



Academic Year 2025

Semester:1

Assignment Work- 3rd

Full Name: Vikash Singh

Program: B.C.A(AI and D.S)

Roll No: 2501060151

Section:(C)

Course: Foundation of Data
Driven Decision making

Faculty: Dr. Satinder

Module 3: Data Analysis and
Visualization

Student Sign:

Vikash Singh

Professor Sign:

Task 1: Using a simple dataset (sales, website traffic, or survey data), compute mean, median and standard deviation.

Sol. we use the Sales Amount values:

$$[1200, 1500, 1100, 1700, 1600, 1800, 1400, 1550, 1650, 1750]$$

1. mean (Average)

$$\text{mean} = \frac{\sum \text{values}}{n}$$

$$\text{mean} = \frac{1200 + 1500 + 1100 + 1700 + 1600 + 1800 + 1400 + 1550 + 1650 + 1750}{10}$$

$$\text{mean} = \frac{15250}{10} = 1525.0$$

$$\text{mean} = 1525.0$$

2. Median (middle value)

Step 2: There are 10 values (even number), the median is the average of the 5th and 6th values

~~5th value~~ = .

Step 1: Convert into ascending order

$$[1100, 1200, 1400, 1500, 1550, 1600, 1650, 1700, 1750, 1800]$$

$$5\text{th value} = 1550$$

$$6\text{th value} = 1600$$

$$\text{median} = \frac{1550 + 1600}{2} = \frac{3150}{2} = 1575.0$$

$$\text{median} = 1575.0$$

3. Standard Deviation (spread of data)

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

where

x = each value

\bar{x} = mean

n = number of data points (10)

Subtract the mean (1525) from each value and square it

value	Deviation ($x - 1525$)	Squared
1200	-325	105625
1500	-25	625
1100	-425	180625
1700	175	30625
1600	75	5625
1800	275	75625
1400	-125	15625
1550	25	625
1650	125	15625
1750	225	50625

Add all squared deviations

$$105625 + 625 + 180625 + 30625 + 5625 + 75625 + 15625 + 625 \\ + 15625 + 5625 = 479,625$$

