

Topic: Percentage & Profit and Loss
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1) What is 25% of 200?

$$\rightarrow \frac{25}{100} \times 200 = 50 \text{ (B)}$$

2) If 40% of a number is 80, what is the number?

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

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

$$x = \frac{80 \times 100}{40} = 200 \text{ (c)}$$

3) 75% of a number is 150. What is the number?

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

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

$$x = \frac{150 \times 100}{75} = 200 \text{ (b)}$$

4) What is 15% of 120?

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

$$\rightarrow \frac{15}{100} \times 120 = 18 \text{ (c)}$$

- 5) If 30% of a number is 90, then the number is
 a) 200 b) 250 c) 300 d) 350

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

$$x = \frac{90 \times 100}{30} = 300 \quad (\text{c})$$

- 6) The price of a product increases from ₹200 to ₹250.
 What is the % increase?
 a) 20% b) 25% c) 30% d) 35%

$$\rightarrow \% \text{ increase} = \frac{250 - 200}{200} \times 100 = \frac{50}{200} \times 100 = 25\% \quad (\text{b})$$

- 7) A salary increases from ₹40,000 to ₹50,000.
 What is the % increase?
 a) 20% b) 25% c) 30% d) 35%

$$\rightarrow \% \text{ increase} = \frac{50,000 - 40,000}{40,000} \times 100 = \frac{10,000}{40,000} \times 100 = \frac{1}{4} \times 100 = 25\% \quad (\text{b})$$

- 8) The population of a town decreased from 10,000 to 8,000, what is the % decrease?
 a) 10% b) 15% c) 20% d) 25%

$$\rightarrow \% \text{ decrease} = \frac{10,000 - 8,000}{10,000} \times 100 = \frac{2,000}{10,000} \times 100 = 20\% \quad (\text{c})$$

- 9) A book's price drops from ₹500 to ₹400, what is the % decrease?
 a) 10% b) 15% c) 20% d) 25%

$$\rightarrow \% \text{ dec.} = \frac{500 - 400}{500} \times 100 = \frac{100}{500} \times 100 = 20\% \quad (\text{c})$$

- 10) If the cost price of an item is ₹600 and the SP is ₹450, what is the % loss?
 a) 20% b) 22.5% c) 25% d) 30%

$$\rightarrow \% \text{ Loss} = \frac{CP - SP}{CP} \times 100 = \frac{600 - 450}{600} \times 100 = \frac{150}{600} \times 100 = 25\% \quad (\text{c})$$

★ Percentage Comparison ★

- 11) 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.

$$\rightarrow \frac{30}{100} \times 400 = 120 ; \frac{40}{100} \times 300 = 120$$

(c) Both are equal

- 12) A person spends 60% of his income & saves ₹8000. What is his total income?

$$\rightarrow I = E + S \quad \text{e.g. } 100 = 60 + S \Rightarrow S = 40\% \\ \therefore 40\% = 8,000 \Rightarrow x = \frac{8,000 \times 100}{2000 \times 40} = 20,000 \\ (c) 20,000$$

- 13) If A is 20% more than B, then B is how much less than A?
 a) 20% b) 16.67% c) 25% d) 10%

→ If $100 \rightarrow 120$
 $B \quad A$
 $\therefore 120 - 100 \times 100 = 20\% \rightarrow 16.67\%$

- 14) If the price of 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%

Initially: ₹100 → 1 kg
 Now ₹125 → 1 kg

As ₹125 → 1 kg
 ₹100 → ? kg
 Current consumption = $\frac{100}{125} = 0.8 \text{ kg}$

% reduction = $1 - 0.8 \times 100 = 20\%$ (a)

- 15) If A's income is 40% more than B's income, then B's income is what % less than A's?
 a) 28.57% b) 30% c) 33.33% d) 40%

→ 100 140
 $B \quad A$
 $\% \text{ less} = \frac{140 - 100}{140} \times 100 = \frac{40}{140} \times 100 = 28.57\%$ (a)

- 16) The price of an item is increased by 20% and then decreased by 10%. What is the net percentage change?
 a) 8% increase b) 8% decrease
 c) 10% increase d) 10% decrease

