

Assignment 1

1. What is 25% of 200?

Percentage = percentage × total value

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

2. If 40% of a no. is 80, what is the no?

→ Let the no. be 'n'.

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

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

$$\frac{40n}{100} = 80$$

Multiply both sides by 100,

$$\frac{10n}{100} \times 100 = 80 \times 100$$

$$40n = 8000$$

$$n = \frac{8000}{40}$$

$$n = 200$$

3. 75% of a no. is 150. What is the no?

Let the no. be 'n'.

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

$$\frac{75n}{100} = 150$$

multiply by 100!

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

$$75n = 15000$$

$$n = \underline{15000}$$

$$\boxed{n = 200}$$

Q4. what is 15% of 120?

$$\rightarrow \frac{150}{100} \times 120 = \frac{15 \times 120}{100} =$$

$$\rightarrow \frac{15}{100} \times 120 = \frac{15 \times 120}{100} = \frac{1800}{100} = 18$$

Q5) what if 30% of a no. is 90; then no. is?

→ Let the no. be n ,

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

$$3n = 9000$$

$$n = \underline{9000}$$

$$\boxed{n = 300}$$

Q.6 The price of a product increases from Rs 200 to Rs 250. What is the percentage increase?

$$\rightarrow \text{Change \%} = \frac{\text{New} - \text{Old}}{\text{Old price}} \times 100$$

$$\frac{250 - 200}{200} \times 100 = \frac{50}{200} \times 100 \\ \approx \frac{50}{2} = 25\%$$

Q7. A salary increases from Rs 40,000 to 50,000 Rs. What is the percentage increase.

$$\rightarrow \text{Change \%} = \frac{\text{New} - \text{Old}}{\text{Old}} \times 100$$

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

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

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

Q.8 The population of a town decreased from 10,000 to 8000. What is the percentage decrease?

$$\begin{aligned}
 \Rightarrow \text{percentage decrease} &= \frac{\text{Old} - \text{New}}{\text{Old}} \times 100 \\
 &= \frac{10000 - 8000}{10000} \times 100 \\
 &= \frac{2000}{10000} \times 100 \\
 &\equiv \frac{2000}{2000} \times 100 \\
 &\Rightarrow 20\%.
 \end{aligned}$$

Q.9 A book's price drops from 500 Rs to 400 Rs. What is the percentage decrease?

$$\begin{aligned}
 \Rightarrow \% \text{ Change} &= \frac{500 - 400}{500} \times 100 \\
 &= \frac{100}{500} \times 100 \\
 &= 20\%.
 \end{aligned}$$

Q.10 If the cost price of an item is 600 Rs & the selling price is 450. What is % loss?

$$\Rightarrow \text{Loss} = \text{C.P} - \text{S.P} = 600 - 450 = 150$$

$$\begin{aligned}
 \% \text{ Loss} &= \frac{\text{Loss}}{\text{C.P.}} \times 100 = \frac{150}{600} \times 100 \\
 &= 25\%.
 \end{aligned}$$

#3. Percentage Comparison

Q11. Which is greater: 30% of 400, or 40% of 300.

$$\rightarrow 30\% \text{ of } 400 = \frac{30}{100} \times 400 \\ = 120$$

$$40\% \text{ of } 300 = \frac{40}{100} \times 300 \\ = 120$$

\rightarrow Both are equal

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

\rightarrow Let the total income be x

- Spending 60% of x = ~~40% saving~~
~~40% of x~~

$$\{100 - 60 = 40\}$$

$$= \text{So, } 40\% \text{ of } x = 8000$$

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

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

$$= 20000 \text{ Rs.}$$

Q.13 If A is 20% more than B, then B is how much less than A?

→ If A is 20% more than B

$$\text{Let } A = 120, B = 100, A = 120$$

$$\therefore B = 100$$

→ percentage decrease from A to B =

$$\frac{\text{Difference}}{\text{Original value}} \times 100 = \frac{120 - 100}{120} \times 100$$

$$= \frac{20}{120} \times 100 = \frac{5}{3} = 16.66\%$$

Q.14 If the price of sugar is increased by 25%, by how much should the consumption be reduced to maintain the same expense?

