

① Scenario - Delivery Time Analysis for E-commerce Company.

data = [25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95]

⇒ calculate Q_1 & Q_3

$$Q_1 \Rightarrow P_K = \frac{K}{100} (N+1) \Rightarrow P_{25} = \frac{25}{100} (15+1) = \frac{16}{4} = 4$$

$Q_1 = 4^{th} \text{ value} \rightarrow 40$

$$Q_3 = P_{75} = \frac{75}{100} (16) = \frac{3}{4} \times 16 = 12^{th} \text{ value} \rightarrow 80$$

$$\Rightarrow IQR = Q_3 - Q_1 = 80 - 40 = 40$$

$$\Rightarrow \text{Outliers lower bound} = Q_1 - 1.5 \times IQR = 40 - 1.5 \times 40 = -20$$

$$\text{upper bound} = Q_3 + 1.5 \times IQR = 80 + 1.5 \times 40 = 140$$

⇒ No lower outliers & Upper outliers

② Scenario - Student Score Analysis

[45, 50, 55, 60, 60, 62, 63, 65, 90, 95]

$$\Rightarrow \text{mean} \Rightarrow \frac{45+50+55+60+60+62+63+65+90+95}{10}$$

$$= \frac{645}{10} = 64.5$$

$$\Rightarrow \text{median} \Rightarrow \frac{60+62}{2} = 61$$

$$\Rightarrow \text{mode} \Rightarrow 60$$

⇒ Median is considered than Mean because it is not affected by extreme values.

③ Scenario - Grocery store Customer analysis

[5, 10, 8, 15, 20, 5, 12, 14, 10, 18]

Data	Frequency
5	2
10	2
8	1
15	1
20	1
12	1
14	1
18	1

④ Scenario - Real estate model analysis

1) Calculate VIF

2) If VIF > 10 → multicollinearity.

⑤ Scenario - Medicine effectiveness study

1) Perform Independent T-test

2) Calculate P-value

3) If $P \leq 0.05$, it reject null hypothesis. - The medicine is effective

4) If $P > 0.05$, it fails to reject null hypothesis - The medicine has no effect can be due to random chance.

⑥ Scenario - Identifying Outliers in sales data

⇒ calculate Q_1 & Q_3

⇒ calculate $IQR = Q_3 - Q_1$

⇒ calculate lower bound = $Q_1 - 1.5 \times IQR$

upper bound = $Q_3 + 1.5 \times IQR$

⇒ Then check for outliers if the value less than lower bound - lower outlier.

Value > upper bound - upper outlier.

⑦ Scenario - Understanding customer satisfaction

[5, 4, 4, 5, 3, 4, 5, 2, 4, 3]

⇒ calculate mean

$$\frac{5+4+4+5+3+4+5+2+4+3}{10} = 3.9$$

$$\Rightarrow \text{calculate median} \Rightarrow \frac{3+4}{2} = 3.5$$

⇒ calculate mode ⇒ 4 ⇒ mostly given rating.

So customer satisfaction is good.