→ $100 \rightarrow 120 \quad 120 - 100 = 20\% \uparrow$
 $120 \rightarrow 108 \quad 108 - 120 = 8\% \downarrow$

Net % change = $\frac{108 - 100}{100} \times 100 = 8\% \text{ increase}$ (a)

- 17) A number is increased by 30% and then decreased by 20%. What is the final percentage change?
 a) 4% ↑ b) 8% ↓ c) 10% ↑ d) 12% ↑

→ $100 \rightarrow 130 \quad 130 - 100 = 30\% \uparrow$
 $130 \rightarrow 104 \quad 104 - 130 = 20\% \downarrow$

Final % change = $\frac{104 - 100}{100} \times 100 = 4\% \uparrow$ (a)

- 18) If the population of a city increases by 25% & then decreases by 20%, what is the net % change?
 a) 0% b) 5% ↑ c) 10% ↓ d) 5% ↓

→ $100 \rightarrow 125 \quad 125 - 100 = 25\% \uparrow$
 $125 \rightarrow 100 \quad 100 - 125 = 20\% \downarrow$

Net % change = $\frac{100 - 100}{100} \times 100 = 0\%$

- 19) If a price increases by 40% and then decreases by 30%, the final change is?
 a) 2% ↑ b) 10% ↑ c) 10% ↓ d) 2% ↓

$$\begin{array}{cccc} \rightarrow & 100 & 140 & 140 - 42 \\ & \swarrow 40\% & \uparrow 30\% \downarrow & = 98 \end{array}$$

$$\therefore \text{Change \%} = \frac{100 - 98}{100} \times 100 = 2\% \downarrow \quad (\text{d})$$

- 20) The salary of a person is first increased by 20% and then decreased by 10%. What is the overall % change?
 a) 8% ↑ b) 10% ↑ c) 10% ↓ d) No change

$$\begin{array}{cccc} \rightarrow & 100 & 120 & 120 - 12 \\ & \swarrow 20\% \uparrow & \uparrow 10\% \downarrow & = 108 \end{array}$$

$$\text{Overall \% change} = \frac{108 - 100}{100} \times 100 = 8\% \uparrow \quad (\text{a})$$

- 21) If an article is sold at a profit of 25%, then the S.P. is what % of the C.P.?
 a) 100% b) 125% c) 150% d) 175%

$$\begin{array}{ccccccc} \rightarrow & 100 & 125 & \therefore \frac{S.P.}{C.P.} \times 100 = \frac{125}{100} \times 100 = 125\% \quad (\text{b}) \\ & \swarrow 25\% & \uparrow P & & & & \end{array}$$

- 22) A shopkeeper allows a discount of 10% on the marked price and still makes a profit of 8%. If the marked price is ₹500, what is the C.P.?
 a) ₹400 b) ₹420 c) ₹450 d) ₹460

$$\begin{array}{ccccccc} \rightarrow & M.P. & & & & & \\ & 500 & 500 - 50 & & & & \\ & \swarrow 10\% \text{ discount} & \uparrow & & & & \\ & & = 450 \text{ (S.P.)} & & & & \end{array}$$

$$\therefore \text{Profit \%} = 8 = \frac{S.P. - C.P.}{C.P.} \times 100 = \frac{450 - C.P.}{C.P.} \times 100$$

$$\left(\frac{450 - 1}{C.P.} \right) \times 100 = 8$$

$$\frac{450}{C.P.} = \frac{8 + 1}{100}$$

$$\frac{450}{C.P.} = \frac{108}{100}$$

$$C.P. = \frac{450 \times 100}{108} = \frac{1250}{3} = ₹416.67$$

- 23) If the profit is 20% of the C.P., then what is the profit % on the S.P.?
 a) 16.67% b) 18% c) 20% d) 22%

$$\rightarrow \text{Profit} = S.P. - C.P = \frac{20}{100} \times C.P$$

$$\Rightarrow S.P = 1.2 C.P$$

$$\begin{aligned} \text{Profit \% on S.P.} &= \frac{S.P. - C.P}{S.P.} \times 100 \\ \text{As } S.P. &= 1.2 C.P \\ &= \frac{1.2 C.P - C.P}{1.2 C.P} \times 100 \\ &= \frac{0.2}{1.2} \times 100 = \frac{1}{6} \times 100 = 16.67\%. \quad (\text{a}) \end{aligned}$$