→ Let price be 100, & consumption be X .
 Total cost = $100X$.
 New price = $100 + 25 = 125$

To maintain the same expense

$$100X = 125 \times \text{new consumption}$$

$$\text{New consumption} = \frac{100X}{125} \Rightarrow 0.8X$$

So, the original consumption - New consumption
 $X - 0.8X = 0.2X$

$\therefore \text{decrease} = \frac{\text{decrease in consumption}}{\text{original consumption}} \times 100$

$$= \frac{0.2x}{x} \times 100 = 20\%$$

Q.15) If A's income is 40% more than B's income, then B's income is what percentage less than A's?

\rightarrow Let B's income be 100;
 A's income = $100 + 40 = 140$

$$\text{percentage decrease} = \frac{140 - 100}{140} \times 100$$

$$= \frac{40}{140} \times 100 = \frac{40 \times 5}{7} = 28.57\%$$

Q.16) The price of an item is increased by 20% and then decreased by 10%. What is the net % change?

$$\rightarrow \text{Let initial price} = 100$$

$$\text{After } 20\% \text{ increase} = 100 + 20 = 120$$

$$\text{After } 10\% \text{ decrease} = 120 - \frac{10}{100} \times 120 = 108$$

$$\Rightarrow \text{Net percentage change} = \frac{108 - 100}{100} \times 100 \\ = 8.1\% //$$

Q. 13) A no. is increased by 30% and then decreased by ~~20%~~ 20%. What is the final percentage change?

→ let, original no. = 100

$$\text{After 30\% fine} = 100 + 30 = 130$$

$$\text{deelrege} = 130 - \frac{(20 \times 130)}{100}$$

$$= 130 - 26 = 104$$

$$\leftarrow \text{Net percentage change} = \frac{104 - 100}{100} \times 100 \\ = 4\%$$

Q. 18) If the population of a city increases by 25 %, and then decreases by 20 %.

→ what is the net percentage change?
Initial population = 100

After 25% incr. = 125

$$\text{After 20\% delete} = 125 - \left(\frac{20}{100\%} \times 125 \right)$$

$$= 125 - 25$$

$$= 100$$

$$\text{Net Change} = \frac{100 - 100}{100} = 0\%$$

Q.19 If a price increases by 40%, then decreases by 30%, the final change is:

→ Initial price = 100
After 40% increase = $100 + 40 = 140$
After 30% decrease = $140 - \frac{(30 \times 140)}{100}$
 $= 140 - 42 \Rightarrow 98$
→ Net % change = $\frac{98 - 100}{100} \times 100$
 $= -2\%$ decrease

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

→ Original = 100
After 20% increase = $100 + 20 = 120$
10% decrease = $120 - \frac{(10 \times 120)}{100}$
 $= 120 - 12$
 $= 108$
Net % change = $\frac{108 - 100}{100} \times 100$
 $= 8\%$

Q.21 If an article is sold at a profit of 25%, then the selling price is what % of the cost price?

Let $CP = 100$ Rs

$$\therefore \text{Profit} = 25\% \text{ of } CP = \frac{25}{100} \times 100 = 25$$

$$\therefore SP = CP + \text{Profit} = 100 + 25 = 125$$

Q.22 A shopkeeper allows a discount of 10% on the marked price & still makes a profit of 8%. If the marked price is Rs 500, what is cost price?

\rightarrow Marked price = Rs 500

Discount = 10% of MP

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

$$\therefore P. \text{ after discount} = 500 - 50 = 450$$

Given \rightarrow profit 8% of CP, So

let $CP = n$

\therefore profit = 8% of CP,

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

$$450 = n + 0.08n$$

$$450 = 1.08n$$

$$n = \frac{450}{1.08} = 416.67 //$$

Q.23 If the profit is 20% of the cost price, then what is the profit percentage on the selling price?

→ Let CP = 100.

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

$$SP = CP + \text{Profit} = 100 + 20 \\ = 120$$

$$\text{Profit \% on SP} = \frac{\text{Profit}}{SP} \times 100 \\ = \frac{20}{120} \times 100 \\ = \frac{1}{6} \times 100 \\ = 16.67\%$$

Q.24 A product is marked at ₹ 1200 and sold for ₹ 960. What is the discount given?

$$\rightarrow \text{Discount} = \text{Marked price} - SP \\ = 1200 - 960 \\ = 240$$

$$\text{Discount \%} = \frac{\text{Discount}}{\text{Marked price}} \times 100 \\ = \frac{240}{1200} \times 100 = 20\%$$

Q.25 If an article is bought for Rs 500 and sold for Rs 650. What is the profit %?

$$\Rightarrow C.P = 500 \text{ Rs}$$

$$S.P = 650 \text{ Rs}$$

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

$$= 150 \text{ Rs}$$

$$\text{Profit \%} = \frac{\text{Profit}}{C.P} \times 100$$

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

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

\Rightarrow A's income is 20% more,

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

$$\therefore A's \text{ income} = 100 + 20 = 120 \text{ Rs}$$

$$\therefore \text{decrease} = \frac{120 - 100}{120} \times 100$$

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

$$= \frac{50}{3} = 16.67\%$$

Q.27 If the Ratio of boys to girls in a school is $3:2$, what % of the total students are boys?

