

Assignment 21

Topic \Rightarrow Percentage and Profit/Loss.

What is 25% of 200?

- (A) 25 (B) 50 (C) 75 (D) 100

$$\frac{25}{100} \times 200 = \frac{25 \times 2}{100} = 50$$

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

- (A) 100 (B) 150 (C) 200 (D) 250

$$40\% \text{ of } x = 80$$

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

$$x = \frac{80 \times 5}{4}$$

$$x = 200$$

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

- (A) 175 (B) 200 (C) 225 (D) 250

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

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

$$x = 200$$

Q What is 15% of 120?

- (A) 12, (B) 15, (C) 18, (D) 20.

$$\frac{15}{100} \times 120 = 18 \text{ Ans}$$

Q If 30% of a number is 90, then the number is .

- (A) 200, (B) 250, (C) 300, (D) 350

$$30\% \text{ of } x = 90$$

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

$$x = 300$$

Q The price of a product increase from 200 to 250. What is the percentage increase?

- (A) 20%, (B) 25%, (C) 30%, (D) 35%.

Change

$\times 100$

Siebenenwerte

$$\Rightarrow \frac{250 - 200}{200} \times 100$$

$$\Rightarrow \frac{50}{200} \times 100$$

Q) Salary increase from Rs 40000 to Rs 50000. What is the percentage increase.
 ① 20% ~~② 25%~~ ~~③ 30%~~ ~~④ 35%~~
Change $\frac{x}{100}$
(Old value - New value)

$$= \frac{(50000 - 40000)}{40000} \times 100$$

$$= \frac{10000}{40000} \times 100^{25}$$

$$= 25\%. \text{ Ans}$$

Q) The population of a town decreased from 10000 to 8000. What is percentage decrease?

- ① 10% ~~② 15%~~ ~~③ 20%~~ ~~④ 25%~~

$$\frac{10000 - 8000}{10000} \times 100$$

$$\frac{2000}{10000} \times 100$$

$$= 20\%. \text{ Ans}$$

- ⑨ A book's price drops from ₹ 800 to ₹ 400. What is the percentage decrease?
 (a) 10% (b) 18% (c) ~~20%~~ (d) 28%.

$$\frac{800 - 400}{800} \times 100 \Rightarrow \frac{\text{(Change)}}{\text{Old value}} = \frac{400}{800} \times 100 = 50\%$$

20% Ans

- ⑩ If the cost price of an item is ₹ 600 and the selling price is ₹ 450. What is the percentage loss?
 (a) 20% (b) 22.5% (c) ~~25%~~ (d) 30%.

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

$$= \frac{(600 - 450)}{600} \times 100$$

25% Ans

Which is greater : 30% of 400 or 40% of 300?

① 30% of 400

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

$$= 120$$

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

$$120$$

② 40% of 300

Both are equal

Both are equal

③ Cannot be determined

④ A person spends 60% of his income and saves

₹ 8000 - What is his total income?

- ① ₹ 15000 ⑤ ₹ 18000 ~~④ ₹ 20000~~ ⑦ ₹ 25000

Let total income is x

$$\frac{80}{100} \times 60\% \text{ of } x + 8000 = x$$

$$\frac{60}{100} \times x + 8000 = x$$

$$\frac{60x + 800000}{100} = x$$

$$60x + 800000 = 100x$$

$$800000 = 100x - 60x$$

$$\frac{800000}{40} = 20000$$

$$\boxed{x = 20000}$$

- (13) If A is 20% more than B, then B is
how much less than A?
Ⓐ 20% Ⓑ 16.67% Ⓒ 28% Ⓓ 18%
Ⓐ 20% Ⓑ 16.67% Ⓒ 28% Ⓓ 18%

Let $B = 100$
so $A = 120$

Change $\rightarrow \frac{(120 - 100) \times 100}{100}$
 $= \frac{120}{120} \times 100 \times 16.67\%$
 $\Rightarrow 16.67\% A$

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

Ⓐ 20% Ⓑ 25% Ⓒ 30% Ⓓ 18%

Let $P_1 = 100$, Cons. = 100, $E_1 = P_1 \times C_1$
 $E_1 = 100 \times 100 = 10000$

$P_2 = 125$ as $\frac{100 \times 25}{100} = 25$ + 100 = 125

Cons? $E_2 = 100 \times 100 = 10000$

$E_2 = P_2 \times C_2$

$10000 = 125 \times C_2$

$\frac{10000}{125} = C_2$

$C_2 = 80\%$

$E_1 = 100\%$
 $\downarrow - 20\% \rightarrow$

$C_2 = 80\%$

If A's income is 40% more than B's income, then B's income is what percentage less than A's income?

