understanding Ratio

2 Concept of Mixtures Alligations

3 Questions on the Topic



DISCOUNT



↓ percentage Concept



Q. By giving a discount of 25%, a shopkeeper gains 25%. If he gives a discount of 40%, find his gain or loss%.

P
W

$$\frac{S.P}{C.P} = 1.25$$

$$\cancel{\frac{S.P}{C.P} = 1.25 C.P}$$

$$S.P = 125\% C.P$$

$$\boxed{\frac{S.P_N}{C.P} = 1.25 \quad | \quad \cancel{S.P = 125\% C.P}}$$

No Profit

$$\frac{M.P}{Discount} = 25\%$$

$$\frac{C.P}{Profit} = 25\%$$

$$\cancel{75\% M.P. = 125\% C.P.}$$

$$M.P. = \frac{5}{4} C.P$$

$$60\% P = \frac{60}{100} \times \frac{5}{4} C.P$$

$$S.P_N = C.P$$

Q.

By giving a discount of 25%, a shopkeeper gains 25%. If he gives a discount of 40%, find his gain or loss%.

P
W

$$\frac{75}{C.P} = 1.25$$

$$\frac{\cancel{75}}{\cancel{100}} \frac{60}{\cancel{25}} = C.P.$$

|

$$M.P. = 100$$
$$S.P. = 75$$
$$C.P = 60$$
$$S.P_N = 60$$

No P No L

Q.

A trader gains 20% by giving a discount of 20%, if he gives a discount of 25% then find his P% or L%.

$$\cancel{80\% \text{ M.R.} = 120\% \text{ C.P.}}$$

$$\text{M.P.} = \frac{3}{2} \text{ C.P.}$$

$$\frac{\text{S.P.N}}{\text{C.P.}} = \frac{9}{8} = 1.125$$

A 12.51% profit

B 8.33% profit

C 12.49% profit

D 12.5% profit

$$\text{M.P.} = 100$$

$$\text{S.P.} = 80$$

$$\frac{80}{\text{C.P.}} = 1.2$$

$$\frac{200}{3} \frac{80}{1.2} = \text{C.P.}$$

$$\text{Disc} = 20\%$$

$$25\%$$

$$\text{S.P.N} = 75$$

$$\frac{\text{S.P.N}}{\text{C.P.}} = \frac{3}{2} = \frac{75}{50} \times \frac{3}{2} = \frac{9}{8} = 1.125$$

Q.

A milk vendor mixes water to milk such that he gains 25%.

Find the percentage of water in the mixture.

$$\frac{100+x}{100} = 1.25$$

A 25%

B 20%

C 32%

D 28.3%

$$100+x = 125$$

$$x = 25$$

$$\frac{25}{100} \times 100$$

25%

Q.

A person, by selling an article at three-fourths of the list price incurs a loss of 20%. Find the profit percentage if he sells at the list price?

(06)

$$S.P = \frac{3}{4} M.P$$

- A 25%
- B 6.66%**
- C $11\frac{1}{9}\%$
- D None of these

$$\begin{aligned} \frac{S.P}{C.P} &= 0.8 \\ S.P &= 0.8 C.P \end{aligned}$$

$$0.8 C.P = 0.75 M.P$$

$$\frac{0.8}{0.75} C.P = M.P$$

$$1.06 C.P = S.P$$

Q.

One-fifth of the cost price, one-seventh of the marked price
and one-sixth of the selling price are all equal. What is the
gain or loss to the trader?

A 20% gain

B $16\frac{2}{3}\%$ loss

C $14\frac{2}{7}\%$ gain

D 10% loss

$$\frac{1}{5} CP = \frac{1}{6} SP$$

$$\frac{6}{5} = \frac{SP}{CP}$$

$$\frac{SP}{CP} = 1.2$$



RATIO



Significance

Fraction

600

2:1

$\frac{2}{3} \times 600$

400

$\frac{1}{3} \times 600$

200

Q. The sum of three numbers is 98. If the ratio between the first and second is 2 : 3 and that between the second and the third is 5 : 8, then the second number is

$$\frac{15}{49} \times 98$$

$$\boxed{A + B + C = 98}$$

$$(A : B = 2 : 3) \times 5 \quad A : B = 10 : 15$$

$$(B : C = 5 : 8) \times 3 \quad B : C = 15 : 24$$

$$A : B : C = 10 : 15 : 24$$

Q.

Two numbers are respectively 20% and 50% more than a third number. The ratio of the two numbers is:

$$A = 1.2$$

$$B = 1.5$$

$$A:B = \frac{4}{12} : \frac{5}{15}$$

$$= 4:5$$

A 3:5

B 2:5

C 7:6

D 4:5

Q.

Seats for Mechanical, Civil and Electronics in a college are in the ratio 5 : 7 : 8. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of increased seats?

$$\begin{array}{c} 1.4 \times 5 \\ 1.5 \times 7 \\ 1.75 \times 8 \end{array}$$

A 6 : 7 : 8

B 2 : 3 : 4

C 5 : 7 : 6

D 4 : 5 : 6

$$7 \quad : \quad 10.5 \quad : \quad 14$$

$$\begin{array}{c} 70 : 105 : 140 \\ 2 : 3 : 4 \end{array}$$



PUZZLE

$$M + W + K = 100$$

$$4M + 3W + \frac{1}{2}K = 100$$

A function hall was filled with 100 guests including men, women and kids. 100 biscuits has to be distributed among these guests, such that each man gets 4 biscuits, each woman as 3 and each kid gets 1/2 biscuits. How many men, women and kids are there in function hall?





Solution:

2280

280

A
 40

B
 1

C
 0.2

P
W

$$M + \omega + K = 100$$

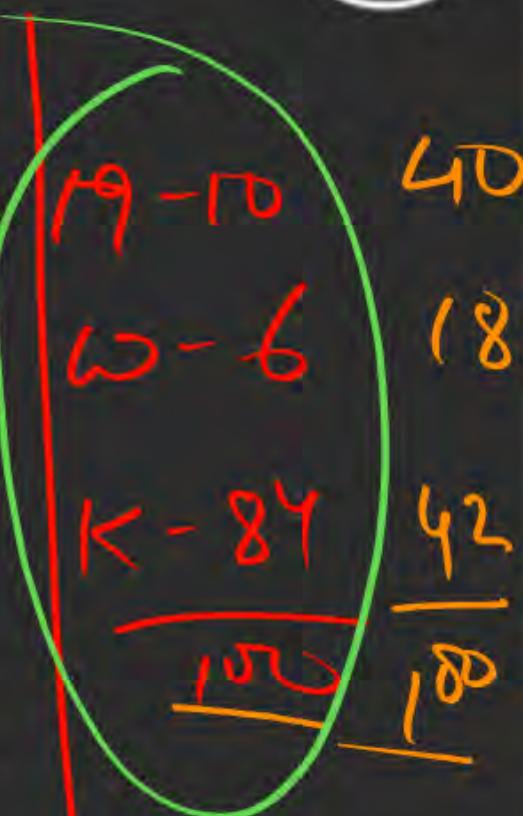
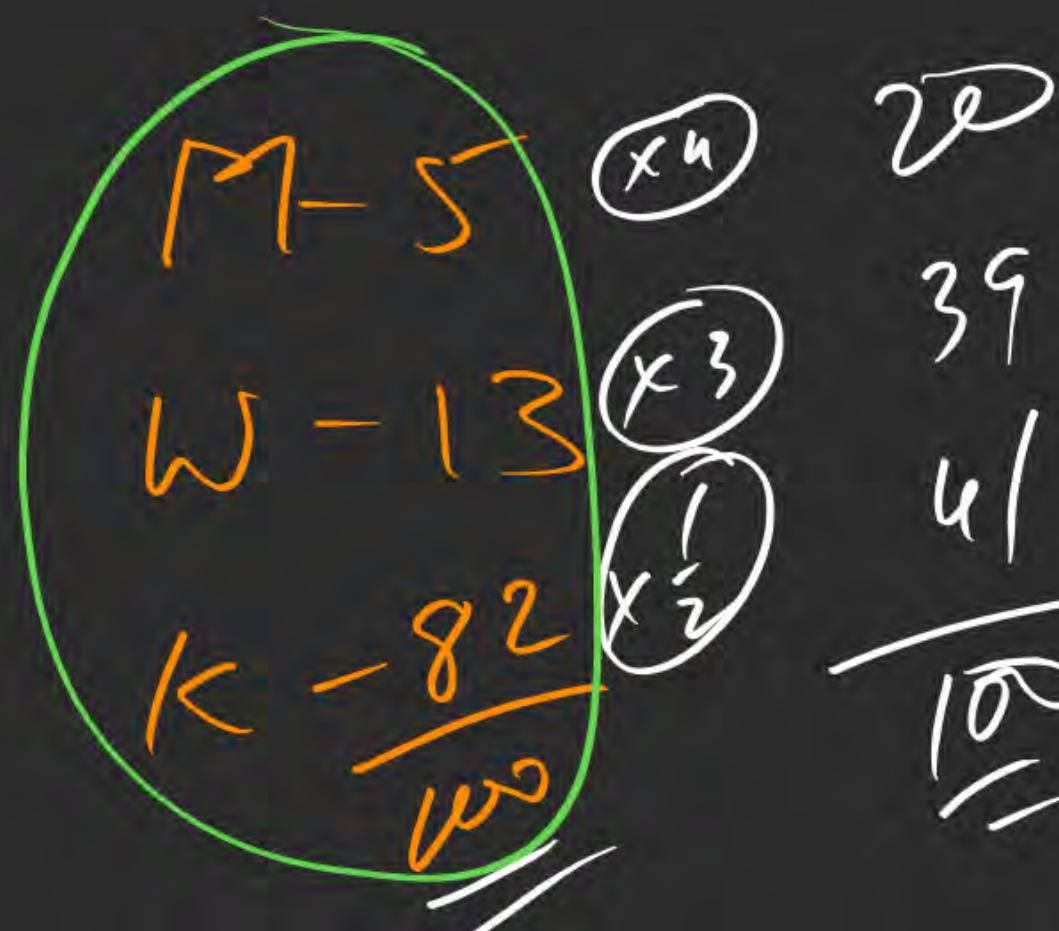
$$7M + 5\omega = 100$$

$$(4M + 3\omega + \frac{1}{2}K = 100) \times 2$$

$$8M + 6\omega + K = 200$$

$$M + \omega + K = 100$$

$$7M + 5\omega = 100$$





PUZZLE



TOTAL Money : 280/-

TOTAL Number of Product : 280



Solution:

No.

