MODULE-1:
CRITICAL THINKING THROUGH QUANTITATIVE ANALYSIS

1.2 PERCENTAGES

Conversion of Fraction to Percentage

Group-1

$$100\% = 1$$

$$50\% = \frac{1}{2}$$

$$33.33\% = \frac{1}{3}$$

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

$$20\% = \frac{1}{5}$$

$$16.66\% = \frac{1}{6}$$

$$14.2857\% = \frac{1}{7}$$

$$12.5\% = \frac{1}{8}$$

$$11.11\% = \frac{1}{9}$$

$$10\% = \frac{1}{10}$$

$$9.09\% = \frac{1}{11}$$

$$8.33\% = \frac{1}{12}$$

Group-2

$$14.2857\% = 14\frac{2}{7}\% = \frac{1}{7}$$

$$28.5714\% = 28\frac{4}{7}\% = \frac{2}{7}$$

$$42.8571\% = 42\frac{6}{7}\% = \frac{3}{7}$$

$$57.1428\% = 57\frac{1}{7}\% = \frac{4}{7}$$

$$71.4285\% = 71\frac{3}{7}\% = \frac{5}{7}$$

$$85.7142\% = 85\frac{5}{7}\% = \frac{6}{7}$$

Cyclic Numbers

142857

Group-3

$$12.5\% = \frac{1}{8}$$

$$25\% = \frac{2}{8}$$

$$37.5\% = \frac{3}{8}$$

$$50\% = \frac{4}{8}$$

$$62.5\% = \frac{5}{8}$$

$$75\% = \frac{6}{8}$$

$$87.5\% = \frac{7}{8}$$

Group-4

$$11.11\% = 11\frac{1}{9}\% = \frac{1}{9}$$

$$22.22\% = 22\frac{2}{9}\% = \frac{2}{9}$$

$$33.33\% = 33\frac{3}{9}\% = \frac{3}{9}$$

$$44.44\% = 44\frac{4}{9}\% = \frac{4}{9}$$

$$55.55\% = 55\frac{5}{9}\% = \frac{5}{9}$$

$$66.66\% = 66\frac{6}{9}\% = \frac{6}{9}$$

$$77.77\% = 77\frac{7}{9}\% = \frac{7}{9}$$

$$88.88\% = 88\frac{8}{9}\% = \frac{8}{9}$$

Group-5

$$9.09\% = 9\frac{1}{11}\% = \frac{1}{11}$$

$$18.18\% = 18\frac{2}{11}\% = \frac{2}{11}$$

$$27.27\% = 27\frac{3}{11}\% = \frac{3}{11}$$

$$36.36\% = 36\frac{4}{11}\% = \frac{4}{11}$$

$$45.45\% = 45\frac{5}{11}\% = \frac{5}{11}$$

$$54.54\% = 54\frac{6}{11}\% = \frac{6}{11}$$

$$63.63\% = 63\frac{7}{11}\% = \frac{7}{11}$$

$$72.72\% = 72\frac{8}{11}\% = \frac{8}{11}$$

$57\frac{1}{7}\%$ of 5600= ?

$\frac{4}{7} \times 5600$

$\frac{4}{1} \times 800$

3200

62.5% of 4800= ?

$\frac{5}{8} \times 4800$

$\frac{5}{1} \times 600$

3000

63% of 1600= ?

$$(50\% + 10\% + 3\%) \times 1600$$

$$(800 + 160 + 48)$$

1008

73% of 142 – 42% of 73= ?

142% of 73 – 42% of 73

100% of 73

73

X% *of* Y = Y% *of* X

87.5% of 64= ?

37.5% of 3600= ?

45% of 2400= ?

What is 20% of 30% of 40%?

87.5% of 64= 56

37.5% of 3600= 1350

45% of 2400= 1080

(Method-1 20%+20%+5%)

(Method-2 50%-5%)

$\left(\frac{20}{100} \times \frac{30}{100} \times \frac{40}{100}\right)$=2.4%

60% of ? = 360

$\frac{60}{100} \times 600 = 360$

600

?% of 900 = 720

$\frac{80}{100} \times 900 = 720$

80%

A's income is 60% of B's income. If B's income is Rs. 15,000, then what is A's income?

9000

If the milk to water ratio in a mixture is 2:3, then what is the percentage of milk in the mixture?

$\frac{2}{5} \times 100 = 40\%$

Model-1

$$\%\text{change (\%inc/dec)} = \frac{Diff\ Value}{Initial\ Value} \times 100$$

If the price of petrol has increased from Rs. 40 per litre to Rs. 60 per litre, Find percentage change.

X%

I ----------> F

40 60

$$\%\text{change} = \frac{F-I}{I} \times 100$$

$$\%\text{Change} = \frac{20}{40} = 50\%$$

A person spends 80% of his income. If his income is increased by 20% and his expenditure is increased by 10%, then his savings will increase by:

	Income	Expenditure	Savings
Before	100	80	20
After	120	88	32

$$\%\text{change} = \frac{Diff}{I} \times 100$$

∴ His savings are increased by 60%

The profit made by a company in the present year is Rs.1500000. Two years ago the profit made by the same company was Rs. 24,00,000. what is the percentage change in the profit made by the company?

$$\frac{15-24}{24} = \frac{-9}{24} = \frac{-3}{8}$$

-37.5% (decrease)

Model-2

Net % change / Effective % change = $\mathbf{a} + \mathbf{b} + \frac{ab}{100}$

The shopkeeper announced a discount of 20% and hence his sales went up by 20%. What is the net increase/decrease in the price?

$$\text{Net \% change} = -20 + 20 + \frac{-20 \times 20}{100}$$

= -4% (4% decrease)

The price of a commodity increases first by 20% and then by 10%. What is the net increase in the price?