- 24) A product is marked at ₹1200 and sold for ₹960. What is the % discount given?
 a) 15% b) 20% c) 25% d) 30%

$$\rightarrow \text{Discount} = M.P - S.P = 1200 - 960 = ₹240$$

Discount is given on M.P.:

$$\begin{aligned} \therefore \% \text{ Discount} &= \frac{\text{Discount}}{M.P.} \times 100 = \frac{240}{1200} \times 100 \\ &= 20\% \quad (\text{b}) \end{aligned}$$

- 25) If an article is bought for ₹650 and sold for ₹650, what is the % profit?
 a) 20% b) 25% c) 30% d) 35%

$$C.P = 650 \quad S.P = 650$$

$$\begin{aligned} \text{Profit \%} &= \frac{S.P - C.P}{C.P} \times 100 = \frac{650 - 650}{650} \times 100 = \frac{150}{650} \times 100 \\ &= 30\%. \quad (\text{c}) \end{aligned}$$

- 26) If A's income is 20% more than B's, then B's income is what % less than A's?

$$\begin{array}{ccc} B & \uparrow & \% \text{ less} \\ \downarrow 100 & \downarrow 120 & = \frac{120 - 100}{120} \times 100 = \frac{20}{120} \times 100 \\ & & = \frac{1}{6} \times 100 \\ & & = 16.67\%. \quad (\text{a}) \end{array}$$

- 27) If the ratio of boys to girls in a school is 3:2, what % of the total students are boys?
 a) 30% b) 40% c) 50% d) 60%

$$\rightarrow \text{Boys \%} = \frac{3}{5} \times 100 = 60\%. \quad (\text{d})$$

- 28) A city's population increased from 2,00,000 to 2,50,000 in 2 years. What is % increase?

$$\begin{array}{llll} \text{a) } 20\% & \text{b) } 25\% & \text{c) } 30\% & \text{d) } 35\% \end{array}$$

$$\rightarrow \% \text{ increase} = \frac{\text{diff.}}{\text{Initial}} \times 100 = \frac{50000}{200000} \times 100 = 25\%. \quad (\text{b})$$

29) In an election, a candidate gets 65% of the total votes and wins by 3000 votes. How many total votes were cast?

→ A's votes 65%, B's votes 35%.

$$\text{Win by} = \frac{65\% \text{ of total votes} - 35\% \text{ of total votes}}{\text{total votes}} \\ = 30\% \text{ of total votes}$$

∴ As he wins by 3000,

$$30\% \text{ of total votes} = 3000$$

$$\therefore \text{total votes} = \frac{3000}{30\%} = 10000$$

30) The price of an article is reduced by 30%. By what % must the new price be increased to restore the original price?
a) 30% b) 42.85% c) 50% d) 60%.

→ Initially = 100

Reduced by 30% = 70

To restore 70 to 100, need to add 30, so difference = 30

$$\therefore \% \text{ increase} = \frac{\text{diff}}{\text{current val}} \times 100 = \frac{30}{70} \times 100 = 42.85 \quad (\text{b})$$

31) If a no. is increased by 50% and then decreased by 50%, what is the net % change?
a) 0% b) 25% ↓ c) 50% ↓ d) 75% ↓

$$\rightarrow 100 \xrightarrow{50\% \uparrow} 150 \xrightarrow{50\% \downarrow} 75$$

$$\text{net \% change} = \frac{100 - 75}{100} \times 100 = 25\% \text{ decrease (b)}$$

32) If A is 20% taller than B, then B is shorter than A by:
a) 16.67% b) 18% c) 20% d) 25%

$$\rightarrow B \underset{100}{\uparrow} A \underset{120}{\uparrow} \therefore B \text{ shorter than } A = \frac{20}{120} \times 100 = \frac{1}{6} \times 100 \\ = 16.67\% \quad (\text{A})$$