Cost

$$A + B + C = 280$$

$$A - 4 \times 40 = 16^{\circ}$$

$$40A + B + 0.2C = 280$$

$$B - 81$$

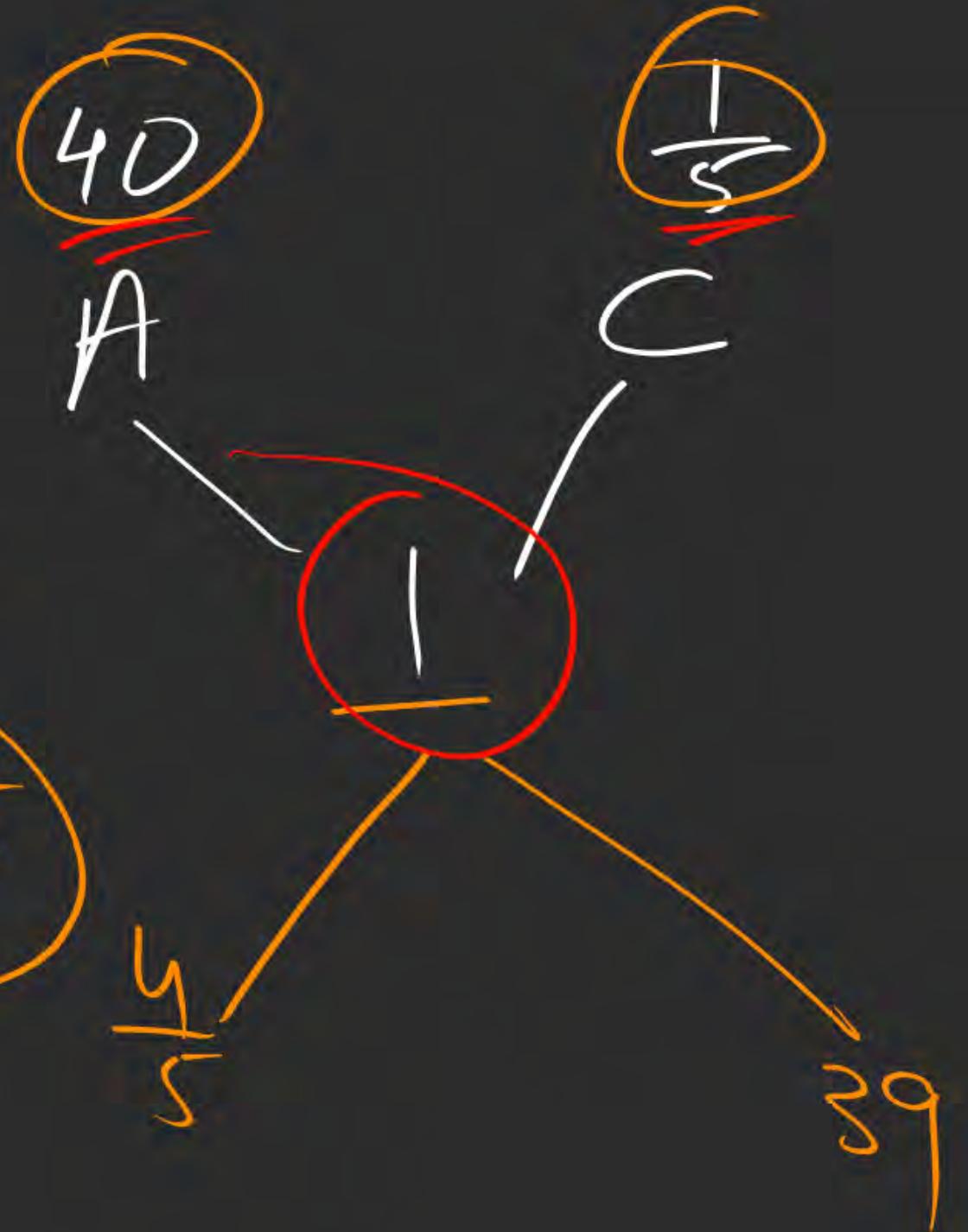
$$81 \quad A + B + C = 40A + B + 0.2C$$

$$\frac{C - 195 \times 0.2}{280} = \frac{39}{280} \quad 39A = 0.8C$$

$$\frac{A}{C} = \frac{0.8}{39} = \frac{8}{390} = \frac{4}{195}$$



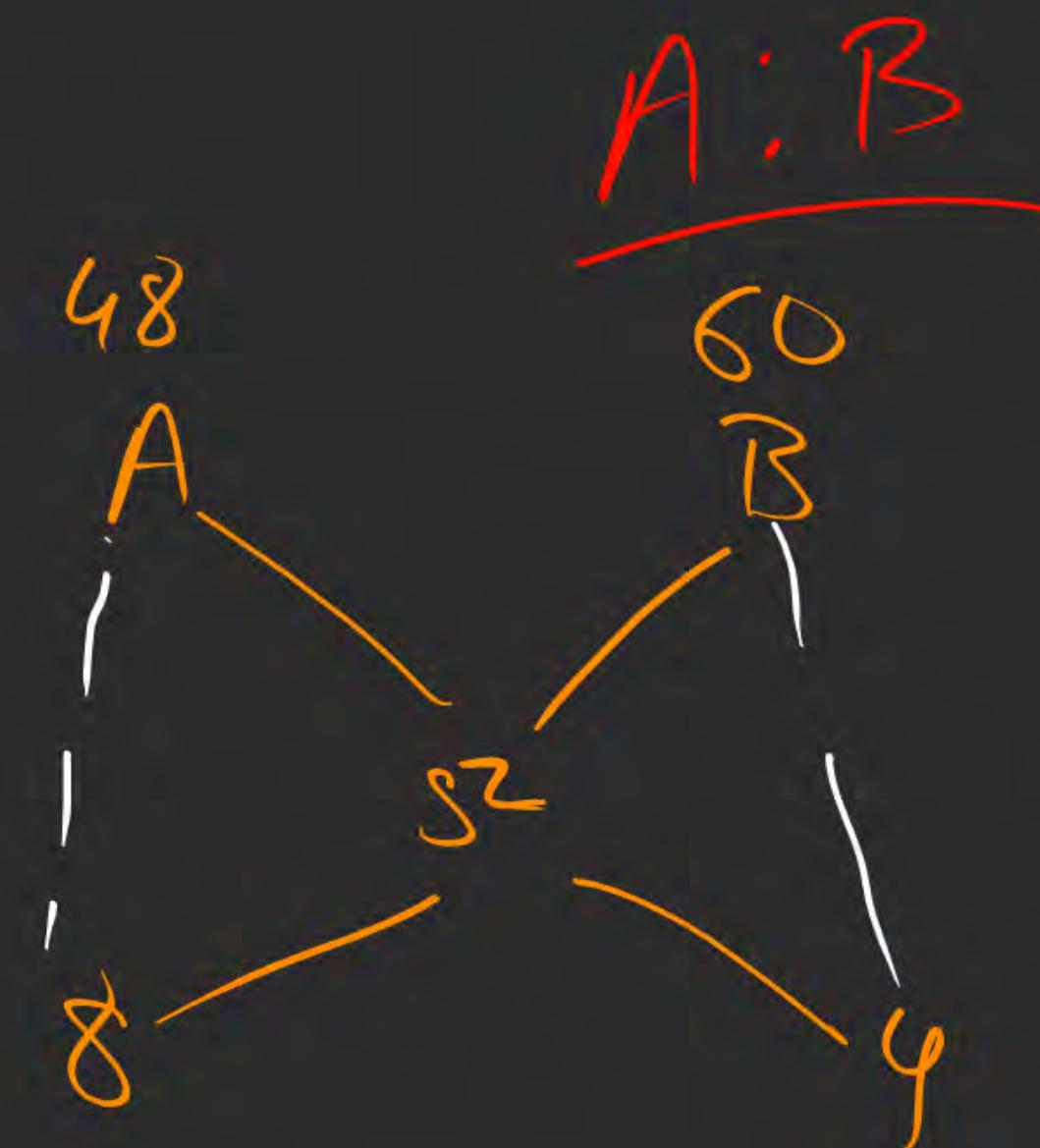
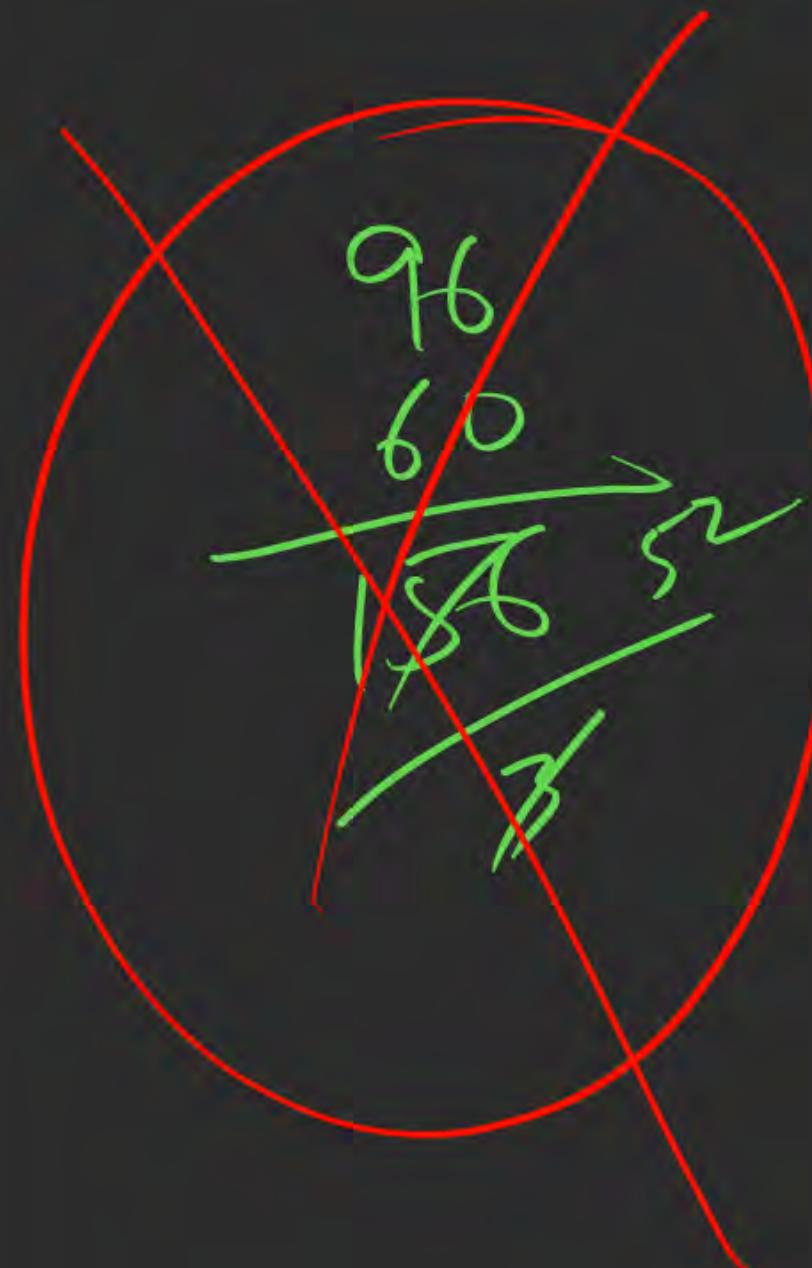
Mixtures Alligations



$$A : C = \frac{4}{5} : 39$$

$$= 4 : (95)$$

Q. A trader purchases two varieties of rice 'A' & 'B' at the rate of ₹48/kg and ₹60/kg respectively. In what ratio he should mix the two varieties, so that the mixture cost becomes ₹52/kg?



$$\text{A:B} = 8 : 4$$

2:1

THANK
YOU!



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General Aptitude
Numerical Reasoning
Lecture No. 04



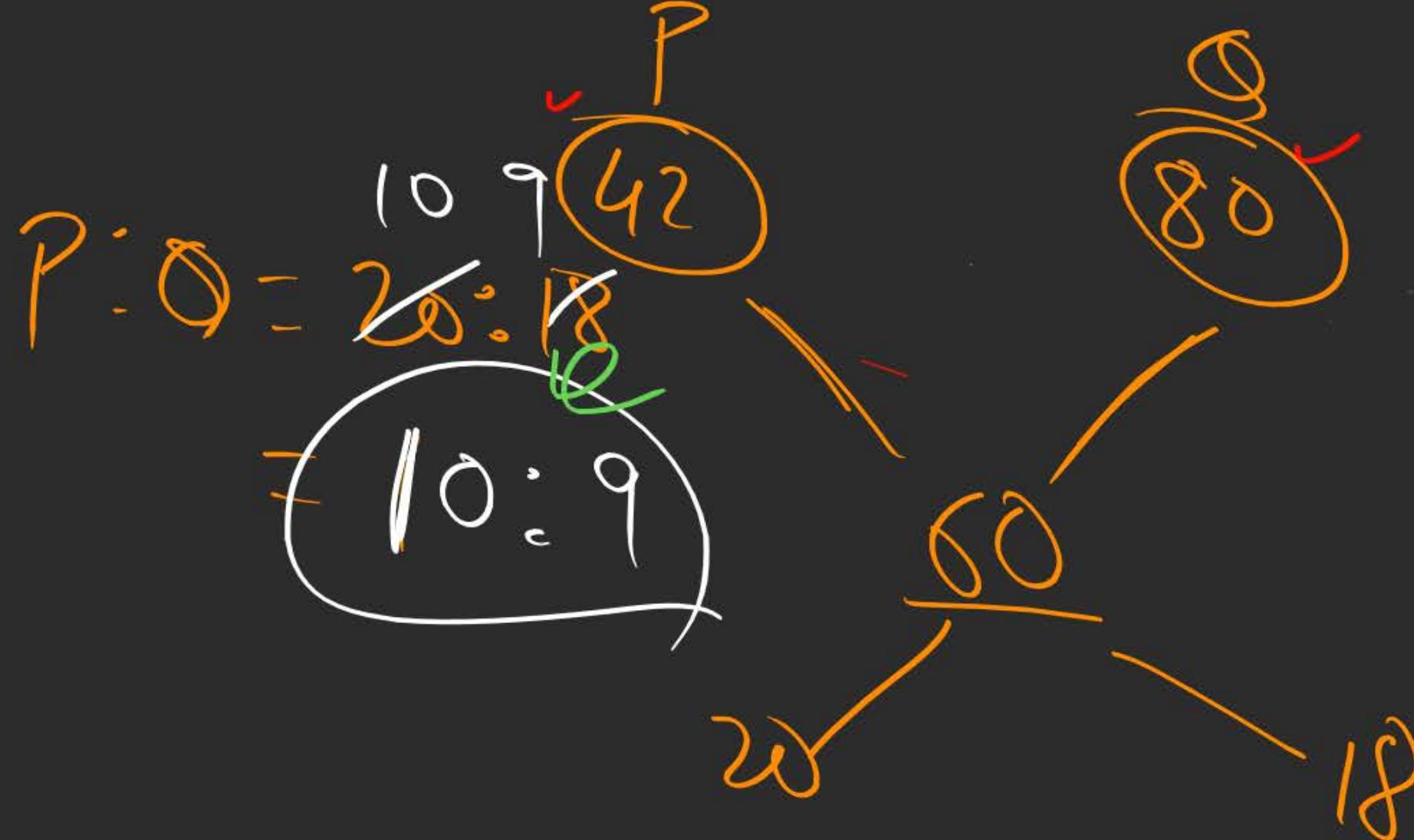
Amulya Ratan Sir

Today's Targets



- 1 Concept of Time & Work
- 2 Understanding Proportions in Time & Work
- 3 Questionnaire on the Topic

Q. A trader purchases two varieties of Sugar 'P' & 'Q' at the rate of ₹42/kg and ₹80/kg respectively. In what ratio he should mix the two varieties, so that he can sell the mixture at ₹78/kg by getting 30% profit?



$$S.P = 78$$

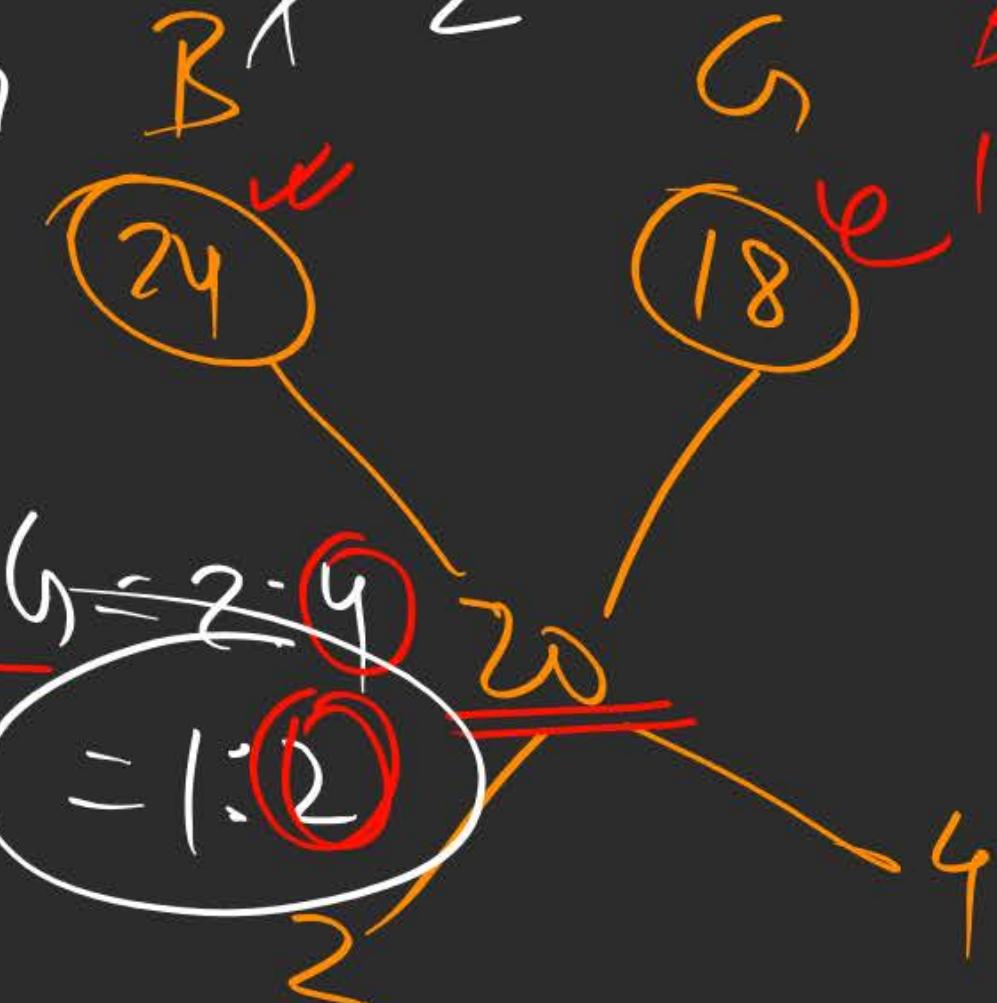
$$P.I. = 30\%$$

$$\frac{78}{C.P.} = 1.3$$

$$\frac{78}{1.3} = C.P.$$

Q. In a class with 360 students, the average age of all the boys is 24 years whereas average age of all the girls is 18 years. If average age of whole class is 20 years, then find the number of girls in that class.

$$\frac{B}{G} = \frac{24}{18} = \frac{4}{3}$$



$$\frac{2}{3} \times 360 = 240$$

$$\frac{4}{6} \times 360 = 240$$

$$24B + 18G = 20(B+G)$$

$$24B + 18G = 20B + 20G$$

$$4B = 2G$$

- A 40
- B 300
- C 120
- D 240

Q.

A merchant sells 1600 sheeps at an overall profit of 25%.
 Some of them he sold at 20% profit whereas remaining at 40% profit. Find the number of sheeps he sold at 40% profit.

