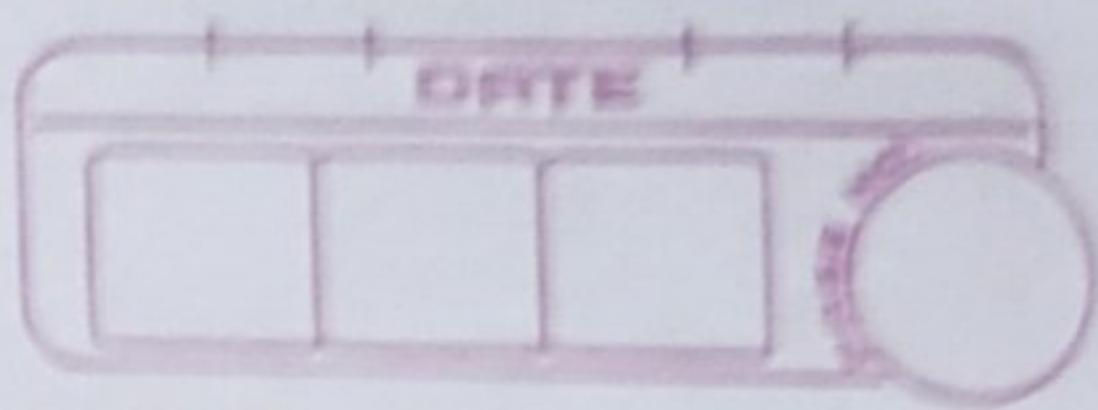


Percentage & Profit / loss.



q1] what is 25% of 200?

- a) 25 b) 50 c) 75 d) 100

$$\frac{25}{100} \times 200 = 50\%$$

q2] If 40% of a number is 80, what is the number?

- a) 100 b) 150 c) 200 d) 250

$$\frac{40}{100} \times x = 80$$

$$x = \frac{80 \times 100}{40} = x = 200$$

q3] 75% of a number is 150. what is the number?

- a) 175 b) 200 c) 225 d) 250

$$\frac{75}{100} \times x = 150$$

$$\frac{3}{4} \times x = 150$$

$$x = \frac{150 \times 4}{3} = x = 200$$

q4] what is 15% of 120?

- a) 12 b) 15 c) 18 d) 20

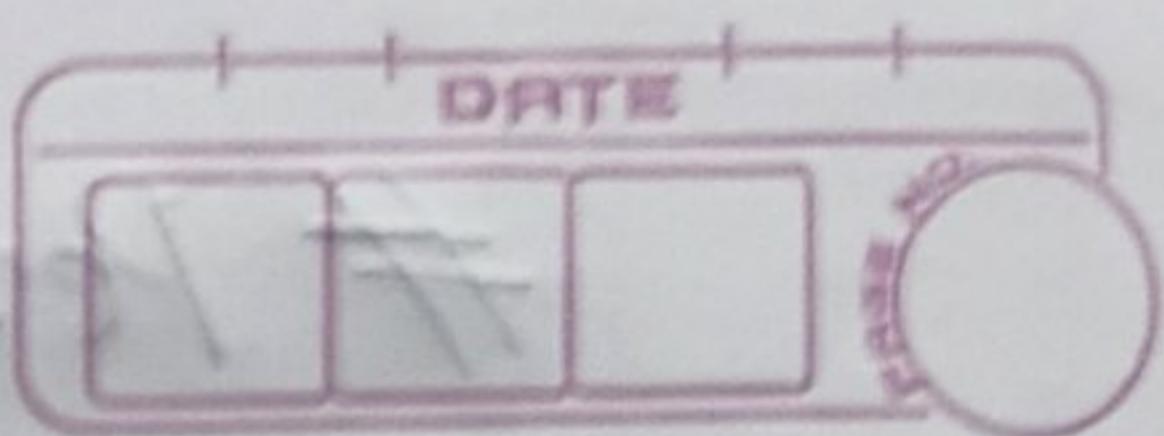
$$\frac{15}{100} \times 120 = 18\%$$

q5] If 30% of a number is 90, then the number is:

- a) 200 b) 250 c) 300 d) 350

$$\frac{30}{100} \times x = 90$$

$$x = \frac{90 \times 100}{30} = x = 300$$



Q6)

IMP

The price of a product increases from 200 to 250. what is the percentage increase?

- a) 20% b) 25% c) 30% d) 35%

$$\% \text{ increase} = \left(\frac{\text{New price} - \text{old price}}{\text{old price}} \right) \times 100$$

$$\% \text{ increase} = \left(\frac{250 - 200}{200} \right) \times 100$$

$$\frac{50}{2} = 25\%$$

Q7)

A salary increases from 40,000 to 50,000. what is the percentage increase?