33) If 30% of a no. is 90, what is 60% of the same no.
a) 120 b) 150 c) 180 d) 200

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

$$\therefore \frac{60}{100} \times 300 = 180 \quad (\text{C})$$

34) A person spends 75% of his income and saves ₹ 5000. What is his total income?

$$\rightarrow 75\% \rightarrow \text{Exp} \quad : 25\% \rightarrow \text{Savings} \\ \frac{25}{100} x = 5000 \Rightarrow x = \frac{5000 \times 100}{25} \\ x = 20,000 \quad (\text{C})$$

- 35) The price of petrol increases by 20%. By what % should consumption be reduced to maintain the same expense?
 a) 16.67% b) 18% c) 20% d) 25%

$$\begin{array}{c} \rightarrow 100 \xrightarrow{+20\%} 120 \\ \qquad \qquad \text{Now } \frac{\text{₹}120}{\text{₹}100} \rightarrow 1 \text{ l} \\ \qquad \qquad \qquad \xrightarrow{-20\%} x \text{ l} \\ \therefore x = \frac{100}{120} = \frac{5}{6} = 0.83 \text{ l} \\ \% \text{ reduction in consumption} = \frac{\text{diff.}}{\text{initial consm}} = \frac{1 - \frac{5}{6}}{1} = \frac{1}{6} \\ = 16.67\% \text{ (a)} \end{array}$$

- 36) The price of a TV was first increased by 20% and then decreased by 10%. What is the overall % change?
 a) 8% ↑ b) 10% ↑ c) 10% ↓ d) No change

$$\begin{array}{c} \rightarrow 100 \xrightarrow{+20\%} 120 \xrightarrow{-10\%} 120 - 12 = 108 \\ \qquad \qquad \qquad \text{Overall } = \frac{8}{100} \times 100 = 8\% \uparrow \text{ (a)} \end{array}$$

- 37) A shopkeeper marks an item 25% above the C.P. and gives a 20% discount. What is his profit/loss %?
 a) 0% b) 2% profit c) 5% profit d) 10% loss

$$\begin{array}{c} \rightarrow \text{If } CP = 100, \text{ then } MP = 125 \\ \because SP = 125 - 20\% \text{ of } 125 = 100 \\ \therefore \% \text{ Profit/Loss} = \frac{100 - 100}{100} \times 100 = 0 \text{ (a)} \end{array}$$

- 38) If the C.P. of an article is ₹500, and it is sold at a loss of 20%, what is the S.P?

$$\begin{aligned} \rightarrow C.P. &= 500 \\ \text{Loss \%} &= \frac{C.P. - S.P.}{C.P.} \times 100 \\ 20 &= \frac{500 - S.P.}{500} \times 100 \\ \frac{20}{100} &= \left(1 - \frac{S.P.}{500}\right) \\ \frac{1}{5} &= 1 - \frac{S.P.}{500} \Rightarrow S.P. = \frac{500 - 100}{5} = 400 \text{ (c)} \end{aligned}$$

- 39) If a salary is increased by 10% and then decreased by 10%, what is the final % change?
 a) 0% b) 1% ↓ c) 1% ↑ d) 2% ↓

$$\begin{array}{c} \rightarrow 100 \xrightarrow{+10\%} 110 \xrightarrow{-10\%} 110 - 11 = 99 \\ \qquad \qquad \qquad \text{final \% change} = \frac{100 - 99}{100} \times 100 \\ \qquad \qquad \qquad = 1\% \downarrow \text{ (b)} \end{array}$$

- 40) A student needs 40% marks to pass. He gets 200 marks and fails by 20% marks. What are the total marks?
 a) 500 b) 550 c) 600 d) 650

$$\begin{array}{c} \rightarrow 200 + 20 = 220 \rightarrow 40\% \\ \qquad \qquad \qquad x \rightarrow 100\% \\ \therefore x = \frac{100 \times 220}{40} = 550 \text{ (b)} \end{array}$$