- 28.57%. (b) 30%. (c) 33.33%. (d) 40%.

Let B's income is ~~100~~ 100.
Then A's income = 140 {B is 40% more than A}.

$$\frac{\text{Change}}{\text{Reference Value}} \times 100 = \frac{(140 - 100)}{140} \times 100$$

$$= \frac{40}{140} \times 100 = \frac{200}{7} = 28.57\%$$

- (b). The price of an item is increased by 20% and then decreased by 10%. What is the net percentage change?

Let price of item is 100.

$$\text{New} = 120$$

$$\text{Change}_1 = 120$$

$$\text{Change}_2 = 120 \left(\frac{120 \times 10}{120} \right) = 12$$

$$\begin{array}{rcl} 100 \\ \downarrow +20\% = 20 \\ 120 \\ \downarrow -10\% = 12 \\ 108 \end{array}$$

$$120 - 12 = 88$$

$$\text{Change}_1 - \text{Change}_2$$

$$120 - 12 = 108$$

$$108 - 100 = 8 \text{% increase}$$

- 8% increase (b) 8% decrease (d) 10% decrease

- (c) 10% decrease

(17) A number is increased by 30% and then decreased by 20%. What is the final percentage change?

- ~~(A)~~ 4% increase, (B) 8% increase (C) 10% increase

(D)

12% increase

Let Number be 100

$$\begin{array}{ccc}
 100 & & 130 \times \frac{20}{100} = 26 \\
 \downarrow +30\% & & \cancel{100} \\
 130 & \rightarrow & \cancel{130} - 26 \\
 \downarrow -20\% & & \cancel{-26} \\
 104 & & \cancel{104}
 \end{array}$$

(18) If the population of a city increases by 25% and then decreases by 20%, what is the net percentage change?

- ~~(A)~~ 0%, (B) 5% increase (C) 10% decrease (D) 5% decrease

Let population is 100

$$\begin{array}{ccc}
 100 & & 125 \times \frac{20}{100} = 25 \\
 \downarrow -25\% & & \cancel{100} \\
 125 & \rightarrow & \cancel{125} - 25 \\
 \downarrow +20\% & & \cancel{-25} \\
 95 & & \cancel{95}
 \end{array}$$

If the price is increased by 40% and then decreased by 30%. the final change.

- (a) 20% increase (b) 10% increase (c) 10% decrease

~~2.1. decrease~~

let price is 100 -

$$\begin{array}{c}
 100 \\
 \downarrow +40\% \\
 140 \\
 \downarrow -30\% \\
 98
 \end{array}$$

$\frac{30 \times 140}{140} = 92$
 $140 - 92 = 48$

The salary of a person is first increased by 20% and then decreased by 10%.

What is the overall percentage change?

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

- (d) No change

Let salary is 100

$$\begin{array}{c}
 100 \\
 \downarrow +20\% \\
 120 \\
 \downarrow -10\% \\
 108
 \end{array}$$

$\frac{10 \times 120}{120} = 10$
 $120 - 10 = 108$

- (21) The article was sold at a profit of 28%. Then selling price is what percent of cost price?
 (A) 100% (B) 125% (C) 150% (D) 175%.

Let $CP = 100$.

gain = 28% of CP

$$SP = 100 + \frac{28 \times 100}{100}$$

$$SP = 125$$

$$\frac{125 - 100}{100} \times 100 = 25\%$$

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

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

- (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 cost price?

- (A) ₹400 (B) ₹420 (C) ₹450 (D) ₹460

$$MP = 500$$

$$(C) 416.67.$$

$$Discount = \frac{500 \times 10}{100} = 50$$

$$CP = \frac{2500}{8000} \times 45000 = 3125$$

$$SP = 500 - 50 = 450$$

$$CP = 416.67$$

$$SP = CP + 8\% \text{ of } CP$$

$$450 = CP + \frac{8}{100} CP$$

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

② If a profit is 20% of the CP, then what is the profit percent of the selling price.