P
W

A 400

B 300

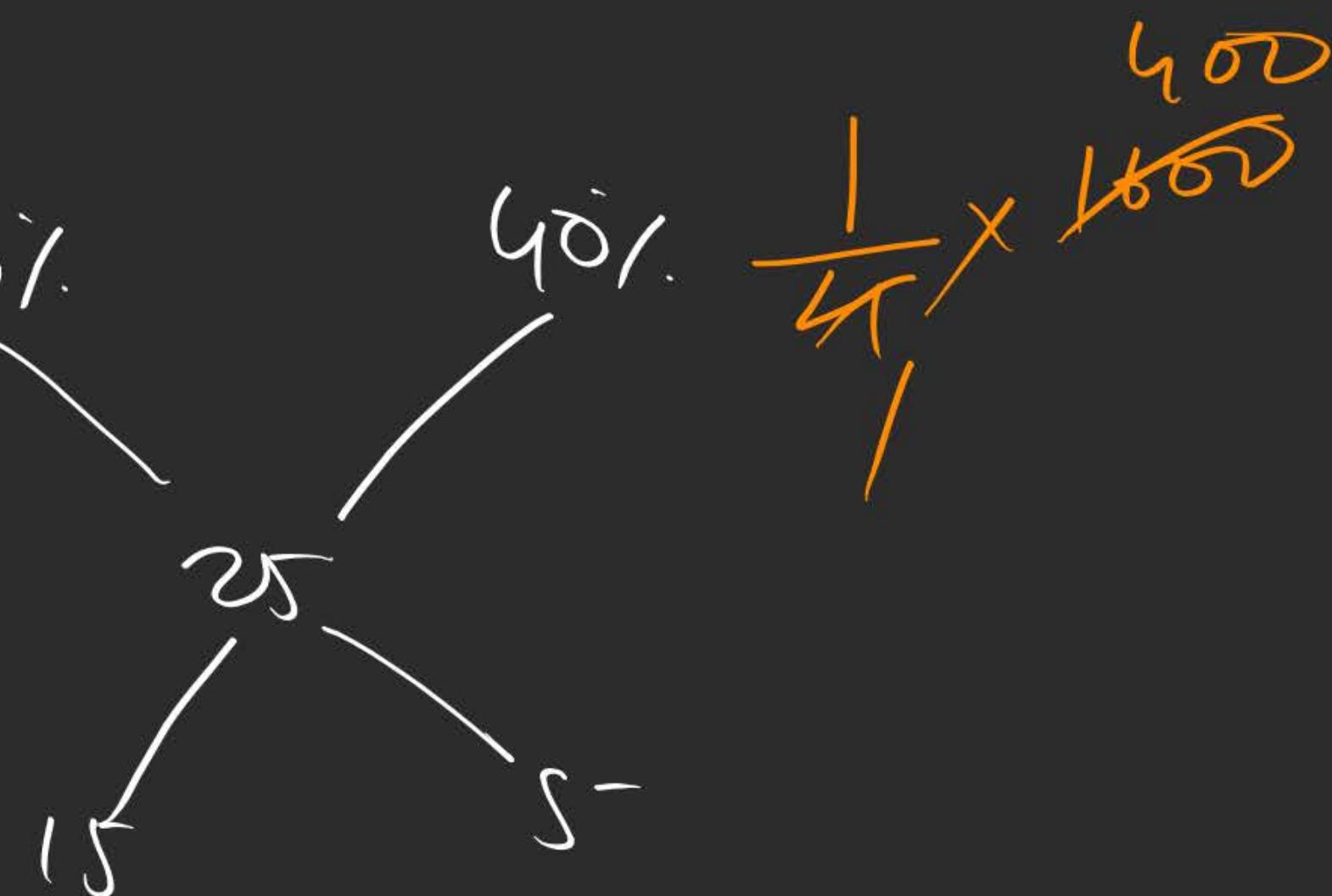
C 1200

D 1240

20% P : 40% P 20%

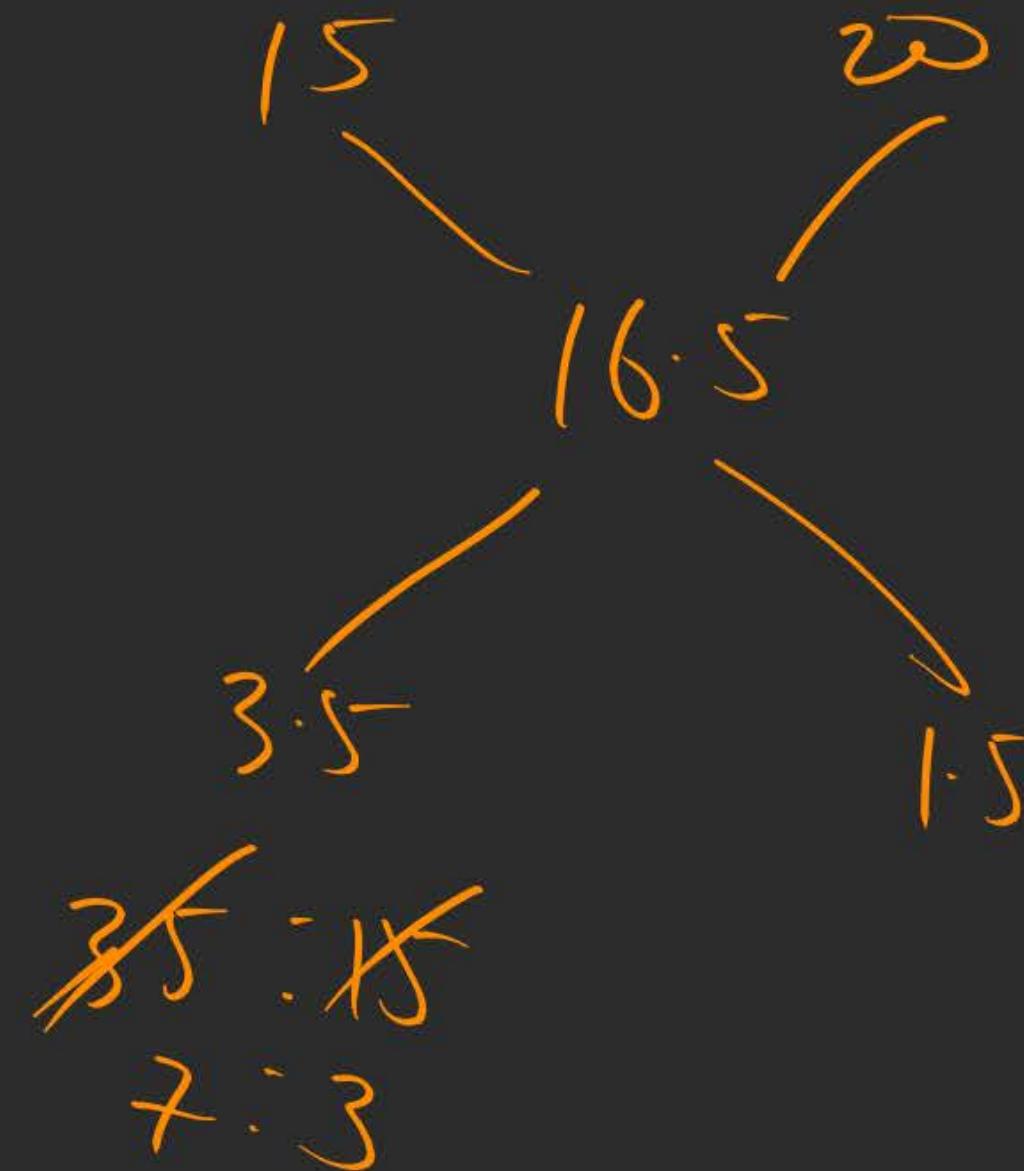
$$= \frac{3}{15} : \frac{1}{5}$$

$$= 3 : 1$$



Q. In what ratio must a grocer mix two varieties of pulses costing ₹15 and ₹20 per kg respectively so as to get a mixture worth ₹16.50 per kg?

- A 5 : 3
- B 7 : 3
- C 3 : 8
- D 4 : 5



Q. In what ratio must Ankit mix two varieties of sugar worth ₹20 per kg and ₹32 per kg so that by selling the mixture at ₹36 per kg he may gain 20%?

A 3 : 2

B 2 : 3

C 3 : 5

D 1 : 5

$$\begin{array}{ccc}
 20 & & 32 \\
 & \swarrow & \searrow \\
 & x : y & \\
 & | & | \\
 30 & & 10 \\
 & \searrow & \swarrow \\
 & 2 &
 \end{array}$$

S.P = 36
 P = 20%
 $\frac{36}{C.P} = 1.2$
 $\frac{36}{1.2} = C.P$

Q.

In a mixture 60 litres, the ratio of milk and water $2 : 1$. If this ratio is to be $1 : 2$ then the quantity of water to be further added is:

(2)

$$\begin{aligned} &= \frac{1}{2} : \frac{1}{2} + 2 \\ &= 4 : 2 \\ &= 60 \text{ lit} \end{aligned}$$

$$\text{Ans: } M:W = \frac{1}{3} : \frac{2}{3} = 60 : 60$$

$$\text{Milk} = 1 : \text{Water}$$

60 lit

Milk Water
40 lit 20 lit

$$\frac{40}{60+x} = \frac{1}{3}$$

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

$$\frac{20+x}{60+x} = \frac{2}{3}$$

P
W



Direct & Inverse Proportion

$\frac{1}{A} + \frac{1}{B} = \frac{1}{T}$

$\frac{1}{10} + \frac{1}{20} = \frac{1}{T}$

$\frac{2}{20} = \frac{1}{T}$

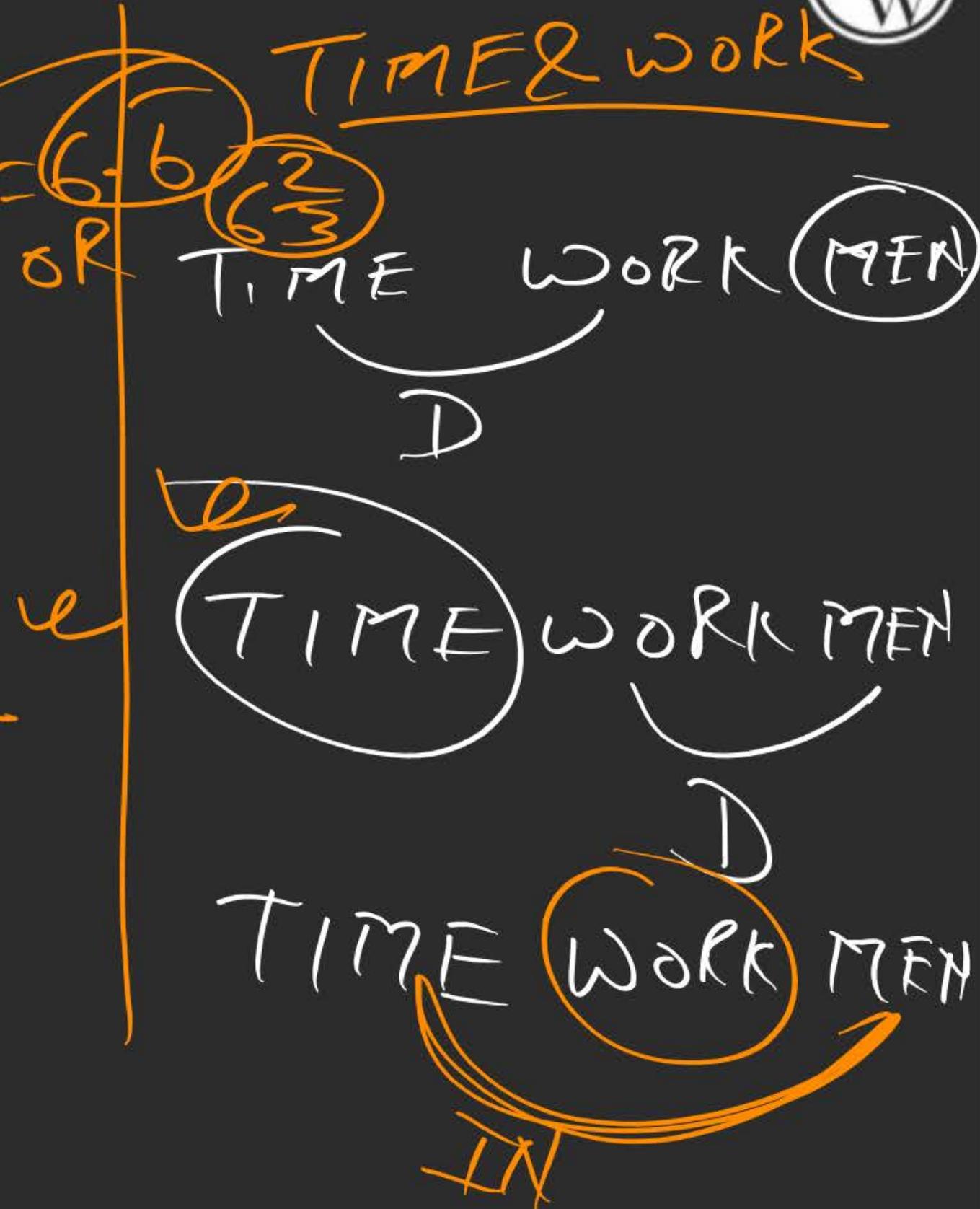
$T = \frac{20}{2} = 10$

$A = 10 \text{ days}$

$B = 20 \text{ days}$

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

$T = 10$





Basic Question:

$$A \& B = \frac{1}{40}$$

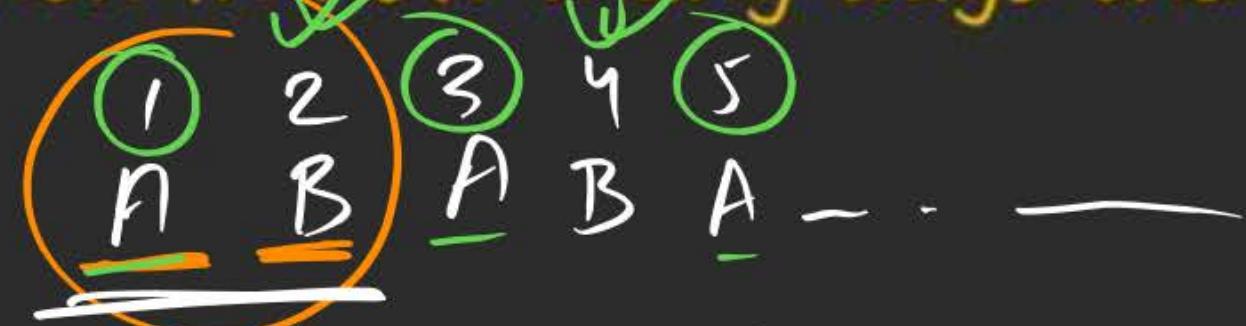
If A and B together can complete a work in 40 days whereas A alone in 60 days, then B alone can complete that work in how many days?

$$A = \frac{1}{60} \quad (-)$$

$$\frac{1}{40} - \frac{1}{60} = \frac{3-2}{120} = \frac{1}{120}$$

Q. A can do a work in 10 days whereas B in 20 days. They started working on alternate days, i.e. 1st day 'A', 2nd day 'B', 3rd day 'A'.....so on. Then in how many days the total work would be completed?

$$A = \frac{1}{10} \quad B = \frac{1}{20}$$



$$\frac{1}{10} + \frac{1}{20} = \frac{3}{20} \rightarrow 2 \text{ days}$$

~~$\frac{1}{10}$~~ $\times 6$ ~~$\frac{1}{20}$~~ $\times 6$

~~13 days~~

$$\frac{18}{20} \rightarrow \underline{\underline{12 \text{ days}}}$$

Q. A can do a work in 10 days whereas B in 20 days. They started working on alternate days, i.e. 1st day 'B', 2nd day 'A', 3rd day 'B'.....so on. Then in how many days the total work would be completed?

132 days

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

$$B = \frac{1}{20}$$

$$\frac{1}{2} A$$

$$\frac{3}{2} B$$

$$13^m$$

$$\frac{1}{10} - \frac{1}{20} = \frac{1}{20}$$

$$\frac{x}{20} = 12$$

$$\frac{1}{10} + \frac{1}{20} = \frac{3}{20} \times 6 \rightarrow 2 \text{ days}$$

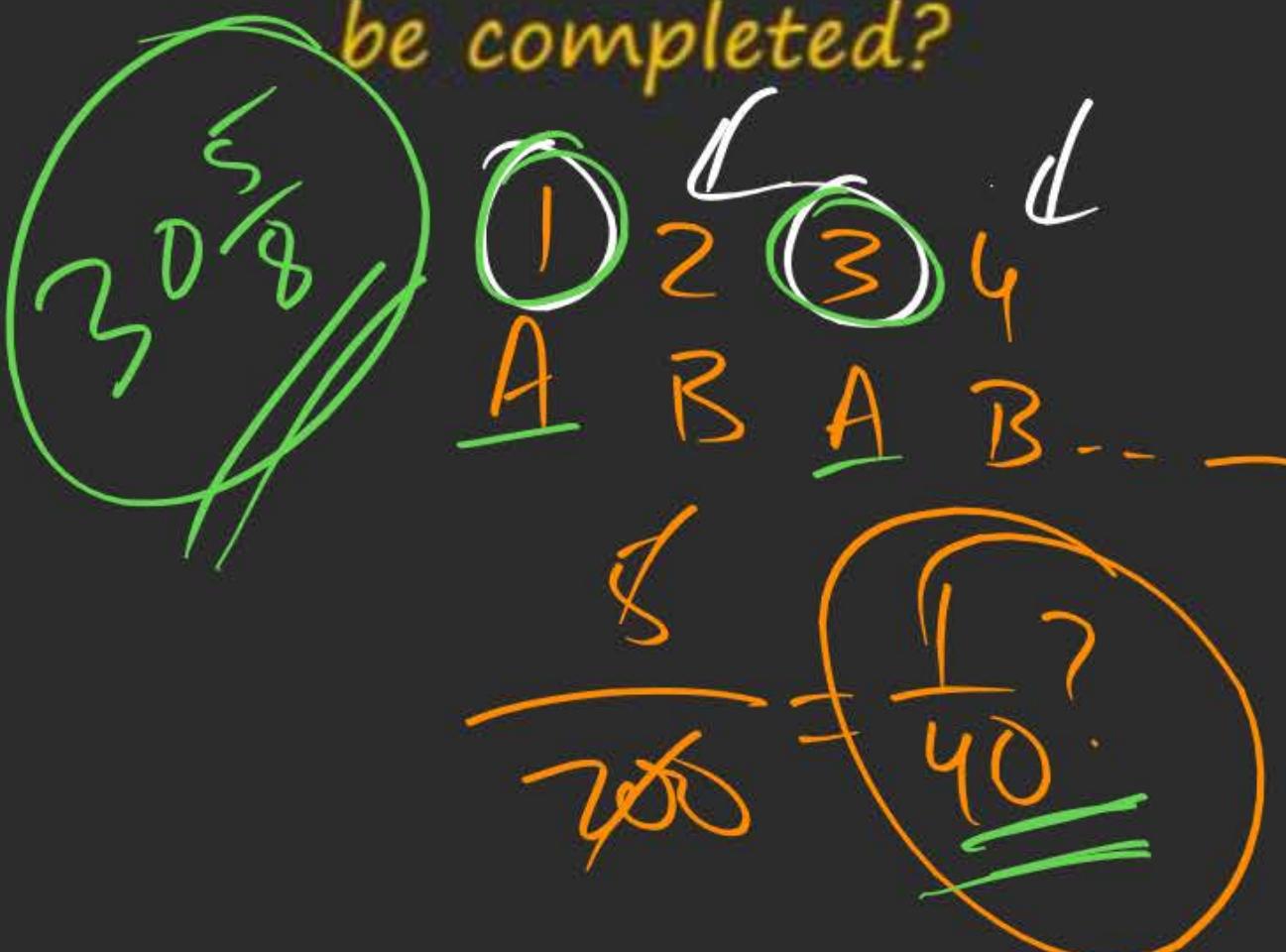
$$\frac{18}{20} \rightarrow 12 \text{ days}$$

$$(\text{work A} = 10)$$

$$\frac{1}{20} \text{ " } A = 10 \times \frac{1}{20} = \frac{1}{2}$$

Q. A can do a work in 25 days whereas B in 40 days. They started working on alternate days, i.e. 1st day 'A', 2nd day 'B', 3rd day 'A'.....so on. Then in how many days the work would be completed?

P
W



$$A = \frac{1}{25} \quad B = \frac{1}{40}$$

$\frac{1}{25} + \frac{1}{40} = \frac{13}{200}$ \Rightarrow 2 days

$$\text{Work A} = \frac{25}{5} = \frac{195}{200} \rightarrow 30 \text{ day}$$

Q.

A can do a work in **20 days** whereas B in **30 days** and C in **60 days**. They started the work together. But A left after two days and B left three days before the work got completed.

Then the total work was done in how many days?

$$\text{Work} \rightarrow A = \frac{1}{20}, B = \frac{1}{30}, C = \frac{1}{60}$$

$$\text{Time} \rightarrow 2 \text{ days} \quad ? \quad 3 \text{ days}$$

$$\text{Rate} \rightarrow \frac{2}{10} A + B + C \quad B + C \quad C = \frac{1}{60} = \frac{1}{20}$$

$$A + B + C = \frac{1}{20} + \frac{1}{30} + \frac{1}{60} = \frac{6}{60} = \frac{1}{10}$$

$$B + C = \frac{1}{30} + \frac{1}{60} = \frac{3}{60} = \frac{1}{20}$$

Work $B + C = \frac{1}{20}$

$$\frac{2}{10} + \frac{1}{20} = \frac{4}{20} = \frac{1}{5}$$

$$\frac{3}{4} B + C = \frac{3}{4} \times \frac{1}{20} = \frac{3}{80}$$

$$\frac{3}{80} \times 20 = \frac{3}{4} = 15$$

Q. A can do a work in 20 days whereas B in 30 days and C in 60 days. They started the work together. But A left after two days and B left three days before the work got completed. Then the total work was done in how many days?