Divide by $n-1 = 9$

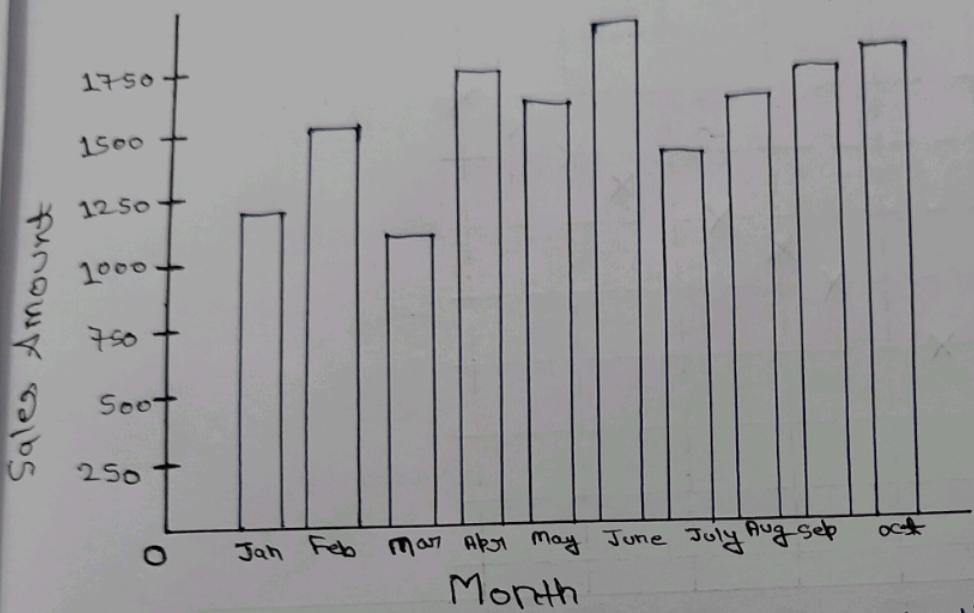
$$\frac{479625}{9} = 53,291.67$$

$$\text{Square root } \sqrt{53291.67} = 231.24$$

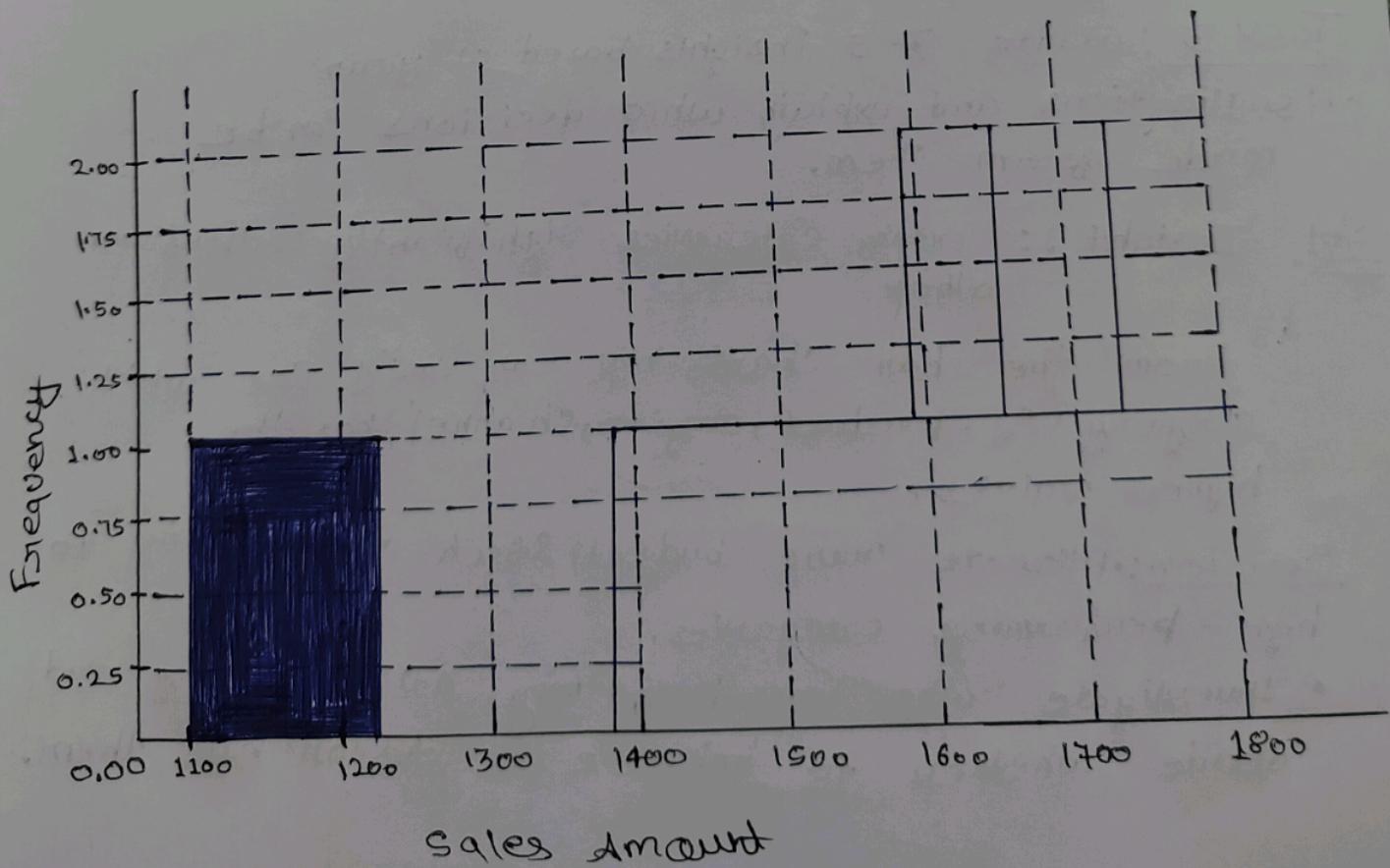
Standard deviation = 231.24

TASK 2: Create at least 3 different charts (bar, histogram and scatter plot) to visualize data trends