- 16.67%. (b) 18%. (c) 20%. (d) 22%.

$$6x \text{ CP} = 100.$$

$$\text{Profit} = 20\% \text{ of CP} = 20.$$

Profit = SP - CP

$$20 = SP - 100$$

$$SP = 120$$

$$SP = 120$$

$$SP\% = \frac{\text{Profit}}{SP} \times 100 = \frac{20}{120} \times 100 = 16.67\%.$$

③ A product is marked at Rs 1200 and sold for 2960. What is the percentage discount given?

- (a) 25% (b) 20% (c) 28% (d) 30%

$$MP = 1200$$

$$SP = 960$$

$$Loss = 1200 - 960 = 240$$

$$\text{Disc percentage} = \frac{240}{1200} \times 100 = \frac{240}{1200} \times 100$$

$$= 20\%.$$

- (25) If an article is bought for ₹ 500 and sold for ₹ 650. What is profit percentage.
 (a) 20% (b) 25% (c) 30% (d) 35%

$$C.P. = 500$$

$$S.P. = 650$$

$$\text{Profit} / \text{Chain} = S.P. - C.P. = 650 - 500 = 150$$

$$P\% = \frac{\text{Profit}}{C.P.} \times 100 \Rightarrow \frac{150}{500} \times 100 = 30\%$$

- (26) If A's income is 20% more than B's then B's income is what percentage less than A's?
 (a) 16.67% (b) 18% (c) 20% (d) 25%

Let B's income is 100 then A will be 120.

$$= \frac{\text{Diff}}{\text{Original}} \times 100 = \frac{20}{100} \times 100 = 20\%$$

- (27) If the ratio of boys to girls in a school is 3:2. What percentage of total students

- (a) 30% (b) 40% (c) 50% (d) 60%

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

$$\text{Let, boys} = 3x \\ \text{girls} = 2x$$

$$\text{Total} = 3x + 2x = 5x$$

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

↑
Original
/ratio
↑

Q) A city's population increased from 200000 to 250000 in 2 years. What is the percentage increase?

- (A) 20% (B) 25% (C) 30% (D) 35%

$$\% = \frac{\text{Change}}{\text{Old value}} = \frac{(250000 - 200000)}{200000} \times 100$$

$$\% = \frac{50000}{200000} \times 100$$

$$\boxed{25\%}$$

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

- (A) 5000 (B) 6000 (C) 8000 (D) 9000

~~(C)~~ 10000.

Let total = x

Method (1)

65% of x - 35% of x = 3000

$$65\% \cdot x - 35\% \cdot x = 3000$$

$$\frac{65}{100} \cdot x - \frac{35}{100} \cdot x = 3000$$

$$\frac{30}{100} \cdot x = 3000$$

$$3x = 30000$$

$$x = \frac{30000}{3}$$

$$x = 10000$$

Head Total

30 100

3000 ?

$$30x? = 100 \times 3000$$

$$? = 10000$$

(30) The price of an article is reduced by 30%. By what percentage must be the new price be increased to restore the original price?

- (a) 30%. (b) 42.85%. (c) 50%. (d) 60%.

Let price is 100.
 $\sqrt{30\%}$

$$\text{new price} = 70$$

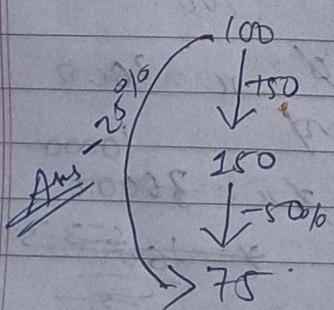
$$\text{Increase required} = 100 - 70 = 30$$

$$\begin{aligned} \text{P}\% &= \frac{\text{change}}{\text{original}} \times 100 \\ &= \frac{30}{70} \times 100 \\ &= \frac{300}{7} = 42.85\% \end{aligned}$$

(31) If a number is increased by 50% and then decreased by 50%, what is the net percentage change?

- (a) 0%. (b) 25% decrease (c) 50% decrease (d) 75% decrease

Let Num is 100



$$\frac{150 \times 50}{100} = 75$$

$$150 - 75 = 75$$

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

Let B is 100.

So, A = 120.

$$\frac{\text{Change } x/100}{\text{Old value}} = \frac{(120 - 100)x/100}{120} = \frac{20x/100}{120}$$

$$\frac{20x/100}{6+20} = \frac{100}{6} \times 16.67\%$$

$$\approx 26.67\% \text{ Ans}$$

- (33) If 30% of a number is 90, what is 60% of some Number?

- (a) 120 (b) 150 (c) 180 (d) 200.