- a) 20% b) 25% c) 30% d) 35%

$$\% \text{ increase} = \left(\frac{50,000 - 40,000}{40,000} \right) \times 100 =$$

$$= \left(\frac{10,000}{40,000} \right) \times \frac{100}{100} = 25\%$$

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

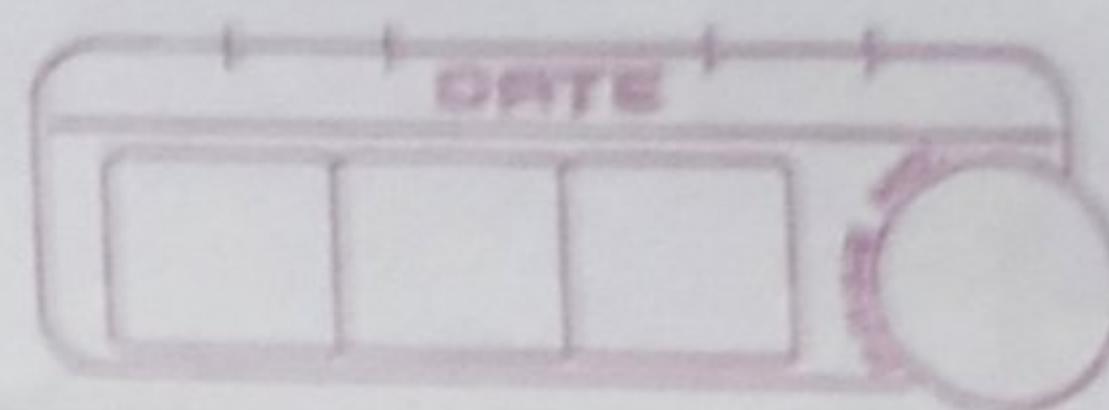
Q8)

IMP

The population of a town decreased from 10,000 to 80,000. what is the percentage decrease?

- a) 10% b) 15% c) 20% d) 25%

$$\% \text{ Decrease} = \left(\frac{\text{old value} - \text{New value}}{\text{old value}} \right) \times 100$$



$$\% \text{ decrease} = \left(\frac{10,000 - 8,000}{10,000} \right) \times 100$$

$$= \frac{2000}{10000} \times 100 = 2 \times 10 = 20\%,$$

Q9] A book price drops from 500 to 400. What is the % decrease?
a) 10%. b) 15%. c) 20%. d) 25%.

$$\left(\frac{500 - 400}{500} \right) \times 100$$

$$\frac{100}{500} \times 100 = 20\%.$$

Q10] If the cost price of an item is 600 & the selling price is 450
what is the % loss?

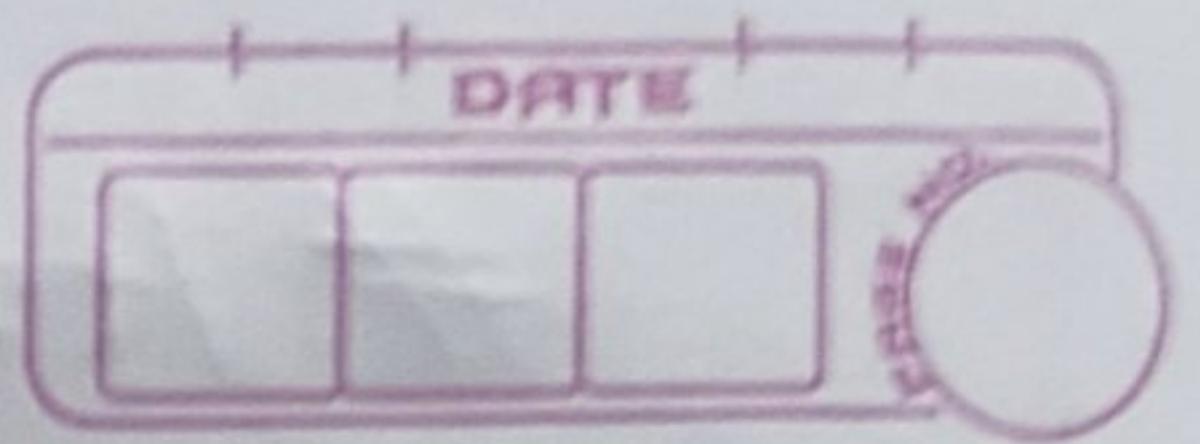
- a) 20%. b) 22.5%. c) 25%. d) 30%.

$$\% \text{ loss} = \left(\frac{\text{Cost price} - \text{Selling price}}{\text{Cost price}} \right) \times 100$$

$$\frac{600 - 450}{600} \times 100$$

$$\frac{150}{600} \times 100 = 25\%$$

Q11]



Percentage Comparison

Q11] which is greater? 30% of 400 or 40% of 300?

- a) 30% of 400
- b) 40% of 300
- c) Both are equal
- d) cannot be determined

→ 1) 30% of 400

$$\frac{30}{100} \times 400 = \frac{30}{100} \times 400 = 120$$

2) 40% of 300

$$= \frac{40}{100} \times 300 = 120$$

Q12) A person spends 60% of his income & saves 8000. what is his total income?

- a) 15,000
- b) 18,000
- c) 20,000
- d) 25,000

→ Total income

100%

60%, 40%

(remaining)

$$0.40 \times x = 8000$$

$$x = \frac{8000}{0.40} = 20,000$$

OR

$$\frac{40}{100} \times x = 8000$$

$$100x = \frac{8000}{40}$$

$$x = \frac{200}{40} \times \frac{100}{100} = 200 \times 100 = 20,000$$

Q13) If A is 20% more than B, then B is how much less than A?

- a) 20%
- b) 16.67%
- c) 25%
- d) 10%

$$A = 20\%$$

$$A = \frac{20}{100} \times B = 0.20B \quad A = B + 0.20B \\ A = 1.20B$$

diff. betw A & B =

$$A - B = 1.20B - B \\ = 0.20B$$

$$\% \text{ less} = \left(\frac{0.20B}{1.20B} \right) \times 100$$

$$= \frac{0.20}{1.20} \times 100 = \frac{1}{6} \times 100 \approx 16.67\%$$

Q14) If the price of the sugar is increased by 25%. by how much should the consumption be reduced to maintain the same expense?