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

a) 40,000 b) 45,000 c) 50,000 d) 55,000

$$\rightarrow \text{Total expenditure} = 20\% + 30\% + 10\% = 60\%$$

$$\therefore \text{Savings} = 40\%$$

$$\text{so, } 40\% \rightarrow 18,000$$

$$100\% \rightarrow x$$

$$\therefore x = 100 \times 18,000$$

$$= 45,000 \quad (\text{b})$$

- 42) The cost of an item is first increased by 30% and then decreased by 30%. What is the overall % change?

a) 0% b) 9% ↓ c) 9% ↑ d) 15% ↓

$$100 \rightarrow 130 \rightarrow 130 - 39$$

$$+30\% \downarrow \quad 30\% \downarrow = 91$$

$$\therefore \text{Overall} = \frac{100-91}{100} \times 100 = 9\% \text{ decrease} \quad (\text{b})$$

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

$$10,000 \xrightarrow{+10\%} 11,000 \xrightarrow{+10\%} 12,100 \xrightarrow{+10\%} 13,310 \quad (\text{a})$$

- 44) If 15% of A is equal to 20% of B, then A:B is:

a) 3:4 b) 4:3 c) 3:5 d) 5:3

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

$$\frac{A}{B} = \frac{20}{15} = \frac{4}{3} \Rightarrow 4:3 \quad (\text{b})$$

- 45) If the CP of an item is ₹800 & profit made is 25%, what is SP?

a) ₹900 b) ₹1000 c) ₹1050 d) ₹1100

$$\rightarrow CP = 800$$

$$\text{Profit \%} = \frac{SP-CP}{CP} \times 100$$

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

$$\frac{25}{100} = \frac{SP-800}{800} \Rightarrow \frac{25}{100} \times 800 = SP-800$$

$$SP = ₹1000 \quad (\text{b})$$

- 46) If CP of an item is ₹200 & SP is ₹250, what is profit %?

a) 20% b) 25% c) 30% d) 40%

$$\rightarrow \text{Profit \%} = \frac{SP-CP}{CP} \times 100 = \frac{250-200}{200} \times 100$$

$$= 50 \times \frac{1}{2} = 25\% \Rightarrow (\text{b})$$

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

(a) 600 (b) 620 (c) 650 (d) 700

$$\rightarrow SP = 720$$

$$\text{Profit \%} = \frac{SP - CP}{CP} \times 100$$

$$\frac{20}{100} = \frac{720 - CP}{CP}$$

$$\frac{1}{5} + 1 = \frac{720}{CP} \Rightarrow \frac{6}{5} = \frac{720}{CP}$$

$$\therefore CP = \frac{720 \times 5}{6} = 600 \quad (\text{a})$$

- 48) A shopkeeper sells an item at a loss of 15%.

If the CP is ₹500, find the SP?

(a) 400 (b) 425 (c) 450 (d) 475

$$\rightarrow \text{Loss \%} = \frac{(CP - SP)}{CP} \times 100$$

$$\frac{15}{100} = 1 - \frac{SP}{500}$$

$$\frac{SP}{500} = 1 - \frac{15}{100} \Rightarrow \frac{SP}{500} = \frac{85}{100}$$

$$SP = 85 \times 5 = 425 \quad (\text{b})$$

- 49) A man purchased a cycle for ₹1500 and sold it at a loss of 10%. What was the SP?

$$\rightarrow \text{Loss \%} = \frac{(CP - SP)}{CP} \times 100$$

$$\frac{10}{100} = 1 - \frac{SP}{1500} \Rightarrow \frac{SP}{1500} = 1 - \frac{1}{10} = \frac{9}{10} \Rightarrow SP = 1500 \times \frac{9}{10}$$

$$SP = 1350 \quad (\text{b})$$

- 50) A trader marks his goods at 30% above the CP and allows a discount of 10%. What is his gain %?

(a) 17% (b) 18% (c) 19% (d) 20%

$$\rightarrow \text{Let } CP = 100, MP = 130$$

$$SP = MP - 10\% \text{ of } MP$$

$$= 130 - 13$$

$$= 117$$

$$\therefore \% \text{ gain} = \frac{117 - 100}{100} \times 100$$

$$= 17\% \quad (\text{a})$$