Let Number be x then 60% of x .

$$30\% \text{ of } x = 90$$

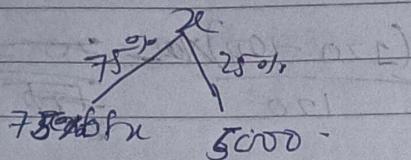
$$\frac{30}{100} x = 90$$

$$x = 300$$

$$\frac{60}{100} x = 180$$

34.) A person spends 75% of his income and saves ₹ 5000. What is his total income?
 (A) ₹ 15000 (B) ₹ 18000 (C) ₹ 20000 (D) ₹ 25000.

Let total income is x



$$75\% \text{ of } x + 5000 = x$$

$$\frac{75}{100}x + 5000 = x$$

$$75x + 500000 = 100x$$

$$500000 = 25x$$

$$x = 20000 \text{ Ans. A}$$

OR
2nd method

$$25\% \text{ of } x = 5000$$

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

$$x = 20000 \text{ Ans. A}$$

35.) The price of a petrol increases by 20%. By what percentage should consumption be reduced to maintain the same expense?
 (A) 16.67% (B) 18% (C) 20% (D) 25%.

Let

$$P_1 = 100$$

$$C_1 = 100$$

$$Exp_1 = 100 \times 100$$

$$P_2 = 120$$

$$C_2 = ?$$

$$Exp_2 = 120 \times 100 = 12000.$$

$$1st \text{ method} \\ \Sigma_2 = P_2 \times C_2$$

$$10000 = 120 \times C_2 \\ \frac{10000}{120} = C_2 \\ \frac{8333}{6} = C_2 \\ = 83.33$$

$$- \frac{10000}{83.33} = 120 - 100 \\ = 20 \text{ Ans. A}$$

2nd method

Change

old value

$$\frac{20}{120} \times \frac{5}{100} = \frac{100}{6}$$

$$\therefore 16.67\%$$

Ans. A

The price of a TV was first increased by 20% and then decreased by 10%. What is the overall percentage change?

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

~~(d) no change.~~

Let price be 100

$$\begin{array}{ccc}
 & 100 & \\
 & \downarrow +20\% & \\
 100 & \xrightarrow{\quad} & 120 \\
 & \downarrow -10\% & \\
 & \xrightarrow{\quad} & 100
 \end{array}$$

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

$$120 - 12 = 100$$

- (38) If the cost price of an article is ₹500 and it is sold at a loss of 20%. what is selling price.

- (a) ₹380 (b) ₹375 (c) ₹400 (d) ₹980

$$CP = 500$$

$$\text{Loss \%} = \frac{\text{Loss}}{CP} \times 100$$

$$120 = \frac{\text{Loss}}{500} \times 100$$

$$100 = \text{Loss}$$

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

$$100 = CP - 500$$

$$\boxed{CP = 600}$$

$$100 = 500 - SP$$

$$SP = 500 - 100$$

$$\boxed{SP = 400}$$

(39) If a salary is increased by 10% and then decreased by 10%. What is the final percentage change?

- (a) 0% (b) 1% decrease (c) 1% increase
- (d) 2% decrease

Let Salary is 100.

$$\begin{array}{ccc}
 & 100 & \\
 \nearrow -10\% & \downarrow +10\% & 110 \times 10 = 11 \\
 & 110 & \\
 \searrow -10\% & \downarrow & 110 - 11 = 99 \\
 & 99 &
 \end{array}$$

- ⑩ 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.

Let total is x
to pass it required 40% of x
i.e. 200 marks + 20 marks = 40% of x

$$220 = \frac{40}{100}x$$

$$220 = 4x$$

$$x = 550$$

- ⑪ A man spends 20% of his salary on rent, 30% on food and 10% on transport.
If he saves ₹ 18000. What is his salary?
- (a) ₹ 40000 (b) ₹ 45000 (c) ₹ 50000 (d) ₹ 55000

Let Salary is x .

$$20\% + 30\% + 10\% = 60\%$$

$$100\% - 60\% = 40\%$$

$$\text{So, } 40\% \text{ of } x = 18000$$

$$\frac{40}{100}xx = 18000$$

$$4x = 18000$$

$$x = 45000 \text{ ₹}$$

- (Q2) The cost of an item is first increased by 30% and then decreased by 30%. What is the overall percentage change?
- (A) 0% (B) -9% decrease (C) +9% increase (D) 18% decrease

$$\begin{array}{c}
 100 \\
 \downarrow +30\% \\
 130 \\
 \downarrow -30\% \\
 91
 \end{array}$$