- a) 20% b) 25% c) 30% d) 15%

$$\text{Initial expense} = A \times B$$

New price increase by 25% =

$$\text{New price} = \frac{25}{100} \times A$$

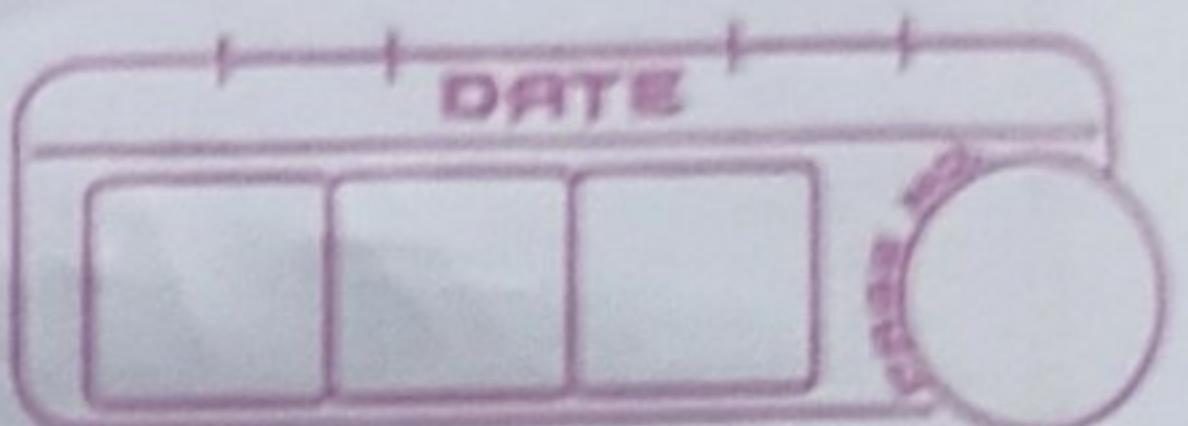
$$\text{New price} = 1.25 \times A$$

New expense = Initial Expense

$$A \times B = (A \times 1.25) \times B_{\text{new}}$$

we can cancel both the side (assuming $A \neq 0$)

$$B = 1.25 \times B_{\text{new}}$$



$$B_{\text{new}} = \frac{B}{1.25} = 0.8B$$

$$\therefore \text{reduction} = (1-0.8) \times 100 = 20\%$$

Q15) If A income is 40% more than Bs income, then Bs income is what % less than As?

- a) 28.57% b) 30% c) 33.33% d) 40%



$$A = B + 0.40B = 1.40B$$

$$A - B = 1.40B - B$$

$$= 0.40B$$

$$\therefore \text{less} = \frac{0.40B}{1.40B} \times 100$$

$$\frac{0.40}{1.40} \times 100$$

$$\frac{4}{14} \times 100 \cong 28.57\%$$

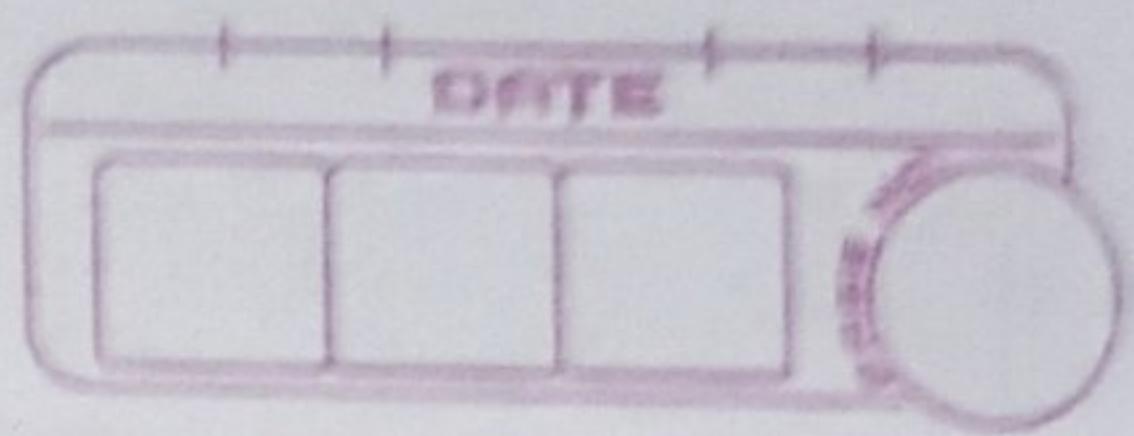
Q16) The price of an item is increased by 20% & then decreased by 10%, what is the net % change?

- a) 8% increase b) 8% decrease c) 10% increase d) 10% decrease

initial price = P

price increase 20% =

$$\begin{aligned} \text{New price after increase} &= P + 0.20P \\ &= 1.20P \end{aligned}$$



price decreased by 20% =

$$\begin{aligned}\text{new price after decrease} &= 1.20P - 0.10(1.20P) \\ &= 1.20P \times 0.90 \\ &= 1.08P\end{aligned}$$

$$\% = \frac{\text{Final price} - \text{initial price}}{\text{initial price}} \times 100$$

$$\frac{1.08P - P}{P} \times 100$$

$$\frac{0.08P}{P} \times 100 = 8\%$$

Q17) A number is increased by 30% & then decreased by 20%. What is the final % change?