P
W

~~x days~~

$$\frac{x}{60} + \frac{x-3}{30} + \frac{2}{20} = 1$$
$$x + 2x - 6 + 6 = 60$$
$$3x = 60$$

Q.

A can do a work in 10 days whereas B in 20 days and C in 60 days. They started the work together. But A left at the end of 3rd day and B left at the end of 5th day. Then the remaining work was done by C in how many days?

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

$$B = \frac{1}{20}$$

$$C = \frac{1}{60}$$



$$\frac{x}{60} + \frac{5}{20} + \frac{3}{10} = 1$$

$$x = 27 \quad x + 15 + 18 = 60$$

**THANK
YOU!**



Mission ISRO 2023
(CS/EC/ME)

General Aptitude
Numerical Reasoning
Lecture No. 05



Amulya Ratan Sir

Today's Targets



- 1 Concept of Time & Distance
- 2 Average Speed & Relative Speed
- 3 Questionnaire on the Topic

3

Questionnaire on the Topic



Give a try:



If 9 MONKEYS EAT 9 BANANAS IN 9 MINUTES, THEN HOW MANY MONKEYS WILL EAT 45 BANANAS IN 45 MINUTES?

$$9x \times \frac{45}{9} \times \frac{9}{45}$$

9

Monkey

9

?

Bana

9

45

Mins

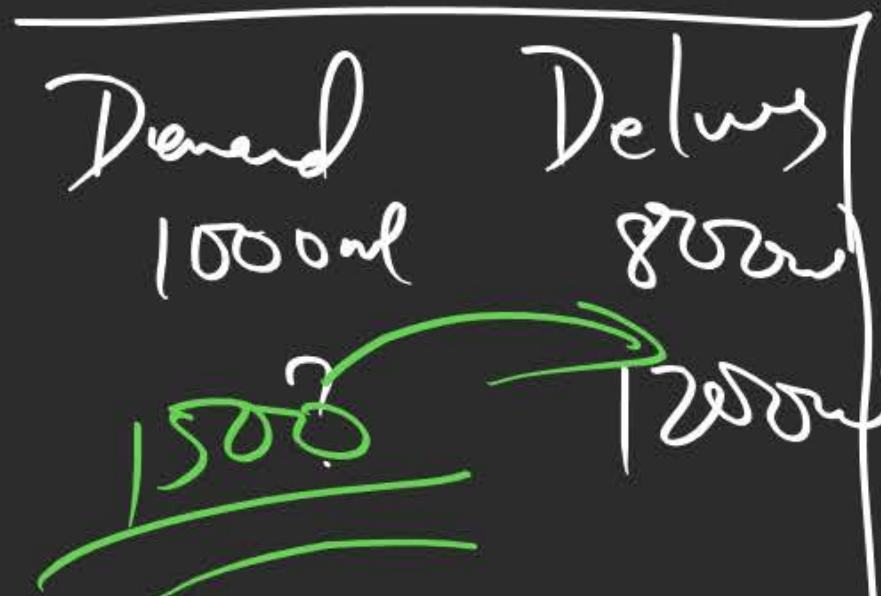
9

45



Chain Rule:

$$\frac{500}{1000} \times \frac{1000}{800} \times \frac{3}{2} = 96 \times \frac{62}{45}$$



$$45\% \text{ of } x = 96$$

$$x = 96 \times \frac{100}{45} \quad \cancel{\times}$$

$$62\% \text{ of } x = \frac{62}{100} \times 96 \times \frac{100}{45}$$

45% \rightarrow ?

1 \rightarrow No
96 \rightarrow ?

$\uparrow 1 \times \frac{3}{2}$
 $\downarrow 1 \times \frac{2}{3}$

Q.

12 men can do a work in 15 days working 8 hours a day. In how many days can 9 men do the same work, working 10 hours a day?

P
W

Men	Days	hrs/day
12	<u>15</u>	8

$$\frac{9}{15} \times \frac{?}{12} \times \frac{10}{8} = 16 \text{ days}$$

Q.

If 12 tailors can stitch 15 shirts working 8 hours daily in 56 days, then 15 tailors can stitch 18 shirts working 6 hours daily in how many days?

P
W

Tailors	Shirts	hrs/day	Days
12	15	8	<u>56</u>
15	18	6	?
$\frac{56 \times 8 \times 4}{25}$	$\frac{56 \times 32}{25}$	$\frac{18}{15} \times \frac{4}{8} \times \frac{12}{5}$	
$= 71.68$			

Q.

A hostel with 600 students had sufficient food for 210 days. After 30 days, 240 students left the hostel. Now the remaining food will last for how many days?

$$\cancel{180} \times \frac{\cancel{600}}{360}$$

$$St$$

$$600$$

$$Days$$

$$210$$

$$300$$

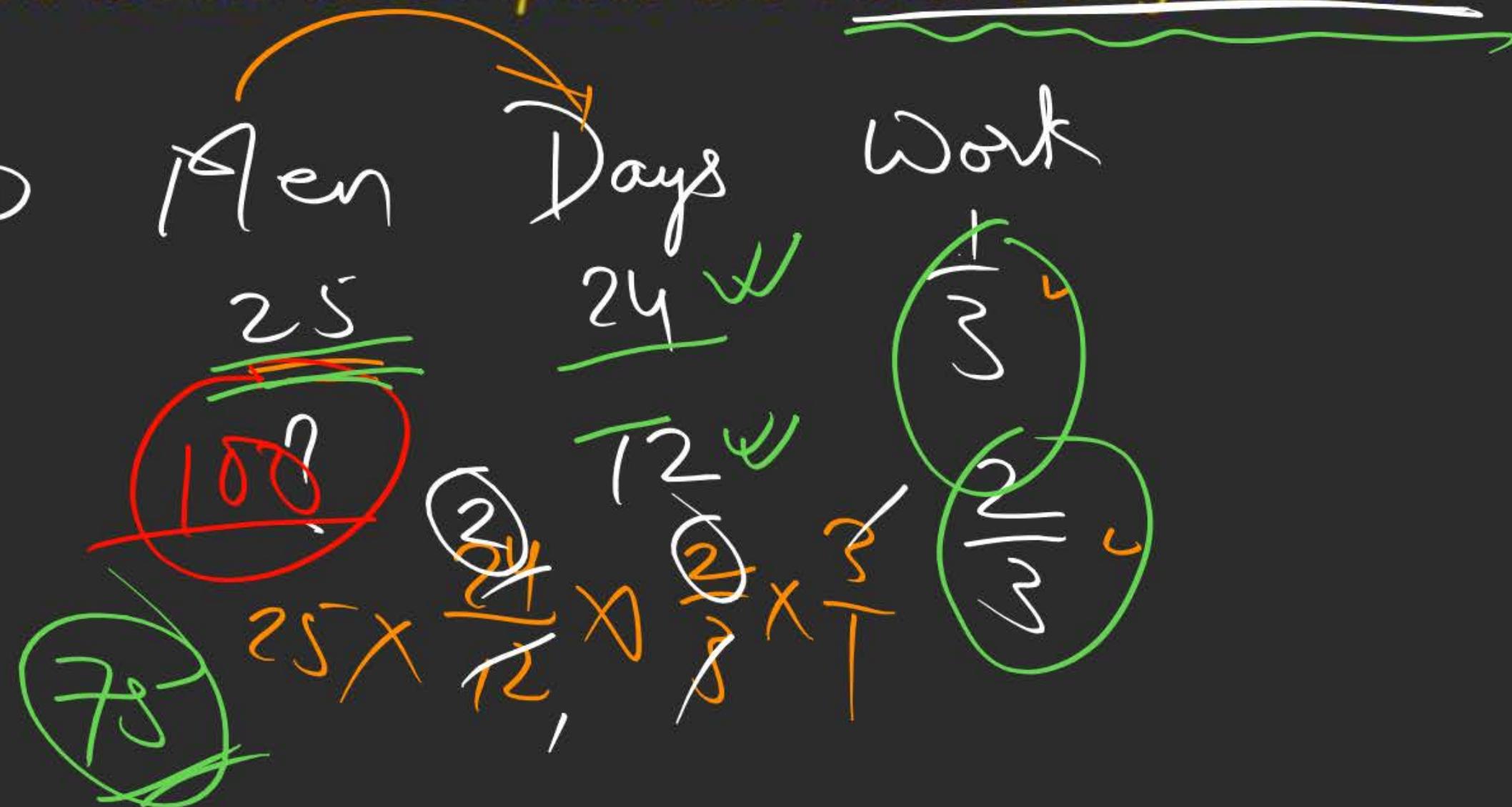
$$\begin{array}{c|c} 600 & 180 (210 - 30) \\ 360 & ? \end{array}$$

Q.

A contractor undertakes to make a road in ~~40 days~~ and employs 25 men. After ~~24 days~~, he finds that only one-third of the road is made. How many extra men should he employ so that he is able to complete the work 4 days earlier?

P
W

- A 75
- B 100
- C 50
- D None





TIME & DISTANCE



$$\times \frac{5}{18}$$

$$\begin{matrix} \text{km/hr} \\ \downarrow \\ \text{m/sec} \end{matrix}$$

$$\times 18 \quad \frac{5}{\text{s}}$$

$$D = \text{Speed} \times \text{Time}$$

$$\text{Speed} = \frac{D}{T}$$

$$\begin{matrix} \text{km} \\ \downarrow \\ \text{m} \end{matrix}$$

$$\begin{matrix} \text{hr} \\ \downarrow \\ \text{s} \end{matrix}$$

$$\text{Time} = \frac{D}{S}$$

$$\begin{matrix} \text{km} \\ \downarrow \\ \text{m} \end{matrix} = \frac{1000 \text{ m}}{\text{m/sec}}$$

$$\begin{matrix} \text{hr} \\ \downarrow \\ \text{s} \end{matrix} = \frac{3600 \text{ sec}}{18}$$

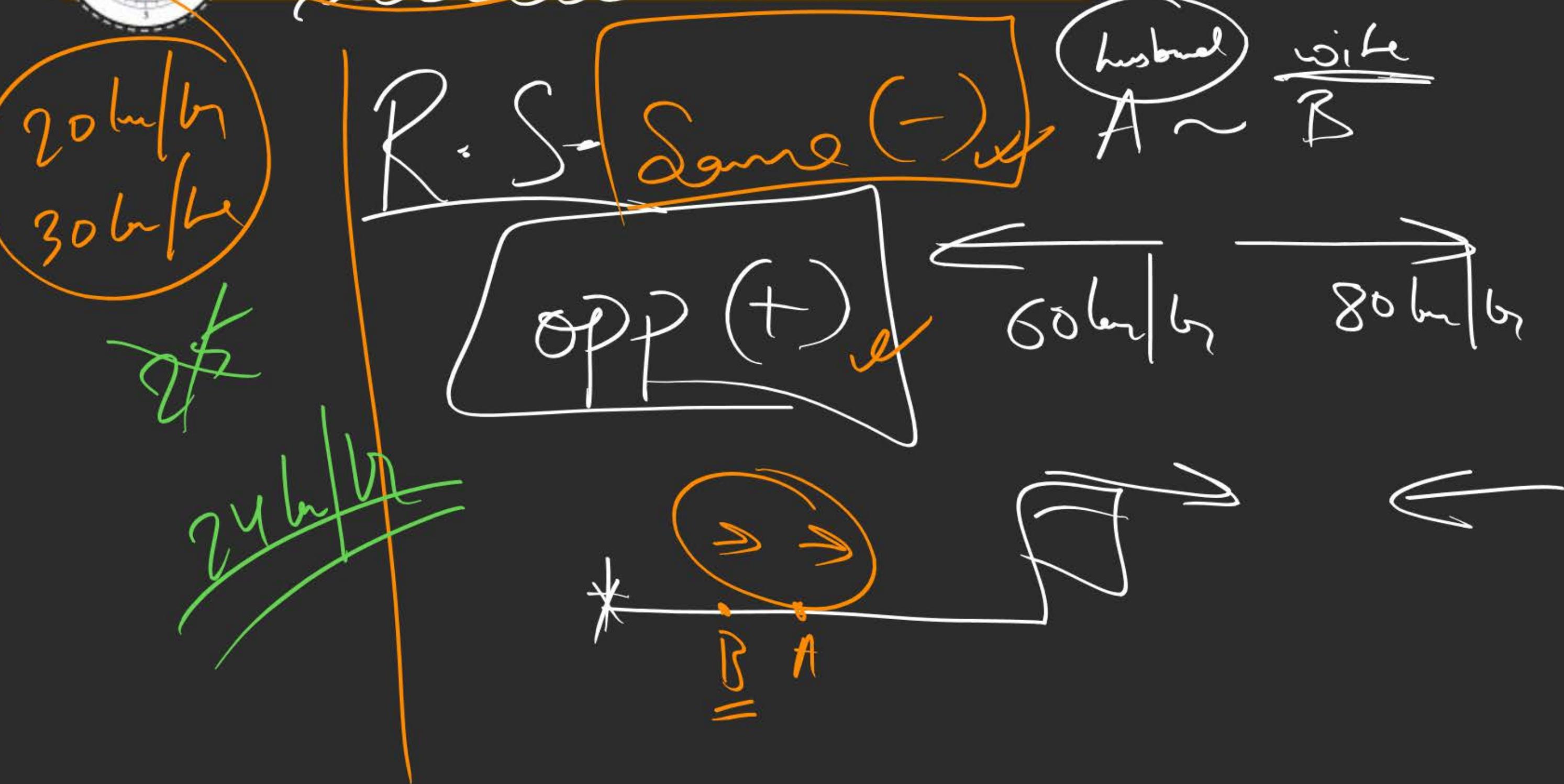
$$D = 400 \text{ m}$$

$$S = 40 \text{ m/sec}$$

$$T = \frac{400 \text{ m}}{40 \text{ m/sec}} = 10 \text{ sec}$$

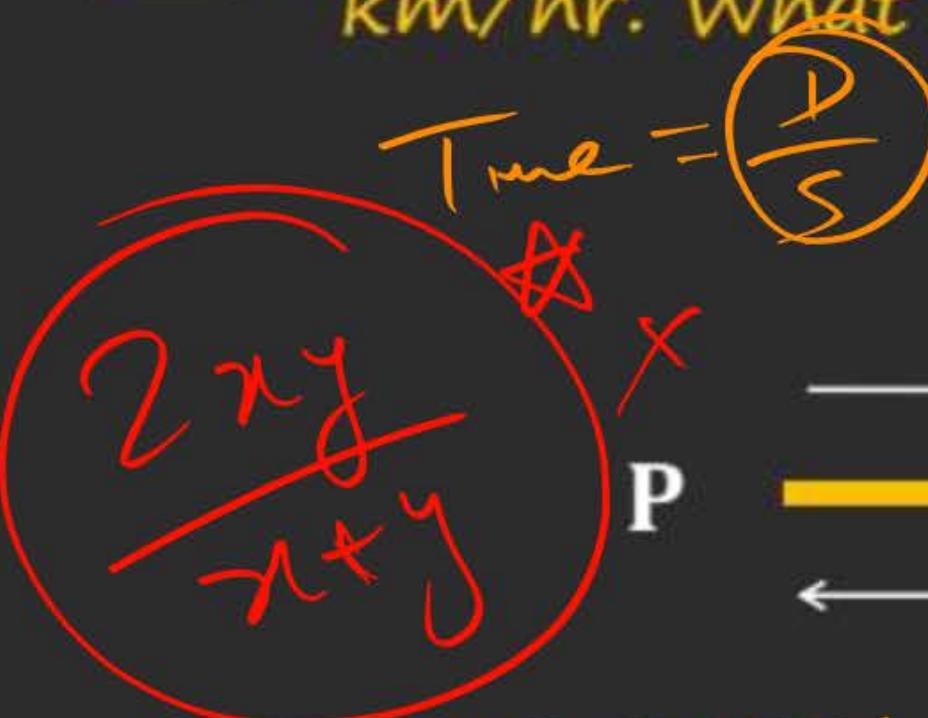
$$10 \text{ m/sec} = 3600 \text{ m/hr}$$

Average Speed & Relative Speed



Q. If you travel from P to Q at 20km/hr and Q to P at 30 km/hr. What would be your average speed of the journey?

P
W



$$\text{Average Speed} = \frac{T \cdot D}{T + Time}$$

$$T + Time = \frac{T \cdot D}{\text{Average}}$$

$$A.S = \frac{2x}{\frac{x}{20} + \frac{x}{30}} = \frac{2x}{\frac{5x}{60}} = \frac{2x}{\frac{x}{12}}$$

Q. A man travels from Jabalpur to Surat in his car. $\frac{1}{3}$ of journey he covers at 60 km/hr & remaining journey at 40 km/hr. Find the average speed of his journey.



$$\frac{x}{60} + \frac{2x}{40} = \frac{3x}{\text{A.S.}}$$

$$\frac{18x}{15+120} = \frac{3x}{\text{A.S.}}$$

Q.