→ Ratio = $3:2$

$$\begin{aligned} \text{Total} &= 3+2 \\ &= 5 \end{aligned}$$

$$\begin{aligned} \% \text{ of boys} &= \frac{\text{Boys}}{\text{Total}} \times 100 \\ &= \frac{3}{5} \times 100 \\ &= 60\% \end{aligned}$$

Q.28 A City's population increased from $2,00,000$ to $2,50,000$ in 2 years. What is the % increase?

$$\begin{aligned} \rightarrow \text{Increase in populn} &= 2,50,000 - 2,00,000 \\ &= 50,000 \end{aligned}$$

$$\begin{aligned} \% \text{ increase} &= \frac{50,000}{2,00,000} \times 100 \\ &= \frac{50}{2} \\ &= 25\% \end{aligned}$$

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

Let total votes = x .
a candidate gets 65% of x .
Other votes $\rightarrow 100 - 65 = 35\%$.

So, difference in votes,

$$65\% \text{ of } x - 35\% \text{ of } x$$

$$\frac{65}{100} \times x - \frac{35}{100} \times x$$

$$0.65x - 0.35x = 0.30x$$

Given:— difference is 3000 votes,

$$0.30x = 30.00$$

$$x = \underline{3000}$$

$$0.30$$

$$= \underline{30.0000}$$

$$30$$

$$x = 10,000$$

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

→ Let original price = 100

After 30% decrease, the new price =
 $100 - 30 = 70$ Rs

To restore original price,
 increase the price of

$$\frac{100 - 70}{70} \times 100 = \frac{30}{70} \times 100 = 42.85\%$$

Q.31 If a no. is increased by 50%, then decreased by 50%. What is the percentage change?

→ Let no. be 100

$$\text{increase by } 50\% = 100 + 50 = 150$$

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

$$= 150 - 75$$

$$= 75$$

$$\text{net change} = 100 - 75 = 25$$

$$\therefore \text{decrease} = \frac{25}{100} \times 100 = 25\%$$

Q.32 If A is 20% greater than B, then B is less than A by:

→ Let B's ht. be 100

A is 20% greater $\rightarrow 100 + 20 = 120$

$$\frac{(120 - 100)}{120} \times 100 = \frac{20}{120} \times 100 = \frac{5}{12} \times 100 = 16.67\%$$

Q.33 If 30% of a no. is 90, what is 60% of same no.?

Let no. be x

30% of $x = 90 \rightarrow$ Given

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

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

$$x = 300$$

$$60\% \text{ of } 300 = \frac{60}{100} \times 300 = 180$$

Q.34 A person spends 75% of his income on games Rs 5000. What is his total income?

→ Let income $\rightarrow x$

$$\text{Savings} = 100\% - 75\% = 25\%$$

$$25\% \text{ of } x = 5000 \rightarrow x = 5000 \times \frac{100}{25}$$

$$x = 20,000$$

Q.35 The price of petrol increases by 20%. By what % should consumption be reduced to maintain the same expense?

→ Original price assume 100
Original consumption = 100

$$\text{New price} = 20 + 100 = 120$$

$$\text{Same expense} = 100 \times 100 = 120 \times \text{New consumption}$$

$$\text{New consumption} = \frac{100 \times 100}{120}$$

$$= 83.33$$

$$\% \text{ decrease} = \frac{100 - 83.33}{100} \times 100 \\ = 16.67\%$$

Q.36 The price of a TV was first increased by 20% and then decreased by 10%.

→ If price be 100,
After 20% increase = 120
10% decrease = $120 - \left(\frac{10}{100} \times 120\right)$
 $= 120 - 12 = 108$

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

Q.37 A shopkeeper marks an item 25% above CP. & gives a 20% discount?.