- ~~a) 1% increase~~ b) 8% increase c) 10% increase d) 12% increase

$$\text{initial no} = x$$

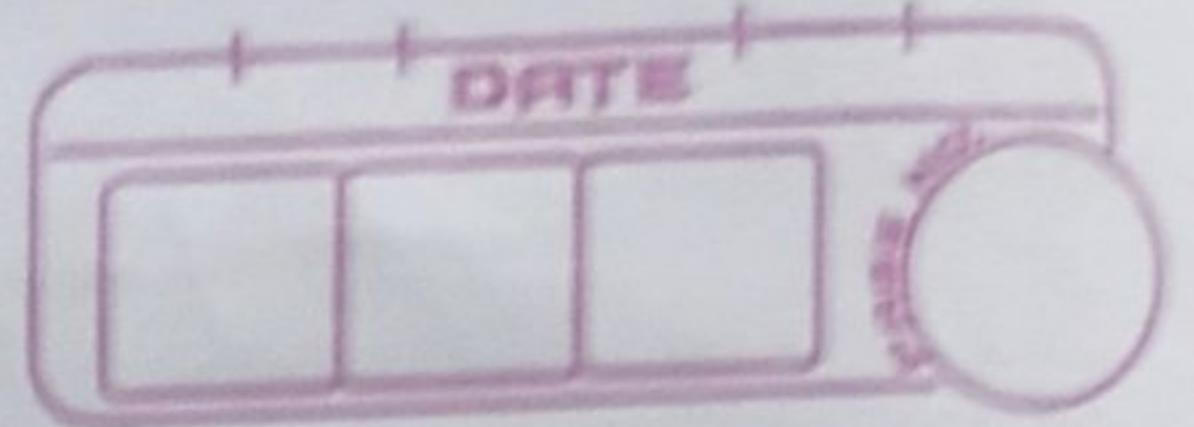
$$\text{increase by } 30\% =$$

$$\begin{aligned}\text{new no. increase} &= x + 0.30x - \\ &= 1.30x\end{aligned}$$

$$\begin{aligned}\text{new no after decrease} &= 1.30x - 0.20(1.30x) \\ &= 1.30x \times 0.80 \\ &= 1.04x\end{aligned}$$

$$\% \text{ change} = \frac{\text{Final No} - \text{Initial No}}{\text{Initial No}} \times 100$$

$$\frac{1.04x - x}{x} \times 100 = \frac{0.04x}{x} \times 100 = 4\%$$



Q18] If the population of city increases by 25% & then decreases by 20%. what is the net percentage change?
 a) 0% b) 5% increased c) 10% decrease d) 5% decrease

→

$$\text{Net change} = 25 + (-20) + \frac{(25)(-20)}{100}$$

$$\frac{5 + (-500)}{100}$$

$$= 5 - 5 = 0\%$$

OR

Increase by 25%.

$$100 + 25\% \text{ of } 100 = 100 + 25 = 125$$

Decrease by 20%.

$$125 - 20\% \text{ of } 125 = 100$$

Final population = 100, which is same as initial pop.
 net % change = 0%.

Q19] If a price increase by 40% & then decrease by 30%, what is the overall % change?

→

$$40 - 30 + \frac{(40)(-30)}{100}$$

$$30 - 4 = 10 - 12$$

decrease by 2%.

OR

$$\text{increase by } 40\% = 100 + 40 = 140$$

Decrease by 30% =

$$30\% \text{ of } 140 = \frac{30}{100} \times 140$$

$$190 - 42$$

$$= 98$$

The net worth % change = $98 - 100 = \underline{-2\%}$

Q20) The salary of a person is increased by 20% & then decreased by 10%. What is the overall % change?

$$\text{change \%} = 20 + (-10) + \frac{(20)(-10)}{100}$$

$$= 10 - 2 \\ = \underline{8\% \text{ increased}}$$

OR

$$20\% \text{ of } 100 = \frac{20}{100} \times 100 = 20$$

$$100 + 20 = 120$$

$$\text{decrease by } 10\% = \frac{10}{100} \times 120 = 12$$

$$120 - 12 = 108 \\ = \underline{8\% \text{ increase}}$$

Q21) If an article is sold at 25%, the selling price is what % of C.P?