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

$$\frac{130 - 39}{130} = \frac{91}{130}$$

- (Q3) The population of a town increases by 10% every year. If the current population is 10000, what will it be after 3 years?
- ~~(A)~~ 13,310 (B) 13,500 (C) 19,000 (D) 19,200

$$\begin{array}{l}
 10000 \\
 \downarrow +10\% \\
 11000 \\
 \downarrow +10\% \\
 12100 \\
 \downarrow +10\% \\
 13310
 \end{array}$$

$$\frac{10000 \times 10}{100} = 1000$$

$$\frac{11000 \times 10}{100} = 1100$$

$$\frac{12100 \times 10}{100} = 1210$$

If 18% of A is equal to 20% of B then
A : B is

- (A) 3 : 4 ~~(B)~~ 4 : 3 (C) 3 : 5 (D) 8 : 3

$$\frac{18}{100} A = \frac{20}{100} B$$

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

If the cost price of an item is ₹ 800 and the profit made is 25%. What is selling price?

- (A) ₹ 900 (B) ₹ 1000 (C) ₹ 1050 (D) ₹ 1100

$$CP = 800$$

$$\text{Profit} \% = 25\%$$

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

$$25 = \frac{\text{Profit}}{800} \times 100$$

$$200 = \text{Profit}$$

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

$$200 = SP - 800$$

$$SP = 1000 \rightarrow$$

(46)

If the CP of an item is ₹ 200 and and the SP is ₹ 280; what is profit percentage?

④

20% ~~25%~~ ② 30% ③ 40%.

$$CP = 200$$

$$SP = 280$$

$$\text{Profit} = 280 - 200 = 80$$

$$P\%. = \frac{80}{200} \times 100 \Rightarrow P\% = 40\%$$

(47)

A man sells an article for ₹ 720 with profit of 20%. Find the cost price.

~~① ₹ 600 ② ₹ 620 ③ ₹ 630 ④ ₹ 700~~

$$SP = 720$$

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

$$20\% = \frac{\text{Profit}}{CP}$$

$$CP \times \frac{20}{100} = \text{Profit}$$

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

$$\frac{CP}{5} = 720 - CP$$

$$\frac{CP + 5CP}{5} = 720$$

$$\frac{6CP}{5} = 720$$

$$CP = 120 \times 5$$

$$CP = 600$$

Q8 A shopkeeper sells an item at a loss of 15%. If the cost price is ₹ 500 - find the selling price.

④ ₹ 425 ~~⑥ ₹ 425~~ ⑦ ₹ 450 ⑧ ₹ 475

$$\text{loss \%} = 15\%$$

$$CP = 500$$

$$\text{loss \%} = \frac{\text{loss}}{CP} \times 100$$

$$15 = \frac{\text{loss}}{SP} \times 100$$

$$75 = \text{loss}$$

$$SP = CP - SP$$

$$75 = 500 - SP$$

$$SP = 500 - 75$$

$$SP = 425 \text{ Rs}$$

Q9 A man purchased a cycle for ₹ 1800 and sold it at a loss of 10%. What was the selling price?

④ ₹ 1620 ⑤ ₹ 1300 ~~⑥ ₹ 1800~~ ⑦ ₹ 1400

$$CP = 1800$$

$$\text{loss \%} = 10\%$$

$$SP = ?$$

$$10 = \frac{\text{loss}}{CP} \times 100$$

$$180 = \text{loss}$$

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

$$180 = 1800 - SP$$

$$SP = 1800 - 180$$

$$SP = 1620 \text{ Rs}$$

(50) A trader marks his good at 30% above the cost price and allows a discount of 10%. What is his gain percent?

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

$$\text{Let } CP = 100$$

$$MP = CP + CP \times 30\% = \frac{100 + 100 \times 30}{100} = 30$$

$$CP \times 30\% = CP \times \frac{30}{100} = 30$$

$$MP = 100 + 30 = 130$$

$$\text{dis.} = 130 \times \frac{10}{100} = 13$$

$$SP = MP - \text{dis.} = 130 - 13$$

$$\boxed{SP = 117}$$

$$\text{gain \%} = \frac{\text{gain}}{CP} \times 100$$

$$\text{gain} = SP - CP = 117 - 100 = 17$$

$$\text{gain \%} = \frac{17}{100} \times 100$$

$$\text{gain} = 17\%$$

~~ANSWER~~