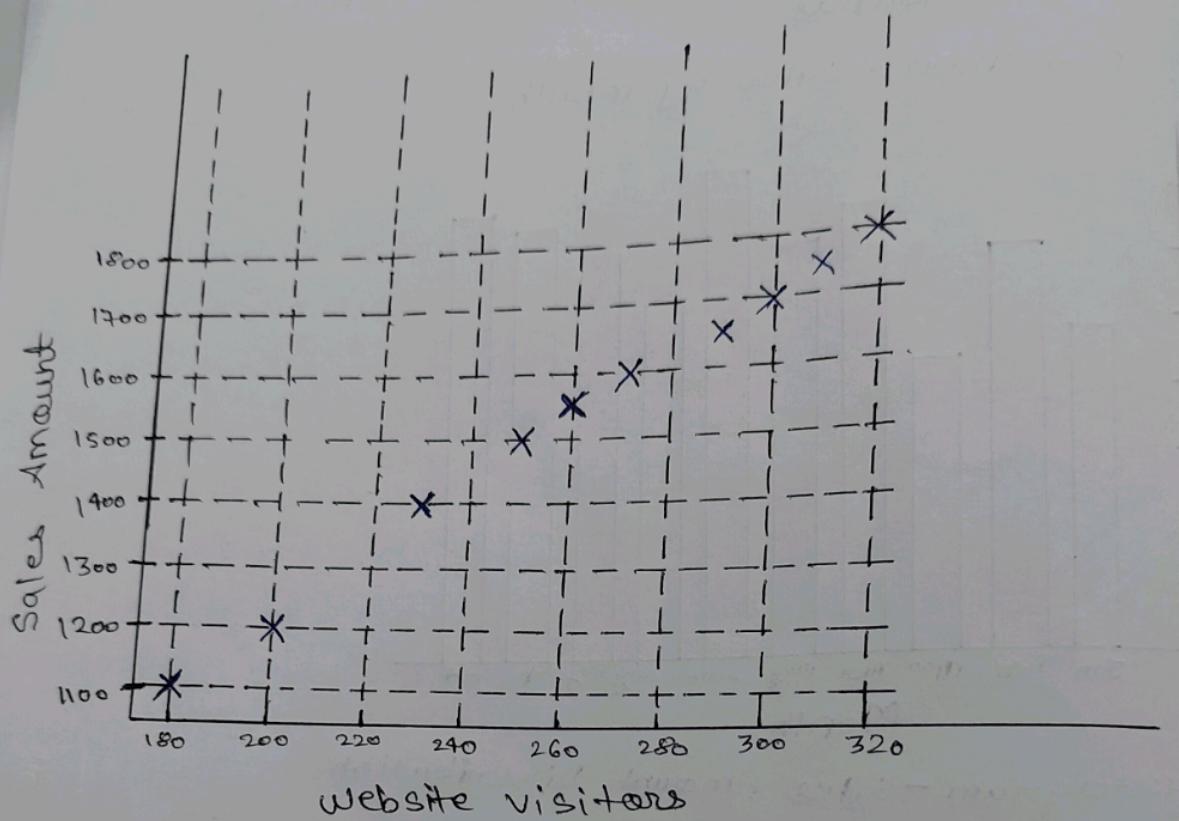
1. Bar chart - sales by month



2. Histogram - Sales Amount Distribution



Scatter Plot - visitors vs sales



Task 3: write 3-5 insights based on your visualizations and explain what decisions can be made from them.

Sol. Insight 1: certain categories significantly outperform other

From the bar chart, you can easily see which category (eg, product, region, channel) has the highest values.

Decision: Allocate more budget, stock, or marketing to high-performing categories.

• Investigate why low-performing categories lag and decide whether to improve or discontinue them.

Insight 2: The data distribution shows skew or concentration.

From the histogram, you learn whether the data is concentrated in a certain range (e.g., most sales are low, most survey responses cluster around 3-4).

- Decision:
- If heavily skewed, adjust targets or KPIs to realistic levels.
 - If values are spread widely, consider segment-specific strategies.

Insight 3: Strong or weak relationships exist between variables.

From the scatter plot, you can observe correlation - for example, higher traffic may lead to higher sales, or more study time improves scores.

- Decision:
- If a strong positive correlation exists, invest more in the driver variable (e.g., increase traffic to boost sales).
 - If no correlation, rethink assumptions and avoid wasting resources on unrelated factors.

Task 4: Reflect on how visual storytelling enhances data interpretation.

Sol. 1. converts complexity into clarity

Large datasets or numerical tables can overwhelm viewers. Visual storytelling distills this complexity into clear diagrams, charts, or infographics, making patterns and insights immediately visible.

Example \Rightarrow A trend line can instantly reveal growth or decline that might be hidden in raw numbers.

2. Creates Emotional and cognitive connection

Human brains are wired to understand stories better than isolated facts. When data is framed within a narrative - such as showing the journey of customer satisfaction over time - it becomes relatable and meaningful.

Example \Rightarrow This connection helps audiences care about what the data is saying.

3. Highlights the "why", Not just the "what"

A simple chart shows what is happening; visual storytelling explains why it matters.

This involves adding context such as annotations, captions, or key message callouts.

Example \Rightarrow For instance, highlighting a sudden sales spike with a note about a festival season adds interpretive value.