$$\text{let C.P} = 100$$

profit is 25% C.P

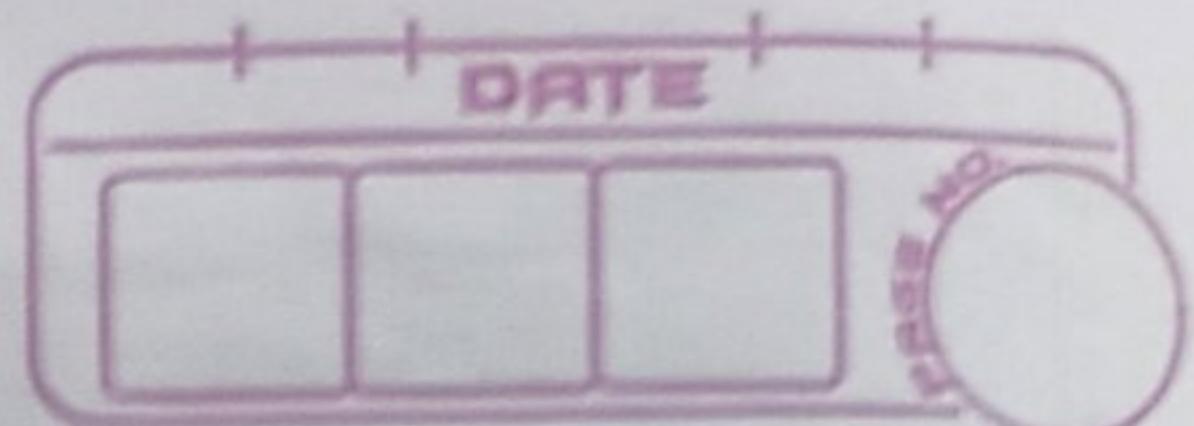
$$\text{profit} = 25$$

$$SP = CP + \text{Profit}$$

$$SP = 100 + 25 = 125$$

SP or a% of C.P

$$\frac{SP}{CP} \times 100 = \frac{125}{100} \times 100 = 125\%$$



OR

$$\begin{aligned} SP &= (100 + \text{profit}) \% \text{ of CP} \\ &= (100 + 25) \% \text{ of CP} \\ &= 125\% \text{ of CP.} \end{aligned}$$

Q22] A shopkeeper allows a discount of 10% on the marked price & still makes a profit of 8%. If the marked price is ₹ 500, what is CP?

→ M.P = ₹ 500

Discount = 10%.

Profit = 8%.

1) calculate SP:

$$\text{discount price} = 10\% \text{ of } 500 = \frac{10}{100} \times 500$$

$$SP = 500 - 50 = 450$$

2) Shopkeeper makes a profit of 8%.

SP = 108%.

SP = 108% of CP

$$450 = \frac{108}{100} \times CP$$

$$CP = \frac{450}{1.08} = 416.67$$

$$416.67 \approx 420$$

Q23] If the profit is 20% of CP, what is the % on the S.P?

→ 1) let CP = 100

$$2) \text{ profit} = 20\% \text{ of CP} = \frac{20}{100} \times 100 = 20$$

$$3) SP = CP + \text{profit}$$

$$= 100 + 20$$

$$= 120$$

$$\text{profit \% of SP} = \left(\frac{\text{profit}}{S.P} \right) \times 100$$

$$= \frac{20}{120} \times 100 = 16.67\%$$

Q24] A product is marked at ₹ 1200 & sold for ₹ 960, what is the \% discount given

$$\rightarrow \text{discount \%} = \frac{MP - SP}{MP} \times 100$$

$$\frac{1200 - 960}{1200} \times 100$$

$$\frac{240}{1200} \times 100 = 20\%$$

Q25) If an article is bought for ₹ 500 & sold for ₹ 650, what \% profit?

$$CP = 500$$

$$SP = 650$$

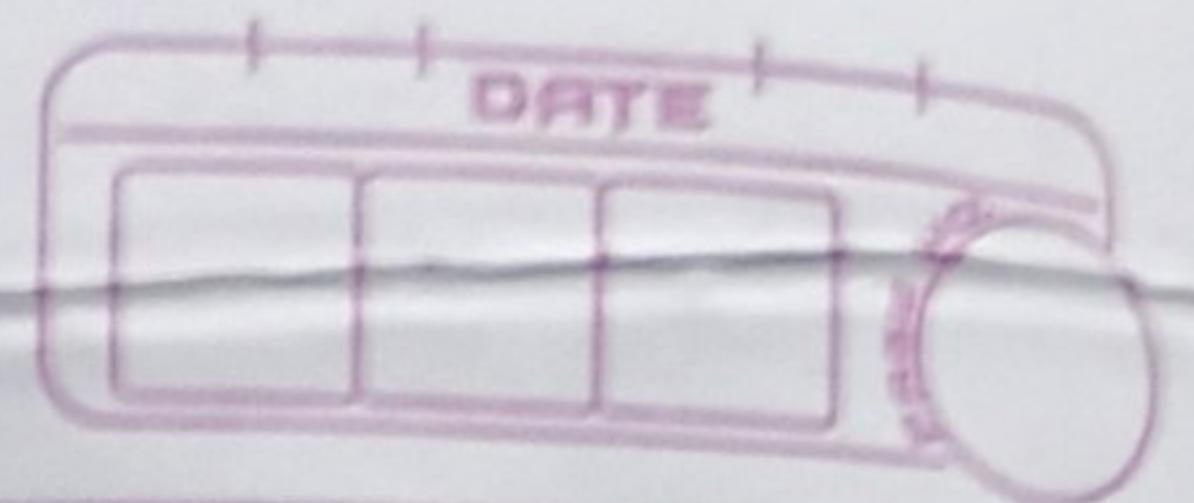
$$\% \text{ profit} = \frac{150}{500} \times 100 = 30\%$$

Q26) If A's income is 20% more than B's, then B's income is what \% less than A's

$$\rightarrow \text{let B's income} = 100$$

$$1) A's income is 20\% than B = 100 + 20 = 120B$$

$$2) \% \text{ decrease} = \frac{A-B}{A} = \left(\frac{120-100}{120} \right) \times 100 = \frac{20}{120} \times 100$$



Q27) If the ratio of boys in a school is 3:2, what % of total student are boy

$$\rightarrow \text{let no. of boys} = 3x$$

$$\text{no. of girls} = 2x$$

$$\text{Total no. of student} = 3x + 2x = 5x$$

$$\% \text{ of boys} = \frac{\text{no. of boys}}{\text{total no. of boys}} \times 100$$

$$\frac{3x}{5x} \times 100 = 60\%$$

Q28) A city population increase from 2,00,000 to 2,50,000 in 2 years. What is % increase?