→ CP assume = 100

$$M.P. \Rightarrow 100 + 25 = 125$$

$$20\% \text{ discount} \Rightarrow 125 - 25 = 100$$

$$\text{Profit} = 100 - 100 = 0\%$$

Q.38 If the CP of an article is 500 & it is sold at a loss of 20%, what is SP?

$$\rightarrow C.P. = 500$$

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

$$S.P. = 500 - \left(\frac{20 \times 500}{100} \right)$$

$$\therefore = 500 - 100$$

$$\therefore = 400$$

Q.39 If a salary is increased by 10% & the decree by 10%. What is final % change?

→ Salary be 100

$$\text{After 10% increase} = 110$$

$$10\% \text{ decree} = 110 - \left(\frac{10}{100} \times 110 \right)$$

$$\therefore = 110 - 11 = 99$$

$$\therefore \text{Change} = \frac{100 - 99}{100} = 1\%$$

Q.40. A student needs 40% marks to pass. He gets 200 marks and fails by 20 marks. Total marks?

$$\rightarrow \text{passing marks} = 200 + 20 = 220$$

$$40\% \text{ of total marks} = \frac{220}{100} \times 100 = 220$$

$$\text{Total marks} = \frac{220}{0.4} = 550$$

Q.41. A man spends 20% on cloth, 30% on food, 10% on tea and saves 18,000 Rs. What is salary?

$$\rightarrow \text{Total} = 100\%$$

$$\text{Remaining} = 100\% - (20 + 30 + 10) \\ = 100\% - 60\% \\ = 40\%$$

$$40\% \text{ of salary} = 18000$$

$$\text{salary} = \frac{18000}{0.4} = 45000$$

Q.42. The cost of an item at list price by 30% & then decreased by 30%. Overall change?

\rightarrow Cost be 100.

$$30\% \text{ more} = 100 + 30 = 130$$

$$30\% \text{ decrease} = 130 - 39 = 91$$

$$\text{Change} = 100 - 91 = 9\%$$

Q.43 The popul'n of a town increas by 10%.
the current popul'n is 10,000.
what will it be after 3 yrs?

$$\rightarrow \text{Initial popul'} = 10,000$$

$$1) \text{ increase in 1st yr} = 10,000 \times 10\% = 1,000$$

$$\text{new popul'} = 10,000 + 1,000 = 11,000$$

$$2) \text{ increase in 2nd yr} = 11,000 \times 10\% = 1,100$$

$$\text{new} = 11,000 + 1,100 = 12,100$$

$$3) \text{ 3rd yr} = 12,100 \times 10\% = 1,210$$

$$\text{new} = 12,100 + 1,210 = 13,310$$

Q.44 If 15% of A = 20% of B, A:B = ?

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

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

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

Q.45 If the CP is 800 & profit = 25%, SP = ?
 $\rightarrow \text{SP} = 800 + 25\% \text{ of } 800 = 800 + 200 = 1000$

Q.46 If $CP = 200$, $SP = 250$, Profit %

$$\Rightarrow \text{Profit \%} = \frac{SP - CP}{CP} \times 100$$
$$= \frac{250 - 200}{200} \times 100$$
$$= 25\%$$

Q.47 A man sells an article for 720 at a profit of 20% . CP

$$\Rightarrow SP = 720$$
$$P\% = 20\%$$
$$CP = ?$$

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

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

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

$$\therefore CP = \frac{720}{1.2} = 600$$

Q.48 A shopkeeper sells at 15% loss, $CP = 500$, $SP = ?$

$$\begin{aligned} \rightarrow SP &= 500 - 15\% \text{ of } 500 \\ &= 500 - \left(\frac{15}{100} \times 500 \right) \\ &= 500 - 75 \\ SP &= 425 \end{aligned}$$

Q.49 A man sells a cycle at 10% loss? $CP = 1500$, $SP = ?$

$$\begin{aligned} \rightarrow SP &= 1500 - 10\% \text{ of } 1500 \\ &= 1500 - \left(\frac{10}{100} \times 1500 \right) \\ &= 1500 - 150 \\ &= 1350 \end{aligned}$$

Q.50 Tridevi makes goods 30% above CP, gives 10% discount, gain%?

$$\begin{aligned} \rightarrow CP &= 100 \text{ (assum)} , MP = 130 \\ SP &= 130 - 10\% \text{ of } 130 \\ &= 130 - \left(\frac{10}{100} \times 130 \right) = 117 \end{aligned}$$

$$\begin{aligned} \text{Profit \%} &= \frac{117 - 100}{100} \times 100 \\ &= 17\% \end{aligned}$$