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 if 80, what is the number?
a] 100 b] 150 c] 200 d] 250

→ $\frac{40}{100} \times x = 80$

$x = \frac{80 \times 100}{40_1} = x = 200$

Q3] 75% of a number is 150. what is the number?
a] 175 b] 200 c] 225 d] 250

→ $\frac{75^3}{100_4} \times x = 150$

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

$x = \frac{150^{50} \times 4}{3_1}$ $x = 200$

Q4] what is 15% of 120?
a] 12 b] 15 c] 18 d] 20

→ $\frac{15^3}{20_5} \times \frac{120}{100} = 18\%$

Q5] If 30% of a number is 90, then the number if:
a] 200 b] 250 c] 300 d] 350

→ $\frac{30}{100} \times x = 90$

$x = \frac{90^9 \times 100}{30_1}$ $x = 300$

Q6] The price of a product increases from 200 to 250. what is the percentage increase?

Imp

a] 20% b] 25% c] 30% d] 35%.

→

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

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

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

Q7] A Salary increases from 40,000 to 50,000. what is the percentage increase?

a] 20% b] 25% c] 30% d] 35%.

→

$$\% \text{ increase} = \left(\frac{50,000 - 40000}{40,000}\right) \times 100 =$$

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

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

Q8] The population of a town decreased from 10,000 to 80,000 what is the percentage decreases

Imp

a] 10%. b] 15%. c] 20%. d] 25%.

→

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

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

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

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

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

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

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%.

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

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

$$\frac{150}{\cancel{600}_{4}} \times \overset{25}{\cancel{100}} = 25\%.$$

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

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

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% (remaining) 40%

$$0.40 \times x = 8000$$

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

OR

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

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

$$x = \frac{200}{8000} \times 100 = 200 \times 100 = 20,000$$

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. betⁿ A & B =

$A - B = 1.20B - B$

$= 0.20B$

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

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

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%

Initial expense = $A \times B$

New price increase by 25% =

new price = $\frac{25}{100} \times A$

New price = $1.25 \times A$

New expense = Initial Expence

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

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

$B = 1.25 \times B_{new}$

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

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

Q15) If A income is 40% more than Bs income. the Bs income is what % less than As?

a] 28.57% b] 30% c] 33.33% d] 40%.

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

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

$$= 0.40B$$

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

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

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

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% $\Rightarrow$

New price after increase $= P + 0.20P$

$= 1.20P$

price decreased by 20% =

new price after decrease = 1.20P − 0.10 (1.20P)

= 1.20P × 0.90

= 1.08P

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

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

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

Q17] A number is increased by 30% & then decreased by 20% what is the final % change?

a] 4% increase b] 8% increase c] 10% increase d] 12% increase

initial no = x

increase by 30% =

new no. increase = x + 0.30x

= 1.30x

new no after decreases = 1.30x − 0.20 (1.30x)

= 1.30x × 0.80

= 1.04x

% 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 changes?
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% of 100 = 100 + 25 = 125

Decrease by 20%.

125 - 20% of 125 = 100

Final population = 100, which is same as initial popuⁿ.

net % change = 0%.

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

→

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

$$30 - 4 = 10 - 12$$

$$26\% = -2 \quad 10 - 12 = -2$$

decrease by 2%.

OR

increase by 40% = 100 + 40 = 140

Decrease by 30% =

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

140 - 42

= 98

The net worth % change = 98 - 100 = -2%

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

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

= 10 - 2

= 8% increased

OR

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

100 + 20 = 120

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

120 - 12 = 108

= 8% increase

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

→ let CP = 100

profit is 25% CP

profit = 25

SP = CP + Profit

SP = 100 + 25 = 125

SP as a % of CP

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

OR

SP = (100 + profit) % of C.P
= (100 + 25) % of CP
= 125 % of CP.

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 = Rs 500
Discount = 10%.
profit = 8%.

1] calculate SP:

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

$SP = 500 - 50 = 450$

2] Shopkeeper makes a profit of 8%.

SP = 108%.
SP = 108% of CP
$450 = \frac{108}{100} \times CP$

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

$416.67 \cong 420$

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

→ 1] let CP = 100
2] profit = 20% of CP = $\frac{20}{100} \times 100 = 20$

3) SP = CP + profit
= 100 + 20
= 120

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

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

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

→ 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

% 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?

→ let B's income = 100

i) A's income is 20% than B = 100 + 20 = 120B

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

$= 16.67\%$

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

→ let no. of boys = 3x
no. of girls = 2x
Total no. of student = 3x + 2x = 5x

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

$$\frac{3\cancel{x}}{\cancel{5x}} \times \frac{20}{\cancel{100}} = 60\%$$

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

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

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

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

$$= 25\%$$

Q29) In an election, a candidate get 65% of tea total voter & wins by 3000 voter, How many total voter qu cast?

→ 1) winning candidate gets is 0.65V
2) losing candidate the remaining vote = 0.35
3) winning candidates wins by 3000 voter.

$$0.65V - 0.35V = 3000$$

$$0.30V = 3000$$

$$V = 10,000$$

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

→ let original price = 100

New price = 100 - 30% = 70%.

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

∴ % increase should be

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

divide both side by 0.70

$$1 + \frac{x}{100} = \frac{1}{0.70}$$

$$= \frac{10}{7} \approx 1.4286$$

substract 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 charge?

→ suppose no = 100

increase by 50%

means value = 150

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

$= 75$

150 - 75 = 75

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 $= x + 20\%$ of x

$= x + 0.20x = 1.20x$

diff $= 1.20x - x = 0.20x$

% 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% 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

→ 1) spend amount $= \frac{75}{100} \times x = 0.75x$

2) remaining 25% of his income which is 5000

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

$$x = \frac{200}{5000} \times \frac{100}{25_1}$$

$$x = 2000$$

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] $1.20 \times y = x$

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

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

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

$$x = 16.67\ \%$$

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

→ increased % = 120

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

$$120 - 12 = 108$$

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

$$= 8\%$$

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

→ let CP = 100

MP = 25% of CP.

MP = CP + 25% of CP. = 100 + 25

= 125

shopkeeper gives 20% discount on MP.

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

discount = $\frac{25}{100} \times 125 = 25$.

SP = MP − Discount = 125 − 25 = 100

for profit & loss

CP = 100 & SP = 10

∴ no profit or lose

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 decrease by 10. what is final % change?

→ increase by 10% = 110

& 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 mg. what are the total.

passing marks = 220

40% of total marks = 220

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

$$T = \frac{220 \times 100^{25}}{40}$$

$$T = 550$$

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

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

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

$$S = \frac{18,0000}{4}$$

$$S = 45,000$$

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

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

$130 - 39 = 91$

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

9% decrease.

Q43] 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 n = 10,000~~

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

∴ 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

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

$$\frac{A}{B} = \frac{20}{100} \times \frac{100}{15_3}$$

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

Q45] ~~If the CP = 800~~ if the CP of an items is 800 & the profit made is 25%, what is the SP?

→ profit = CP - SP

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

$$800 + 200$$

$$SP = 1000$$

Q46) If the CP of an item is 200 & the SP is 250, what is the profit %?

→

$$\text{profit} = 250 - 200$$

$$= 50$$

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

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

→

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

$$720 = CP \times 1.2$$

$$CP = 600$$

~~Q49)~~ 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% × 100 = 130

discount = 10% × 130 = 13

SP = 130 - 13 = 117

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