$$\rightarrow \% \text{ increase} = \frac{\text{new value} - \text{old value}}{\text{old value}} \times 100$$

$$\frac{2,50,000 - 2,00,000}{2,00,000} \times 100$$

$$\frac{50,000}{2,00,000} \times 100 \\ = 25\%$$

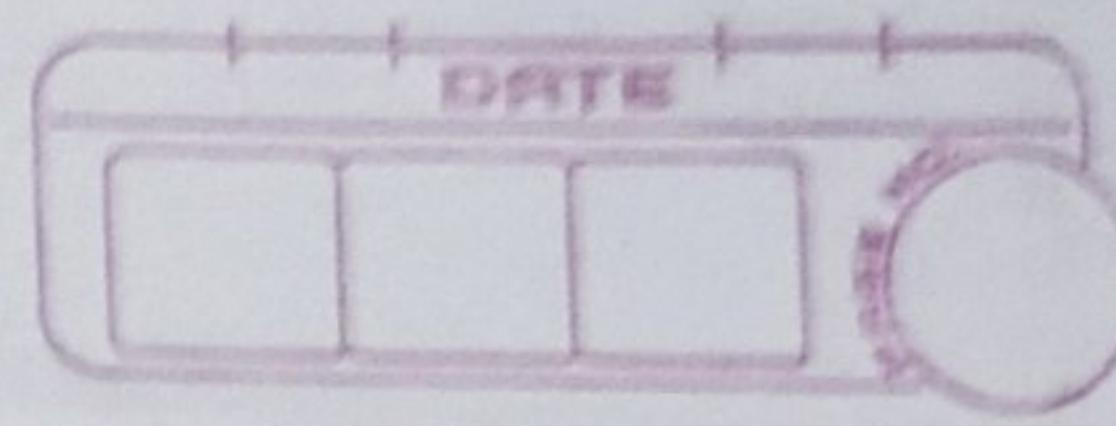
Q29) In an election, a candidate get 65% of the total voter & wins by 3000 Voter. How many total voter are cast?

\rightarrow 1) winning candidate gets is 0.65V

2) losing candidate the remaining vote = 0.35

3) winning candidate wins by 3000 voter.

$$0.65V - 0.35V = 3000$$



$$0.30 V = 3000$$

$$V = 10,000$$

Q30] The price of an article reduced by 30%, by which % must the new price be increased to restore the o.p.

→ let original price = 100

$$\text{New price} = 100 - 30\% = 70\%$$

To restore the o.p 100 we need to increase N.p.c (70) by certain certain %.

∴ % increase should be

$$\frac{70 + \frac{x}{100}}{100} \times 70 = 100$$

divide both side by 0.70

$$\begin{aligned} 0.70 + \frac{x}{100} &= \frac{1}{0.70} \\ - \frac{10}{7} &\cong 1.4286 \end{aligned}$$

subtract 1 from both side:

$$\frac{x}{100} = 0.4286$$

multiply by 100 to find x:

$$x = 42.86$$

Q31] If a no. is increased by 50% & then decreased by 50%. what is the net percentage change?

→ suppose no = 100

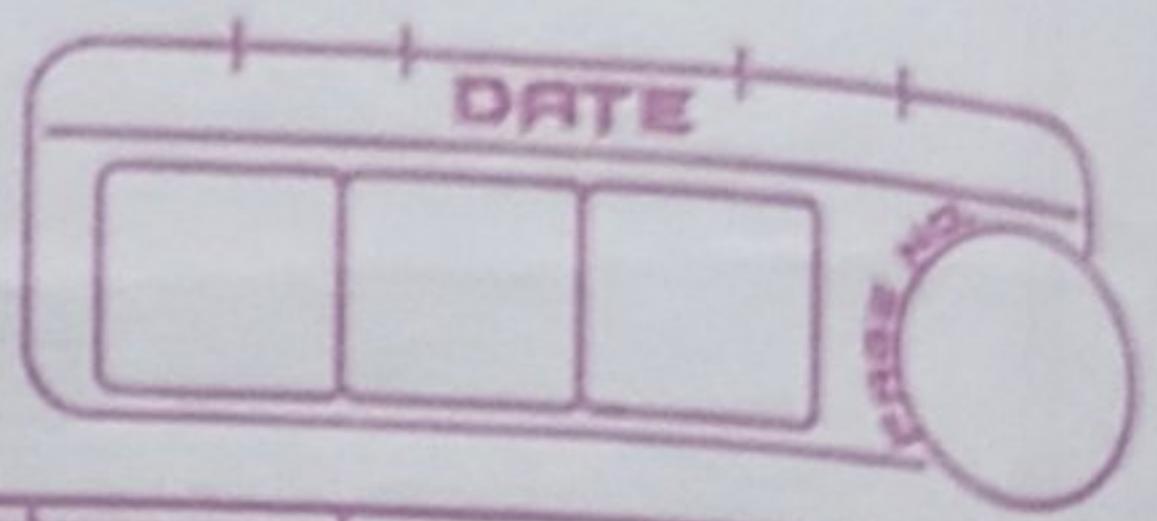
increase by 50%

means value = 150

$$\text{decrease by } 50\% = \frac{50}{100} \times 150$$

$$= 75\%$$

$$150 - 75 = 75$$



$$\text{Net \% change} = \frac{75 - 100}{100}$$

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

decrease by 25%

- Q32) If A is 20% taller than B, then B is shorter than A by
 → A's height = $x + 20\% \text{ of } x$
 $= x + 0.20x = 1.20x$