A man travels $\frac{1}{4}$ th of his journey at 20 km/hr , another $\frac{1}{4}$ th at 30 km/hr & remaining at 60 km/hr . Find the average speed of his journey.

P
W

$$\frac{7x}{60} = \frac{4x}{\text{A.S.}}$$

$$\text{A.S.} = \frac{60 \times 4}{7}$$

$$= \frac{240}{7} = 34\frac{2}{7}$$

$$34.28 \text{ km}$$

$$\frac{x}{20} + \frac{x}{30} + \frac{2x}{60} = \frac{4x}{\text{A.S.}}$$

$$\frac{3x + 2x + 2x}{60} = \frac{4x}{\text{A.S.}}$$

$$\frac{2x + 2x + 3x}{60} = \frac{4x}{\text{A.S.}}$$

$$= 24 \text{ km/h}$$

$$\frac{2x + 2x + 3x}{60} = \frac{4x}{\text{A.S.}}$$

$$2x + 2x + 3x = 8x$$

**THANK
YOU!**



Mission ISRO 2023
(CS/EC/ME)

General Aptitude
Numerical Reasoning
Lecture No. 06



Amulya Ratan Sir

Today's Targets



- 1 Understanding Counting Theory
- 2 More Questions on Time and Distance
- 3 Questionnaire on Counting Theory

Q.

Lucknow police observes a thief 800 metres away from him. The thief started running at 80 km/hr & the police at 170 km/hr. In how much time the police can catch the thief?

P
W

$$D = 800 \text{ m}$$

$$\text{R.S.} = (170 - 80) = \cancel{90} \frac{\text{m}}{\text{hr}} \times \frac{5}{18}$$

$$T = \frac{\cancel{800 \text{ m}}}{\cancel{90 \text{ m}} \frac{1}{\text{sec}}} = \underline{\underline{32 \text{ sec}}}$$

Q. An employee goes to his office from his house at a speed of 60 km/hr and reaches his office 10 minutes late. If he follows the speed of 80 km/hr, he reaches his office 5 minutes early. Find the distance he covers to reach his office.

$$\Rightarrow x = 60$$

$$T = \frac{D}{S}$$

$$\frac{x}{60} - \frac{x}{80} = \frac{15}{60} - \frac{1}{4}$$

$$\frac{4x - 3x}{240} = \frac{1}{4},$$

$$D = S \times T$$

$$60 \left(T + \frac{10}{60} \right) = 80 \left(T - \frac{5}{60} \right)$$

$$T = \frac{5}{6}$$

$$D = 60 \times \underline{\underline{6}}$$

Q.

A boy goes to his school with the speed of 40kmph and reaches his school 10 minutes early. If he follows the speed of 30kmph, he reaches his school 10 minutes late. Find the distance he covers to reach his school.

P
W

$$T = \frac{P}{S}$$

$$\underline{\underline{x = 40}}$$

$$\frac{x}{30} - \frac{x}{40} = \frac{20}{60} \mid \cancel{3}$$

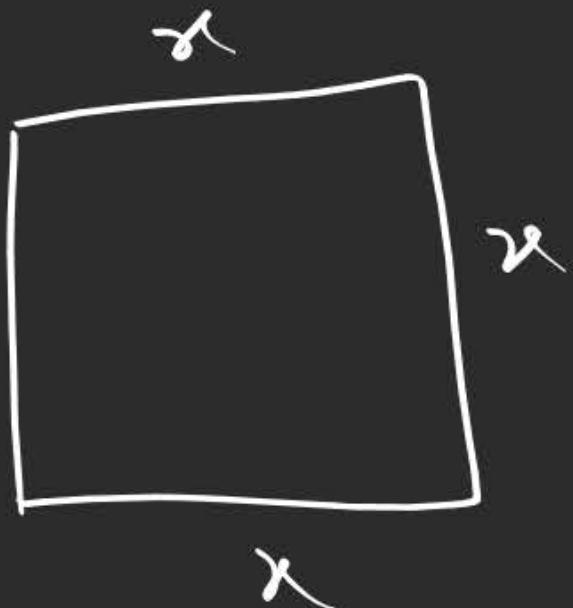
$$\frac{4x - 3x}{120} = \frac{1}{3}$$

Q.

If a car travels along four sides of a square at 100 kmph, 200 kmph, 300 kmph and 400 kmph. Find its average speed.

P
W

$$\frac{4x}{A.S} = \frac{x}{100} + \frac{x}{200} + \frac{x}{300} + \frac{x}{400}$$



$$\frac{12x + 6x + 4x + 3x}{1200} = \frac{4x}{A.S.}$$

$$A.S. = 48 \times 4$$

$$= \underline{\underline{192 \text{ kmph}}} - \frac{\cancel{28x}}{\cancel{1200}} - \frac{4x}{A.S.}$$



Let's Understand:

A person covers a certain distance at a certain speed. If he decrease his speed by 20%, then he takes 16 minutes more to cover the same distance. Find the time taken by him to cover the original distance at original speed.

$$\frac{\cancel{100}}{80} T - T = 16 \text{ min}$$

$$D = \frac{S \times T}{\frac{80}{100}}$$

$\frac{100}{80}$

$$\Rightarrow \frac{1}{4} U \cdot T = 16$$
$$\frac{5}{4} T - T = 16$$
$$U \cdot T = 16 \times 4$$
$$= 64 \text{ min}$$
$$\left(\frac{5}{4} - 1\right) T = 16$$

Q.

Walking $\frac{3}{4}$ th of the usual speed a man is late to office by 10 minutes, find the usual time.

P
W

$$\frac{4}{3} U \cdot T - U \cdot T = 10$$

$$\left(\frac{4}{3} - 1\right) U \cdot T = 10$$

$$\frac{1}{3} U \cdot T = 10$$

$$U \cdot T = 30 \text{ min}$$

- A 40 minutes
- B 12 minutes
- C 60 minutes
- D 30 minutes

Q.

A car driver driving at a speed of 68 km/hr locates a lorry 40 meters ahead of him. After 10 seconds, the lorry is 60 meters behind him. Find the speed of the lorry.

P
W



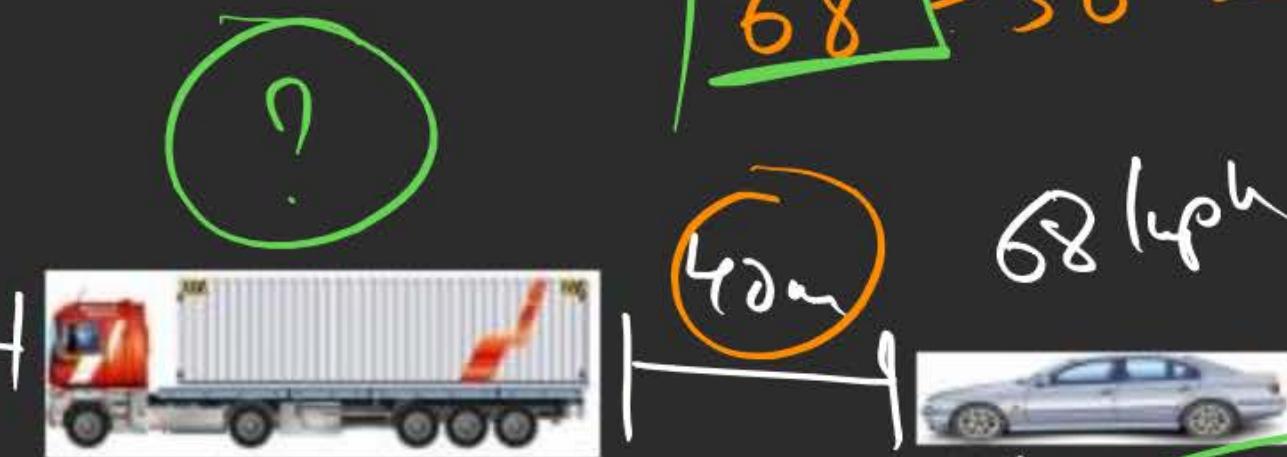
Q. A car driver driving at a speed of 68 km/hr locates a lorry 40 meters ahead of him. After 10 seconds, the lorry is 60 meters behind him. Find the speed of the lorry.

$$D = 100 \text{ m}$$

$$T = 10 \text{ sec}$$

$$R.S = \frac{100}{10} = 10 \text{ m/sec}$$

- 10m \times $\frac{18}{5}$
 - 10m \times $\frac{18}{5}$
 - 36 km/h



$$S.C - S.L = 36$$

$$68 - 36 = S.L$$

$$68 \text{ km/h}$$



$$S.L = 32 \text{ km/h}$$

Q.

A man takes 5 hours 45 minutes in walking to a certain place and riding back. He could have gained 2 hours by riding both ways. The time he would take to walk both ways is _____

P
W

$$(W + R = 5 \text{ hrs } 45 \text{ min})^R$$

$$R + R = 3 \text{ hrs } 45 \text{ min}$$

$$2W = 7 \text{ hrs } 45 \text{ min}$$

$$2W + 2R = 10 \text{ hrs } 45 \text{ min}$$

$$-2R = 3 \text{ hrs } 45 \text{ min}$$

Q. A man misses a train by 40 minutes if he travels at 30 kmph.
 If he travels at 40 kmph, then also he misses the train by 10 minutes. What is the minimum speed required to catch the train on time?

$$T = \frac{D}{S}$$

$$\frac{60}{30} - 2 \text{ hrs}$$

- A 60 kmph
- B 50 kmph
- C 55 kmph
- D 45 kmph

$$\frac{x}{30} - \frac{x}{40} = \frac{50}{80}$$

$$C.T. = 1 \text{ hr } 20 \text{ min}$$

$$= 1 \frac{20}{60} \frac{1}{3}$$

$$\frac{x}{120} = \frac{1}{x}$$

$$= \frac{1}{3} = \frac{4}{3}$$

$$x = 60 \text{ hrs}$$

$$S = \frac{60 \times 3}{15}$$

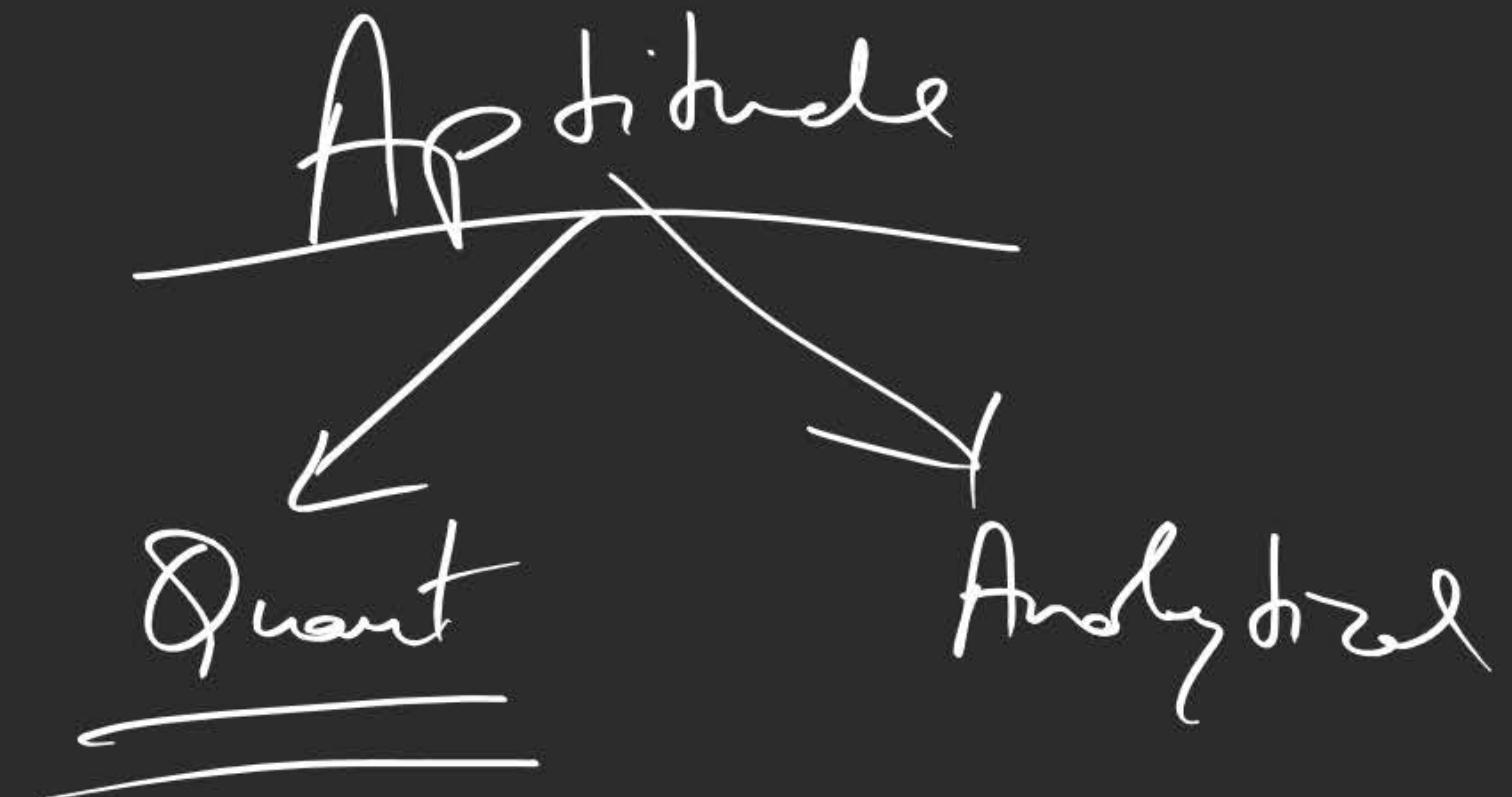
$$= 45 \text{ kmph}$$



Counting Theory



Number





NUMBERS in Life

Counting

Measurement

Sharing



NUMBERS in Life



Counting

- Comparision
- Measurement
- Combination (Mixing)
- Distribution (Sharing)etc.



NUMBER of ways to do a work



(OR) \cong (+)

AND
OR

'x'
'+' \times



PIN or Password

0000 ✓
9999 ✓



$$10 \times 10 \times 10 \times 10$$

0 ✓
1 ✓
2 ✓
3 ✓
4 ✓
5 ✓
6 ✓
7 ✓
8 ✓
9 ✓



10,000



Selection of PIN or Password



- 4 DIGITS

0-9 0-9 0-9 0-9

$$10 \times 10 \times 10 \times 10 \\ = 10,000$$

- 6 DIGITS

0-9 0-9 0-9 0-9 0-9 0-9

$$10 \times 10 \times 10 \times 10 \times 10 \times 10 \\ = 1,000,000$$

Q. How many four digits number can be formed using 1, 2, 3, 4
& 5?

Q W W P
W

- 4 DIGITS (Repetition)



$$5 \times 5 \times 5 \times 5$$

$$= \underline{\underline{625}}$$

$$(5-1) ? (5-2) ?$$

- 4 DIGITS (Without Repetition)



$$5 \times 4 \times 3 \times 2$$

$$= \underline{\underline{120}}$$



Selection of EVEN PIN or Password (Repetition allowed)



- 4 DIGITS

$$\begin{array}{cccc} \text{Th} & \text{H} & \text{T} & \text{U} \\ 10 \times 10 \times 10 \times 5 \\ 0-9 & 0-9 & 0-9 & \sum \\ & & & \sum \end{array}$$

0, 2, 4, 6, 8

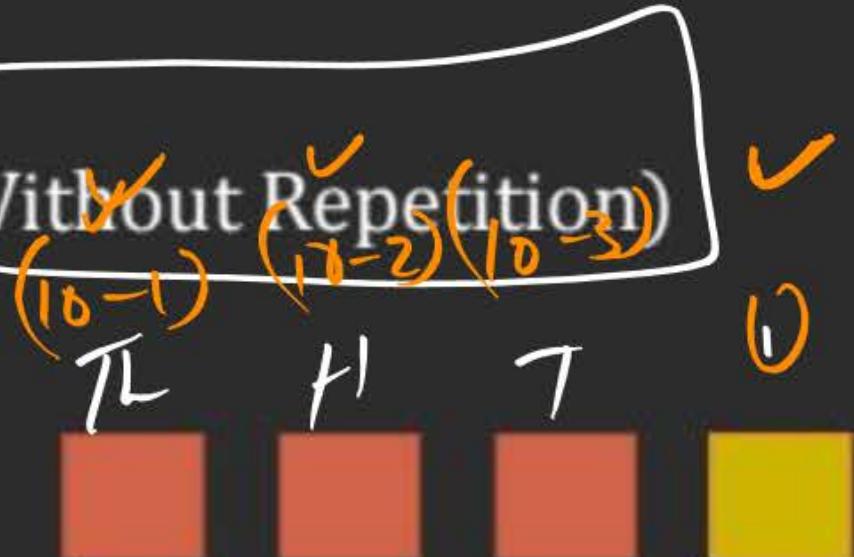
= 5000

AND	'x'
OR	'+'



Selection of EVEN PIN or Password



- 4 DIGITS (Without Repetition)
$$\frac{10 \times 9 \times 8 \times 7}{4!} = 5040$$


0, 2, 4, 6, 8

$$= 72 \times 35^5 = 2520$$

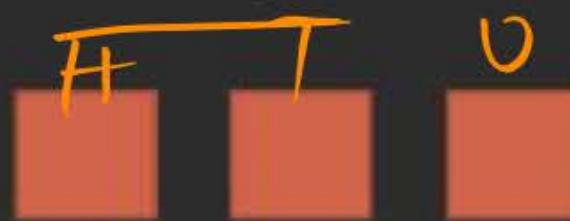
AND 'x'
OR '+'

Q.