Net % change $= 20 + 10 + \frac{20 \times 10}{100}$

= +32% (32% increase)

On decreasing the price of a fan by 30 percent, its sales increases by 40 percent. What will be the percentage decrease in its revenue?

Net % change $= -30 + 40 + \frac{-30 \times 40}{100}$

= -2% (2% decrease)

A retailer offers two successive discounts of 20% and 30%. What is the net decrease in the price?

$$\text{Net \% change} = -20 - 30 + \frac{-20 \times -30}{100}$$

= -44% (44% decrease)

The price of a commodity is first increased by 40% and then reduced by 20%. What is the net increase or decrease in the price?

$$\text{Net \% change} = 40 - 20 + \frac{40 \times -20}{100}$$

= 12% (12% increase)

The revenue of a shop in the month of march was 40000. In month of April, the shopkeeper announced a discount of 20% and hence his sales went up by 20%. What will be the revenue in month of April?

$$\%\text{Revenue} = -20 + 20 + \frac{-20 \times 20}{100}$$

-4% (4% decrease)

$R_{(April)}$ = 40,000 – 4% of 40,000

$R_{(April)}$ = 40,000 – 1600

38,400

Model-3

X is what % more/less than Y?

If A's salary is 25% more than B, then B is how much percentage less than A?

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

We need to reduce the fraction by increasing the denominator by nuerator value which is 1.

$$\frac{1}{(4+1)} = \frac{1}{5}$$

20%

The sales of company A is 40% less than company B, then sale of company B is how much percentage more than A?

$$\frac{4}{(10-4)} = \frac{4}{6} = \frac{2}{3}$$

66.66%

Model-4

Percentage of Percentage

X% of Y% *of* K = $(\frac{xy}{100})$% *of* K

The price of a car is Rs. 5,00,000. It was insured to 90% of its price. The car get damaged completely in an accident and the insurance company paid only 80% of the insurance. What is the difference between the price of the car and the amount received?

Price of the car = 100%

Insurance received=80% of 90%=72%

Diff = 100% - 72% = 28%

100% = 5,00,000

28% = ?

1,40,000

Method-2

80% of 90% of 5,00,000

72% of 5,00,000 = 3,60,000

Difference=1,40,000

Method-3

90% of 5,00,000 = 4,50,000

80% of 4,50,000 = 3,60,000

Difference=1,40,000

In a college election between two students 10% of the votes cast are invalid. The winner gets 70% of the valid votes and defeats the loser by 1800 votes. how many votes were totally cast?

Total votes = 100%

Invalid votes = 10%

Valid votes = 100% - 10% = 90%

Winner = 70% of 90% = 63%

Looser = Valid votes - Winner = 90% - 63% = 27%

Majority = 63% - 27% = 36% = 1800

36% = 1800

100% = ?

5000

Model-5

Product constancy

The price of petrol increases by 50%. By how much %, its consumption should be reduced so as to keep the expenditure same?

$$\frac{1}{(2+1)} = \frac{1}{3} = 33.33\%$$

If the price of petrol has increased from Rs. 40 per litre to Rs. 60 per litre, by how much percent a person has to decrease his consumption so that his expenditure remains same.

$$\frac{1}{(2+1)} = \frac{1}{3} = 33.33\%$$

Due to a 20% fall in the price of potato, one can buy 3kg of potato more by investing ₹240. What is the original price of potato per kg?

$$20\% = \frac{1}{5}$$

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

Difference between consumption (5 - 4) = 1 unit

⇒ 1 unit → 3 kg

⇒ 4 unit → (3 × 4) = 12 kg

Now, the original price of potato is $\frac{240}{12}$ = ₹20 /kg

Model-6

Increased/decreased by P%

1) Harish spent 40% in machinery, 25% in building, 15% in raw materials and 5% in furniture. If he has Rs. 1305 left. Then how much money did he had initially?

Initial Amount = 100%

Spent = 85%

Remaining = 15%

15% = 1305

100% = ?

Rs. 8700

2) Gaurav spends 40% of the amount he received from his father on hostel expenses, 20% on books and stationery and 50% of the remaining on transport. He saves Rs. 450 which is half the remaining amount after spending on hostel expenses, books etc. and transport. How much money did he get from his father ?

Total Amount = 100%

HE & B&S = 40%+20% = 60%

Remaining Amount = 40%

Transport = 50% of 40% = 20%

Savings = $\frac{1}{2}$ of 20% = 10%

10% = 450

100% = ?

Rs. 4500

Model-7

Percentage Changes in Numerator and Denominator

If we increase 20% in numerator and decrease 20% in denominator of a fraction then it is 6/5, then what is the original fraction?

$$\frac{120x}{80y} = \frac{6}{5}$$

$$600x = 480y$$

$$\frac{x}{y} = \frac{4}{5}$$

Model-8

X is what % of Y?

$$\frac{x}{y} \times 100$$

In an examination, Ramesh scored 30% less than Suresh and Mahesh scored 20% less than Suresh. Ramesh's score is what percent of Mahesh's score?

Assume Suresh score = 100%

R = 100% - 30% = 70%

M = 100% - 20% = 80%

$$\frac{R}{M} \times 100 = \frac{70\%}{80\%} \times 100 = \frac{7}{8} \times 100$$

87.5%

Model-9

Successive Percentage

A single discount equivalent to three successive discounts of 5%, 10%, and 20% is,

5%, 10%, 20%

$$-5 - 10 + \frac{(-5)(-10)}{100}$$

14.5%

$$-14.5 - 20 + \frac{(-14.5)(-20)}{100}$$

31.6%

a) 32.5%
b) 35%
c) 31.6%
d) 30%

Thank you..