$$\text{diff} = 1.20x - x = 0.20x$$

$$\% \text{ diff} = \frac{0.20x}{1.20x} = 16.67\%$$

- Q33) If 30% of a no. is 90. What is 60% of the same no.
 → $\frac{30}{100} \times x = 90$

$$x = \frac{90 \times 100}{30}$$

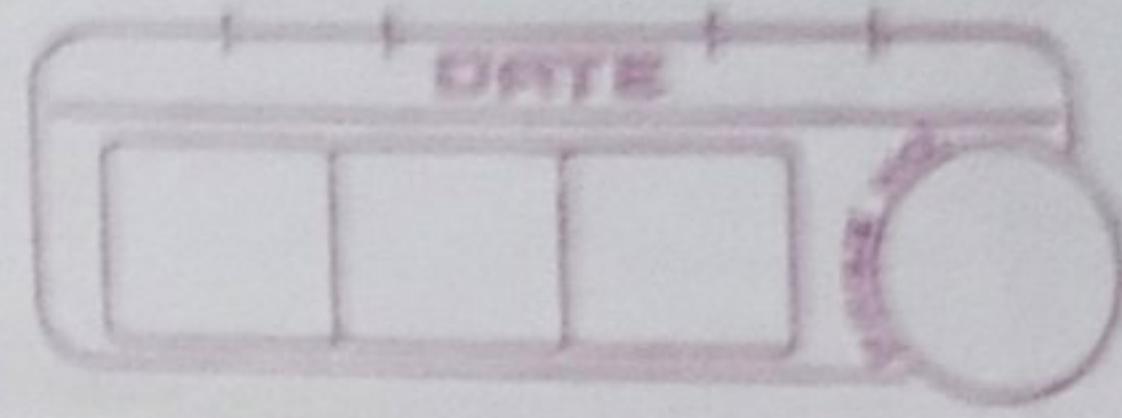
$$x = 300$$

$$60\% \text{ of the same no} = \frac{60}{100} \times 300 \\ = 180$$

- Q34) A person spends 75% of his income & save 5000 RS. what is his total income

$$\rightarrow \text{spend amount} = \frac{75}{100} \times x = 0.75x$$

∴ remaining 25% of his income which is 5000



$$\frac{25}{100} x = 5000$$

$$x = \frac{200}{5000} \times \frac{100}{25}$$

$$x = 2000$$

Q35) The price of petrol increases by 20%. By what % should consumption be reduced to maintain the same expense?

→ 1) Price of petrol increase by 20%.

2) Let original price of petrol be ₹ 1/litr.
Initial consumption = x litres

3) Expense = $1 \times x = x$

4) After 20% increase, the new price become ₹ 1.20

5) $1.20 \times j = x$

$$j = \frac{x}{1.20}$$

$$\% \text{ reduction} = \frac{x-j}{x} \times 100$$

$$= \frac{x - \frac{x}{1.20}}{x} \times 100$$

$$x = 16.67 \%$$

Q36) The price of a TV increased by 20% decreased by 10%. What is the overall % change.

→ 1) Increased % = 120

$$120 \times \frac{10}{100} = 12$$

$$120 - 12 = 108$$

$$\% \text{ of overall change} = \frac{108 - 100}{100} = \frac{8}{100} \times 100 \\ = 8\%$$

Q37) A shopkeeper marks an item 25% above the CP. If given 20% discount, what is profit/loss %?

→ Let CP = 100

$$MP = 25\% \text{ of CP}$$

$$MP = CP + 25\% \text{ of CP} = 100 + 25 \\ = 125$$

Shopkeeper gives 20% discount on MP.

→ The discount is 20% of RS 125, which is

$$\text{Discount} = \frac{20}{100} \times 125 = 25$$

$$SP = MP - \text{Discount} = 125 - 25 = 100$$

For profit & loss

$$CP = 100 \text{ & } SP = 100$$

∴ no profit or loss

Q38) If CP = 500 & loss = 20%, SP = ?

$$SP = CP - \left(\frac{20 \times 500}{100} \right)$$

$$SP = 500 - 100$$

$$SP = 400$$

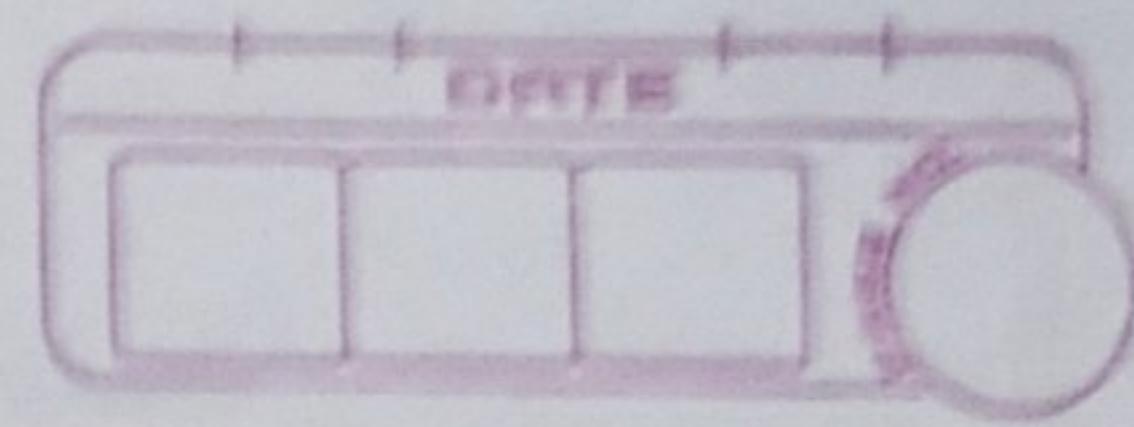
Q39) If a salary increased by 10% & then decreased by 10%. What is final % change?