How many three digits number can be formed using 1, 2, 3, 4 & 5?

P
W

- 3 DIGITS (Repetition Allowed)



$$5 \times 5 \times 5 = 125$$

- 3 DIGITS (Without Repetition)



$$5 \times 4 \times 3 = 60$$

(-1) (-2)

Q. How many three digits number can be formed using 0 to 9 ?

P
W

$$= 900$$

- 3 DIGITS (Repetition Allowed)

H T U

$$\cancel{\times} \quad 9 \times 10 \times 10 \\ (10-1)$$

- 3 DIGITS (Without Repetition)

H T U

$$\cancel{\times} \quad 9 \times 9 \times 8 \\ ((10-1)(10-1)(10-2))$$

$$= 81 \times 8 = \underline{\underline{648}}$$

Q.

In how many ways four letters can be posted in 6 post boxes,
if each box can take any number letters?

P
W

$$\begin{matrix} L_1 & L_2 & L_3 & L_4 \\ 6 \times 6 \times 6 \times 6 \\ = 36 \times 36 \\ = 1296 \end{matrix}$$

- A 4096
- B 1296
- C 5200
- D 24



Q.

In how many ways can you arrange 5 Novels on a shelf?

P
W

$$\underline{5} \times \underline{4} \times \underline{3} \times \underline{2} \times \underline{1}$$

$$(5-1) (5-2) (5-3) (5-4)$$

120

✓



Q. A license plate begins with 3 letters. If the possible letters are A, B, C, D and E, how many different ways these letters can be written if no letter is used more than once?

P
W

$$\overline{5} \times \overline{4} \times \overline{3}$$

$$(5-1) \quad (5-2)$$

$$= 60$$



Q. Four persons P, Q, R and S are to be seated in a row. R should not be seated at the second position from the left end of the row. The number of distinct seating arrangements possible is?

$$= 18$$

- A 6
- B 9
- C 18
- D 24

$$\frac{3 \times 3 \times 2 \times 1}{(4-1) \times \cancel{(4-2)}_{\text{P}} \times \cancel{(4-3)}_{\text{S}}} = 18$$



Q. Five different book (P, Q, R, S, T) are to be arranged on a shelf. The books R and S are to be arranged first and second, respectively from the right side of the shelf. The number of different orders in which P, Q and T may be arranged is?

A 12

B 2

C 120

D 6

$$\begin{array}{c}
 3 \times 2 \times 1 \quad S \quad R \\
 \hline
 \text{---} \quad \text{---} \quad \text{---} \\
 \text{P} \quad \overset{(3-2)}{\text{P}} \quad \overset{(3-1)}{\text{P}} \\
 \text{Q} \quad \text{Q} \quad \text{Q} \\
 \text{T} \quad \text{T} \quad \text{T} \\
 \hline
 \end{array}$$

←

≥ 6



THANK
YOU!



Mission ISRO 2023
(CS/EC/ME)

General Aptitude
Numerical Reasoning
Lecture No. 07



Amulya Ratan Sir

Today's Targets



- 1 Understanding Interpretation
- 2 Types in which the Data is Presented
- 3 Questionnaire on the Topic



Data Interpretation

P
W

Graph

Basic
Calculation

pie
bar

line



Types of Data Presentation

The numerical data pertaining to any event can be presented by any one or more of the following methods.

- 1) Tables ✓
- 2) Line Graphs ✓
- 3) Bar Graphs or Bar Charts ✓
- 4) Pie Charts or Circle Graphs

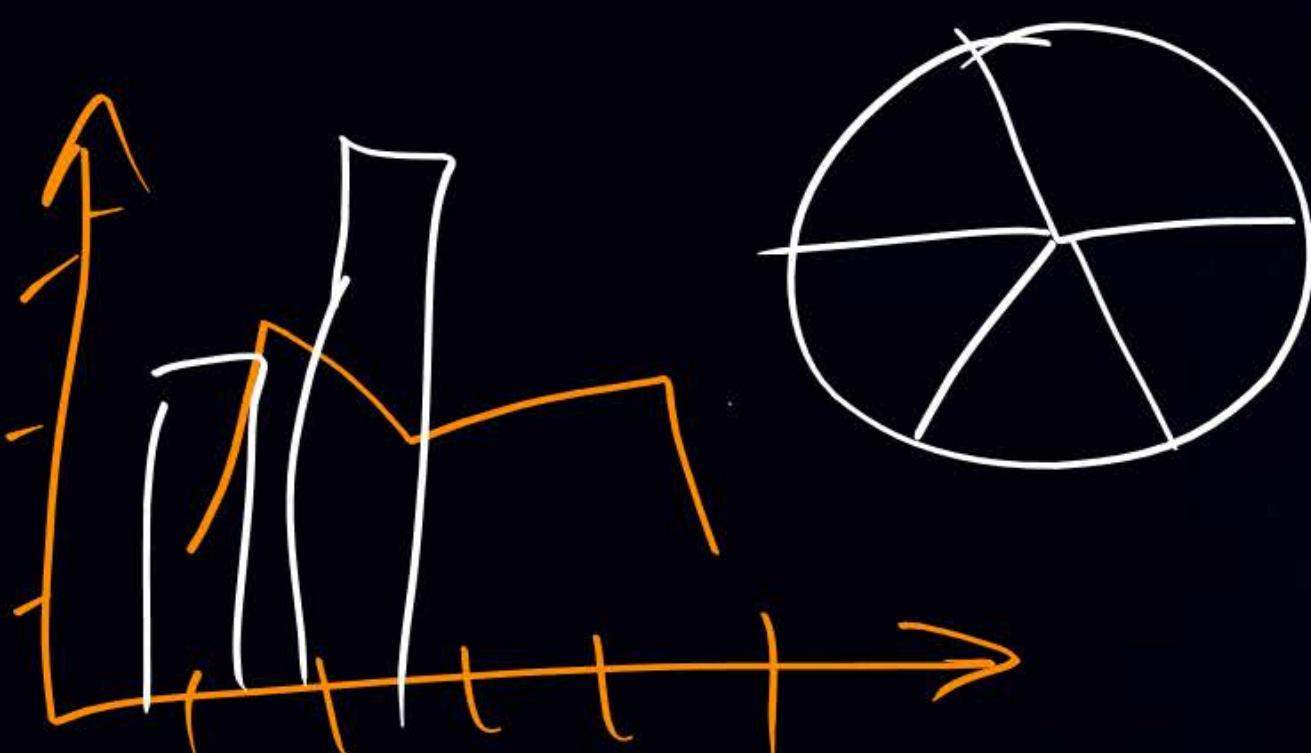




Table Form

Study the following table and answer the questions:

Source of Income	Employees				
	A	B	C	D	E
Salary	400	200	700	300	400
Bonus	80	40	150	80	100
Overtime	180	70	200	170	200
Arrears	200	180	400	140	250
Misc	40	10	50	10	50
TOTAL	900	500	1500	700	1000

Q.

Who among the following employees earns maximum bonus in comparison to his total income?

Source of Income	Employees				
	A	B	C	D	E
Salary	400	200	700	300	400
Bonus	<u>80</u>	40	<u>150</u>	<u>80</u>	<u>100</u>
Overtime	180	70	200	170	200
Arrears	200	180	400	140	250
Misc	40	10	50	10	50
TOTAL	<u>900</u>	500	<u>1500</u>	700	1000

$$A = \frac{80}{900} \times 100 \\ = \frac{80}{9} = 8.\bar{8}\%$$

$$B = 8\%$$

$$C = 10\%$$

$$D = \frac{80}{7} = 11.43\%$$

$$E = 10\%$$

Q. The income from overtime is what percent of income from arrears in the case of employee A?

$$A = \frac{180}{200} \times 100 \\ = 90\%$$

- A 90 ✓
- B 80
- C 75
- D 40

Source of Income	Employees				
	A	B	C	D	E
Salary	400	200	700	300	400
Bonus	80	40	150	80	100
Overtime	180	70	200	170	200
Arrears	200	180	400	140	250
Misc	40	10	50	10	50
TOTAL	900	500	1500	700	1000

Q. How many employee have their salary less than 3 times the income from bonus?

- A One
- B Two
- C Three
- D None

~~240~~ ~~120~~ ~~450~~ ~~240~~ ~~300~~

Source of Income	Employees				
	A	B	C	D	E
Salary	<u>400</u>	<u>200</u>	<u>700</u>	<u>300</u>	<u>400</u>
Bonus	<u>80</u> $\times 3$	<u>40</u> $\times 3$	<u>150</u> $\times 3$	<u>80</u> $\times 3$	<u>100</u> $\times 3$
Overtime	180	70	200	170	200
Arrears	200	180	400	140	250
Misc	40	10	50	10	50
TOTAL	900	500	1500	700	1000

Q.

Who among the following employees has maximum percentage of his salary out of the total income?

$$A = \frac{400}{9} = 44.44\%$$

$$C = \frac{700}{15} = 46.67\%$$

$$D = \frac{300}{7} = 42.86\%$$

$$E = 40\%$$

A

E

B

A

C

D

D

C

Source of Income	Employees				
	A	B	C	D	E
Salary	400	200	700	300	400
Bonus	80	40	150	80	100
Overtime	180	70	200	170	200
Arrears	200	180	400	140	250
Misc	40	10	50	10	50
TOTAL	900	500	1500	700	1000

Q.

Who among the following employees has minimum ratio of income from arrears to the income from salary?

A : S

$$A = \frac{200}{400} = 0.5$$

A

$$B = \frac{180}{200} = 0.9$$

B

$$C = \frac{140}{300} = \frac{7}{15}$$

C

Source of Income	Employees				
	A	B	C	D	E
Salary	400	200	700	300	400
Bonus	80	40	150	80	100
Overtime	180	70	200	170	200
Arrears	200	180	400	140	250
Misc	40	10	50	10	50
TOTAL	900	500	1500	700	1000

D

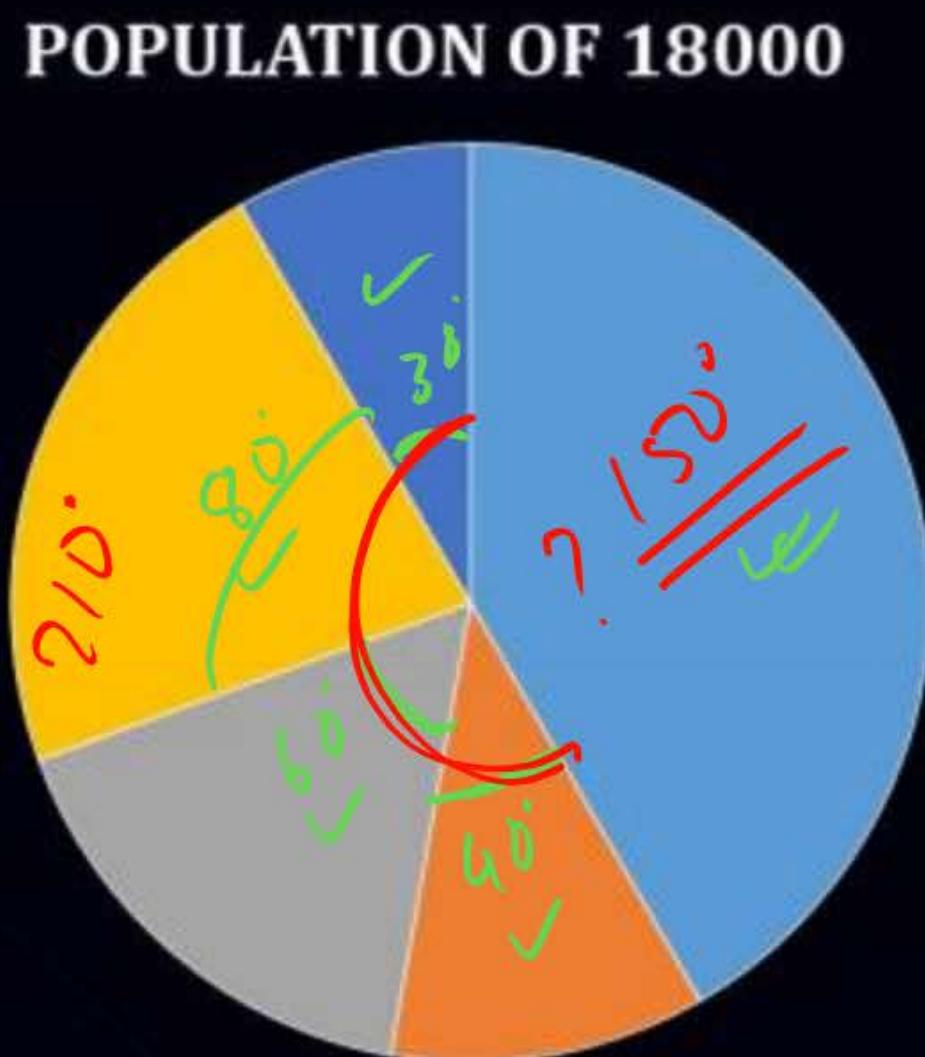
$$D = \frac{250}{400} = \frac{5}{8}$$

$$= 0.625$$



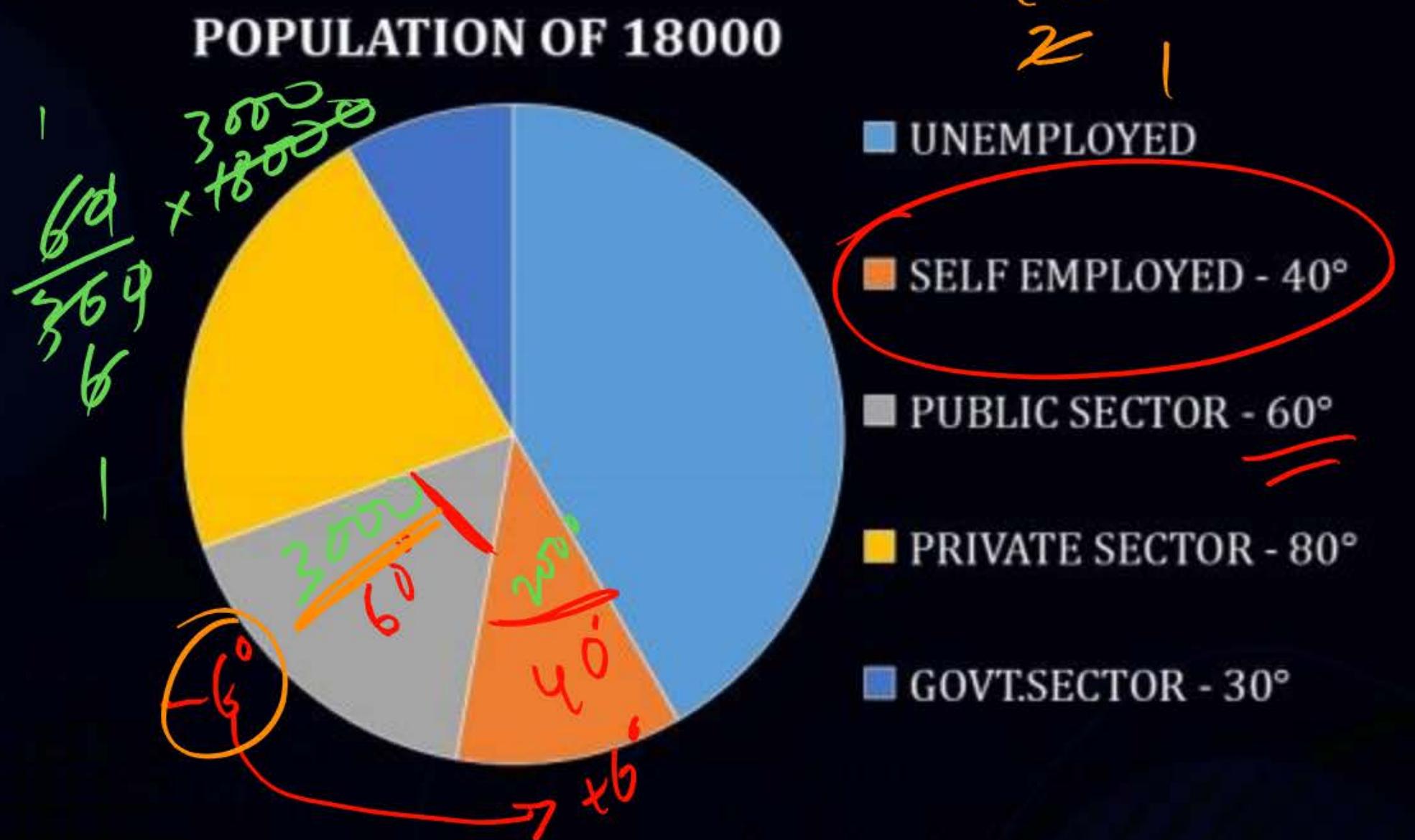
Pie Chart

Study the following graph carefully and answer the questions:



- UNEMPLOYED ✓ → 150°
- SELF EMPLOYED - 40° ✓
- PUBLIC SECTOR - 60°
- PRIVATE SECTOR - 80°
- GVT SECTOR - 30°

Q. If 10% of public sector people resign and becomes self-employed, find the increase percent in self-employed population.



$$\frac{6}{40} \times 10\% = 15\%$$

$$\frac{46}{40} = 1.15$$

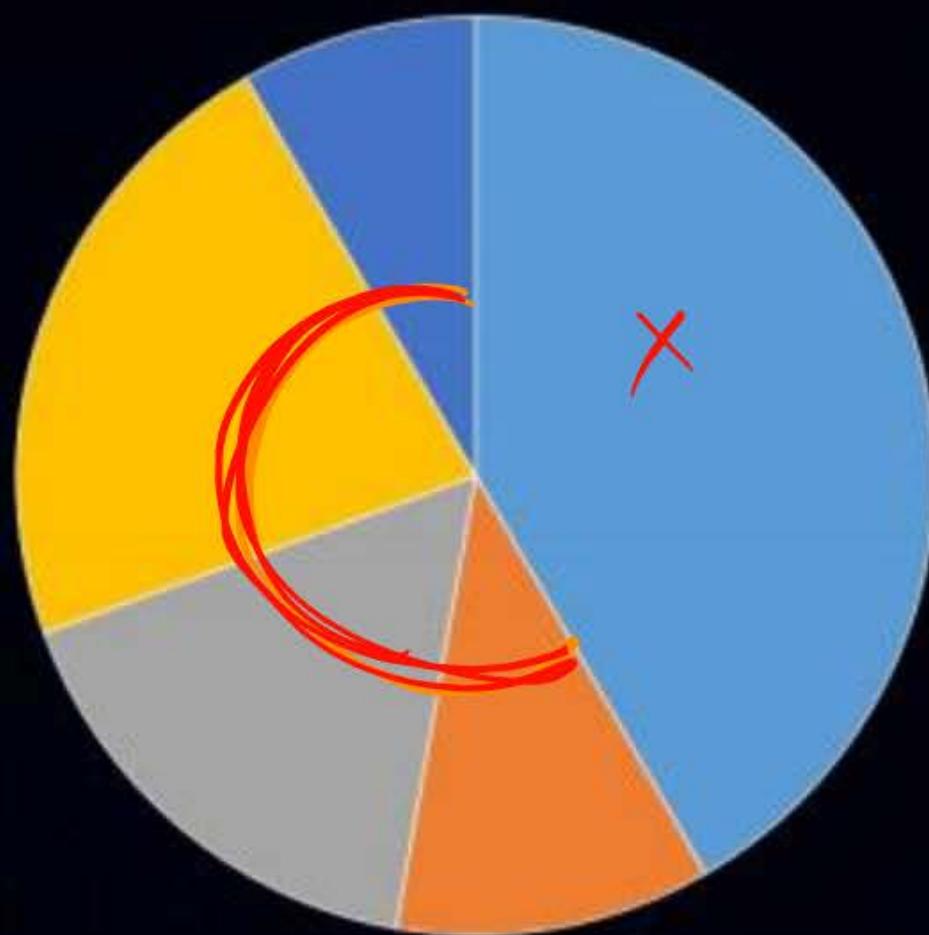
$$\frac{46}{36} \times 18,000 = 2050$$

$$\frac{300}{2550} \times 10\% = 1.15$$

Q. What percentage of employed people are working in government sector?

$$\frac{30^\circ}{360^\circ} \times 100 = \frac{100}{7} = 14.28\%$$

POPULATION OF 18000



- UNEMPLOYED
- SELF EMPLOYED - 40°
- PUBLIC SECTOR - 60°
- PRIVATE SECTOR - 80°
- GOVT.SECTOR - 30°



$$\frac{30^\circ}{360^\circ} \times 100 = \frac{100}{7} = 14.28\%$$

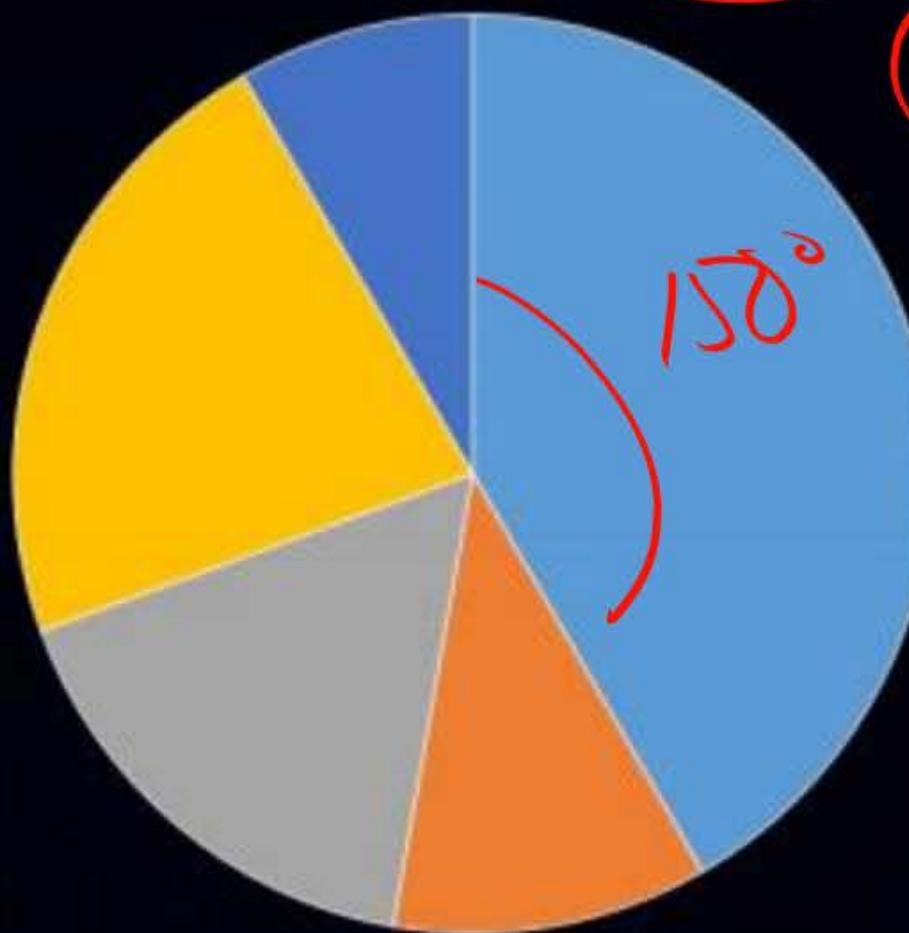
Q.

Find the number of people who are unemployed.

$$\begin{array}{r} 5 \\ \times 150 \\ \hline 7500 \end{array} \quad \begin{array}{r} 153000 \\ \times 18,000 \\ \hline 27500 \end{array}$$

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POPULATION OF 18000



- UNEMPLOYED
- SELF EMPLOYED - 40°
- PUBLIC SECTOR - 60°
- PRIVATE SECTOR - 80°
- GOVT.SECTOR - 30°

Q. If private sector employees are to be mentioned in above chart in the form of percentage, it would be%.



$$\frac{80}{360} \times 100 = \frac{200}{9} = 22.\overline{2}\%$$



Line Graph

Study the following graph carefully and answer the questions:



Marks scored by a student out of 500 in the Unit test held at different months of academic year 2019

Q.

What is the percentage of marks scored by the student in the unit test of August and October taken together?

$$370 + 385 = 755$$

- A 50%
- B 83.3%
- C 60%
- D 75.5%



Marks scored by a student out of 500 in the Unit test held at different months of academic year 2019

$$\frac{755}{1000} = 75.5\%$$

Q.

What are the average of marks obtained by the student in the unit test of given academic year?

$$\frac{360 + 365 + 370 + 385 + 400 + 405}{6}$$

A 361.6

B 380.8

C 377.5

D 400



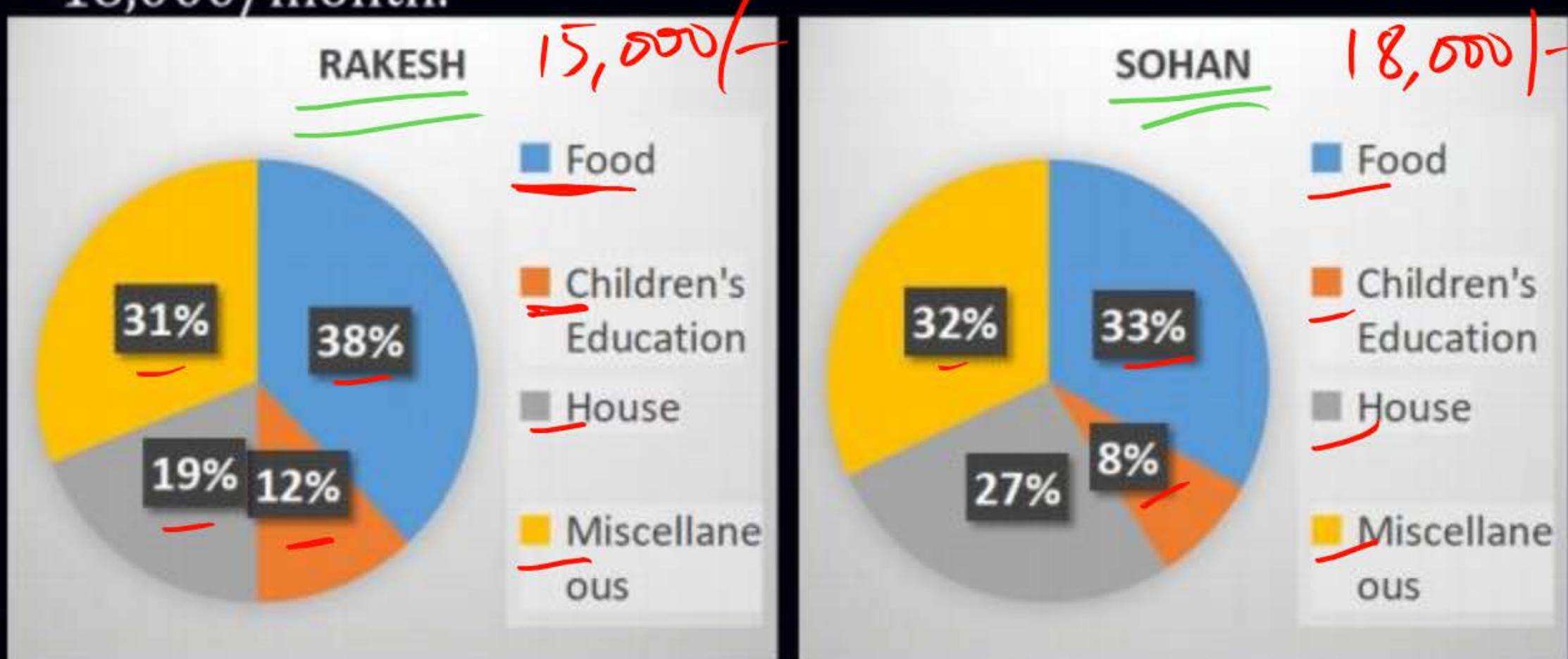
Marks scored by a student out of 500 in the Unit test held at different months of academic year 2019

$$\begin{aligned} & \frac{2285}{6} \\ &= 380.83 \end{aligned}$$



Dual Pie Chart

The pie chart shows the monthly expenditure of Rakesh and Sohan. Rakesh earns 15,000/month whereas Sohan 18,000/month.



Q. How much more (or) less does Sohan spend on children's education than Rakesh?

$$R = 0.12 \times 15,000$$

$$= 1800$$

A ₹900 more

B ₹360 less

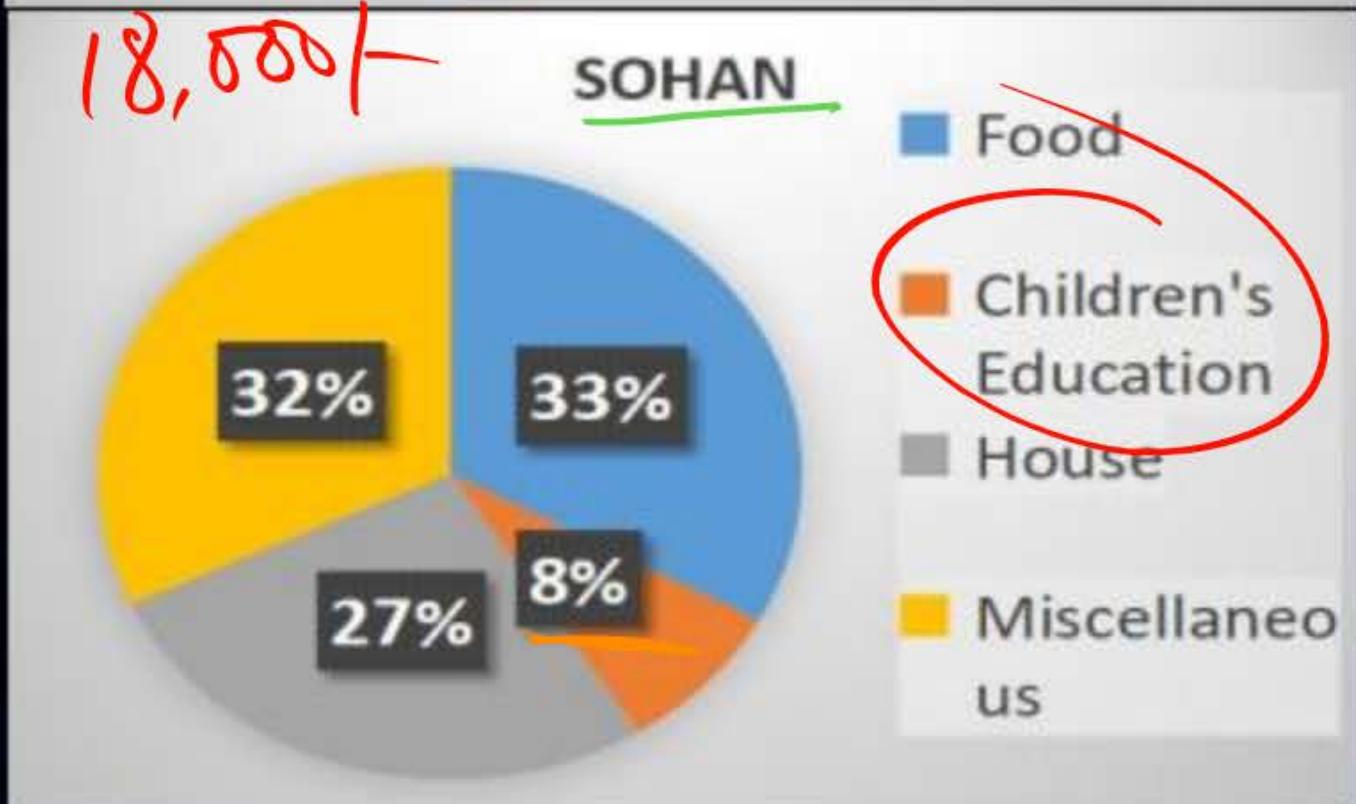
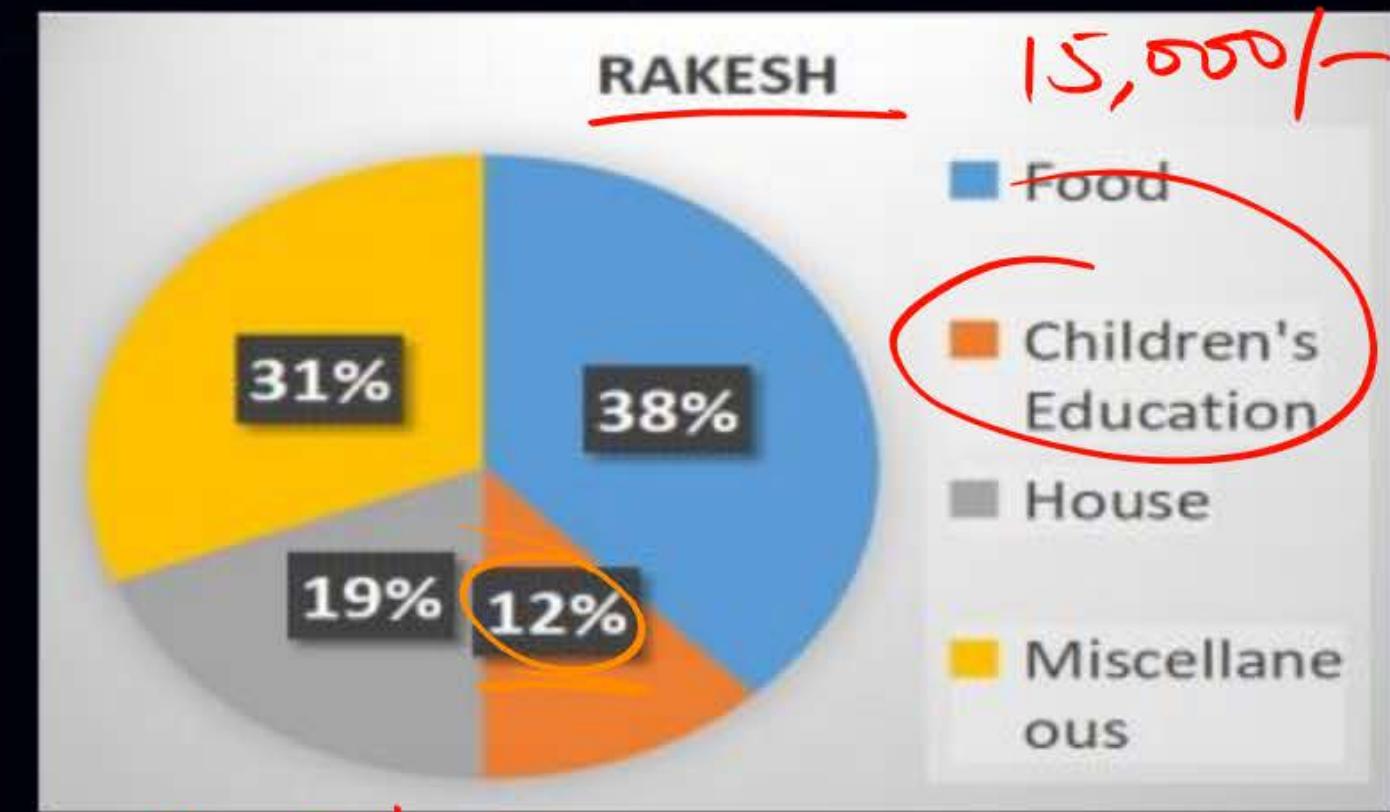
C ₹900 less