→ Increase by 10% = 110

$$\text{If decrease by 10%} = 110 \times \frac{10}{100}$$

11

after decreasing = 99



$$\text{Net change} = \frac{99-100}{100} = -1\%$$

Q40) A student needs 40% marks to pass. He gets 200 marks & fails by 20 marks. What are the total.

$$\text{Passing marks} = 220$$

$$40\% \text{ of total marks} = 220$$

$$\frac{40}{100} \times T = 220$$

$$T = \frac{220 \times 100}{40}$$

$$T = 550$$

Q41) A man spends 20% of his salary on rent, 30% on food & 10% on transport. If he saves 18,000, what is his salary?

20%

30%

10%

60%

remaining 40% of his salary

$$\frac{40}{100} S = 18,000$$

$$S = \frac{18,000 \times 100}{40}$$

$$S = \frac{18,000}{4}$$

$$S = 45,000$$

Q42) increased by 30% decrease by 30%. The cost of an item is first increased by 30% decrease by 30%. What will be the overall % change.

→ After increase = 130

$$\frac{30}{100} \times 130 = 39$$

$$130 - 39 = 91$$

$$\text{overall \% change} = \frac{91-100}{100} = \frac{-9}{100}$$

9% decrease.

Q43] If the population of a town increases by 10% every year. If the current population is 10,000, what will it be after 3 years?

→ Current population = 10,000

$$\frac{10}{100} \times 10,000 = 1000$$

$$\therefore \text{For 1st year} = 10,000 + 1000 \\ = 11000$$

For 2nd year

$$= \frac{10}{100} \times 11,000$$

$$= 1100$$

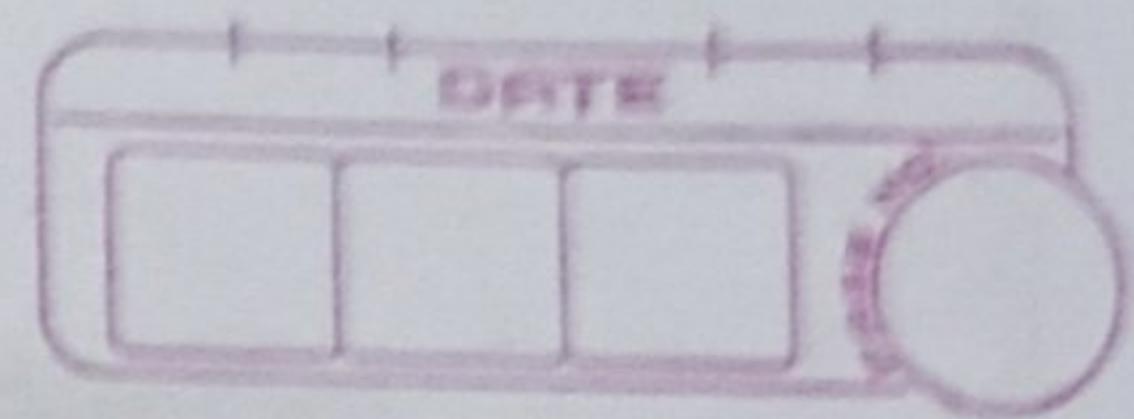
$$11,000 + 1100 \\ 12100$$

For a 3rd year

$$\frac{10}{100} \times 12100$$

$$= 1210$$

$$= 12100 + 1210 \\ = 13310$$



Q44) If 15% of A = 20% of B then A:B is

$$\frac{15}{100} \times A = \frac{20}{100} \times B$$

$$\frac{A}{B} = \frac{20}{100} \times \frac{100}{15}$$

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

Q45) ~~If the CP = 800 F~~ | if the CP of an item is 800 & the profit made is 25%, what is the SP?

$$\text{Profit} = \text{SP} - \text{CP}$$

$$\text{SP} = 800 + \left(\frac{25 \times 800}{100} \right)$$

$$800 + 200$$

$$\text{SP} = 1000$$

Q46) If the CP of an item is 200 & the SP is 280, what is the profit %?

$$\begin{aligned}\text{Profit} &= 280 - 200 \\ &= 80\end{aligned}$$

$$\therefore \text{Profit \%} = \frac{80}{200} \times 100 = 25\%$$

Q47) A man sells an article for 720 at a profit of 20%. Find the CP.

$$720 = \text{CP} \times \left(1 + \frac{20}{100} \right)$$

$$720 = \text{CP} \times 1.2$$

$$\text{CP} = 600$$

Q48) Already done

Q49) A man purchased a cycle for 1500 & sold it at a loss of 10%. what was the SP.

→

$$CP = 1500$$

$$Loss = 10\%$$

$$SP = 1500 - \left(\frac{10 \times 1500}{100} \right) = 1350$$

Q50) A trader marks his goods at 30% above the CP & allows a discount of 10%. what is his gain %.

→

$$MP = 100 + 30\% \times 100 = 130$$

$$\text{Discount} = 10\% \times 130 = 13$$

$$SP = 130 - 13 = 117$$

$$\% \text{ gain} = \frac{117 - 100}{100} \Rightarrow 17\%$$