D ₹360 more

$$S = 0.08 \times 18000$$

$$= 1440$$

$$\begin{array}{r} 18000 \\ - 1440 \\ \hline 360 \end{array}$$

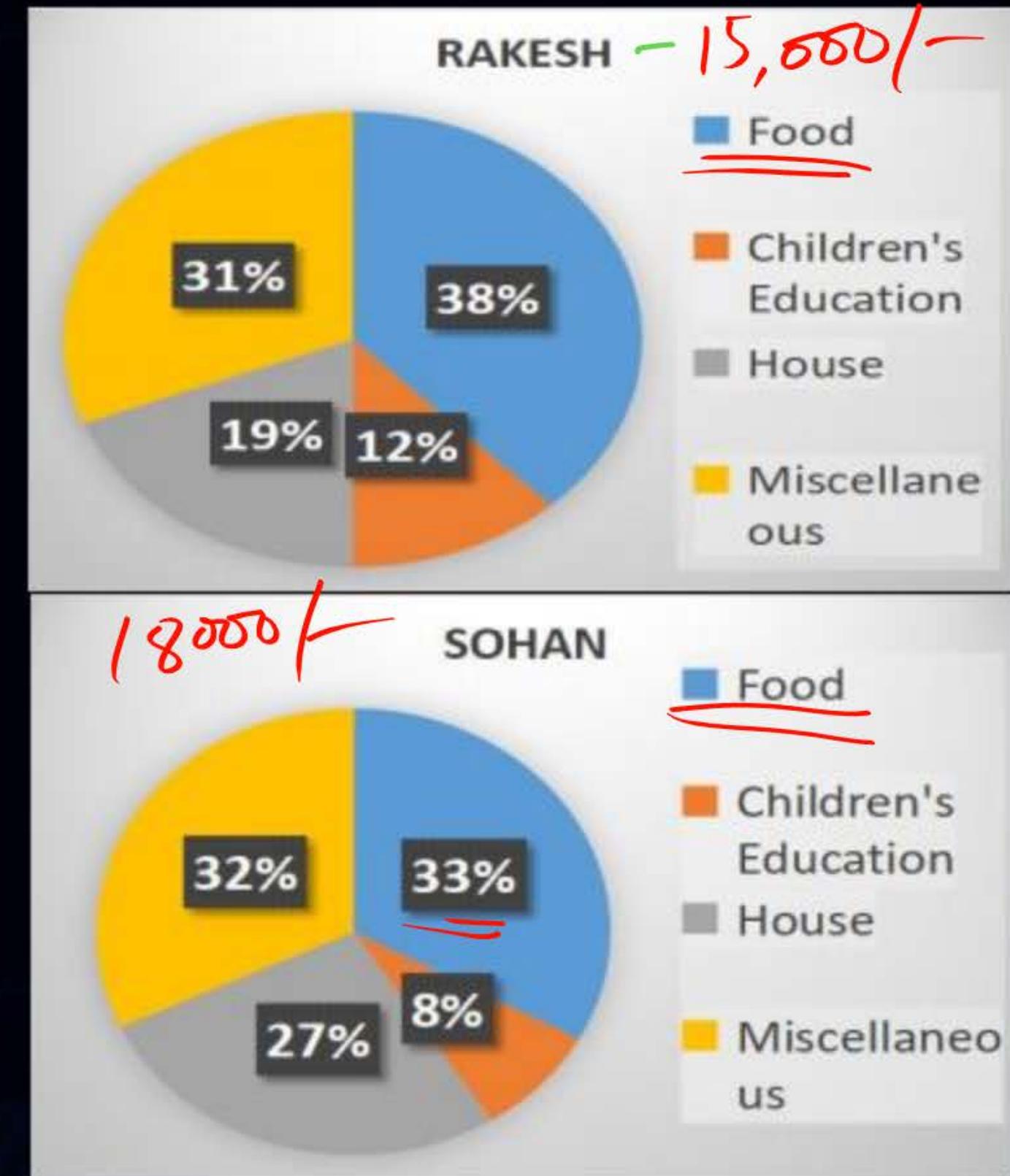


Q. Who spends more on food and how much more?

$$R = 0.38 \times 15,000 \\ = 5700$$

$$S = 0.33 \times 18,000 \\ = 5940$$

- A Sohan, ₹240 more
 - B Rakesh, ₹240 more
 - C Sohan, ₹140 more
 - D Rakesh, ₹140 more
- 240



Q. What is the ratio of the expenditure on children's education by Rakesh and Sohan?

A $5 : 4$

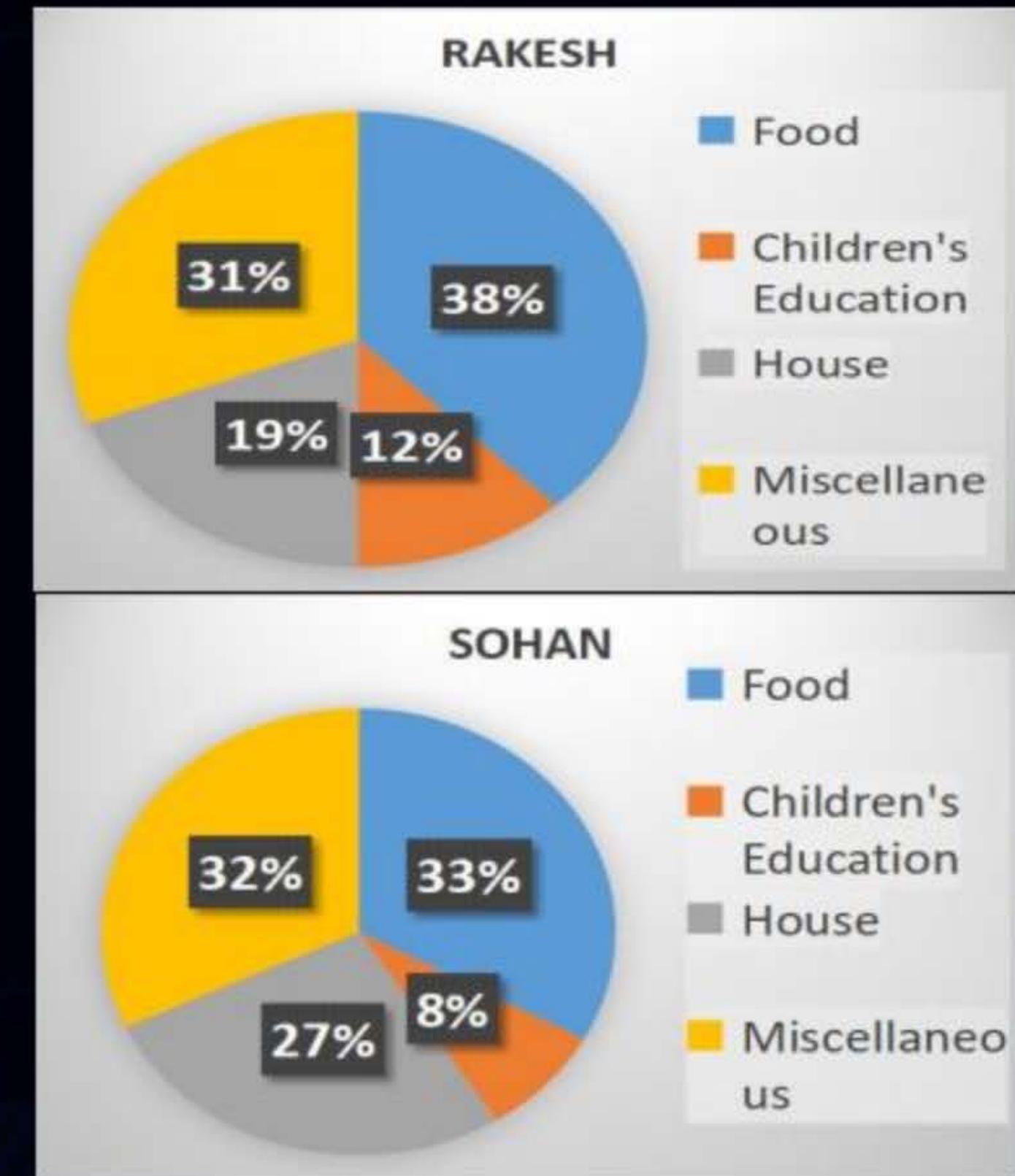
B $4 : 5$

C $3 : 2$

D $8 : 7$

$$\begin{array}{r} \cancel{15} \\ \times 5 \\ \hline \cancel{18} \cancel{5} \cancel{0} \\ \hline \cancel{14} \cancel{4} \cancel{0} \\ \times 4 \\ \hline \end{array}$$

$$= 5 : 4$$



Q. What is the measure of the angle used to represent the expenditure on house by Rakesh?

A 68° approx

B 86° approx

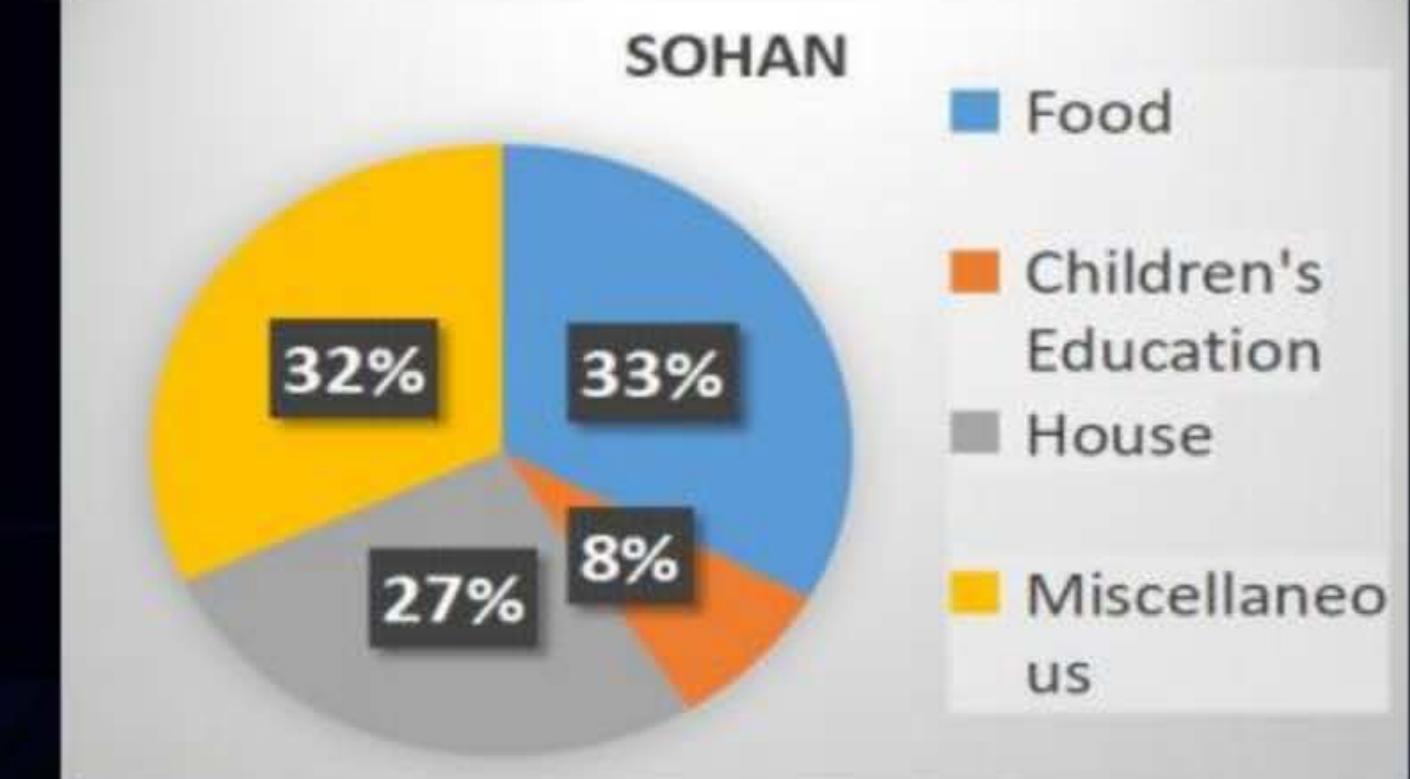
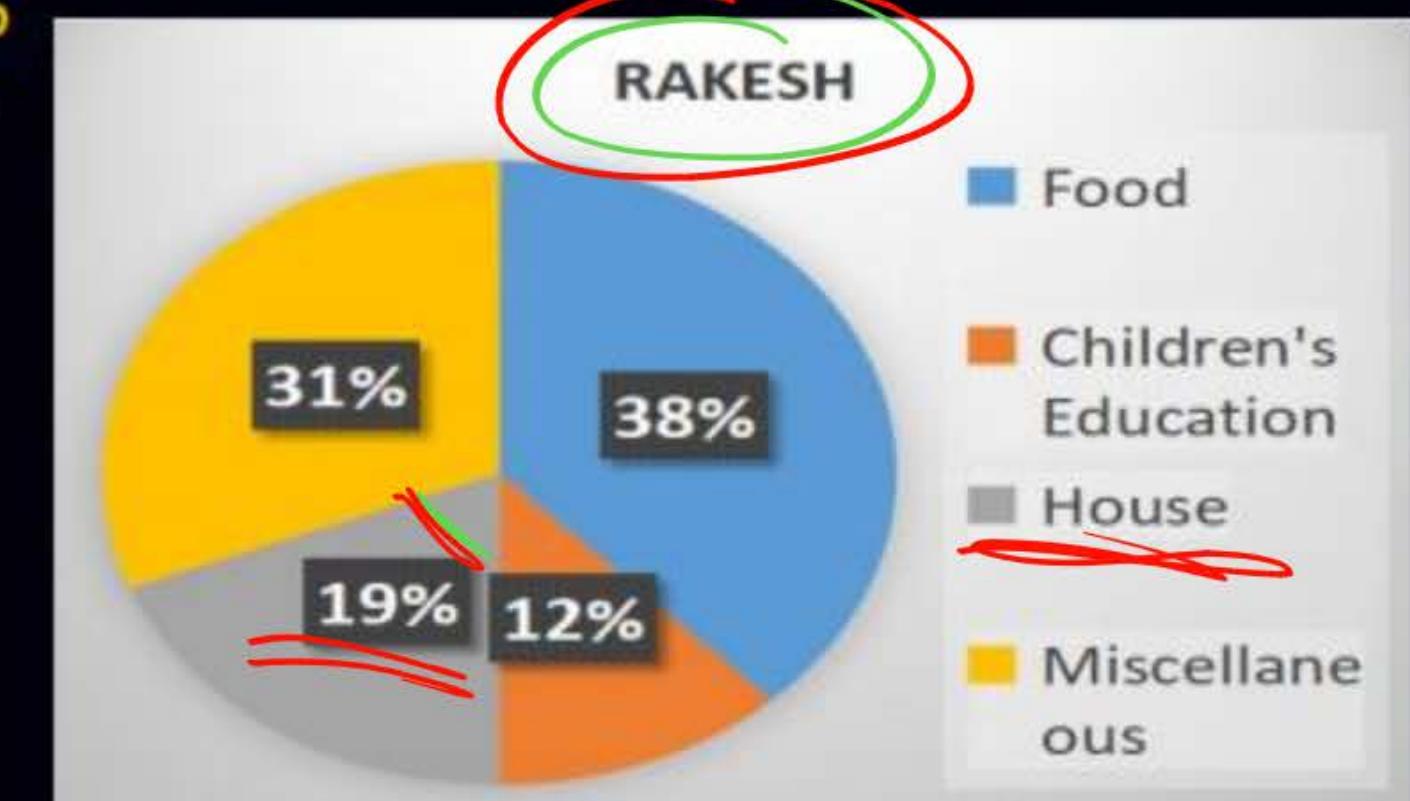
C 60° approx

D 19° approx

$$\frac{19}{5} \times 36^\circ$$

$$= \frac{19 \times 18}{5} = \frac{342}{5}$$

$$= 68.4^\circ$$



THANK
YOU!