ASSIGNMENT

Normal Distribution & Empirical Rule

Domain Chosen: Students' Exam Scores

Introduction to Normal Distribution

A Normal Distribution (also called a Bell Curve) is a data distribution where most values are concentrated around the mean (average), and fewer values are found as we move away from the center. Many real-life datasets such as exam scores follow this pattern.

1. Understanding the Domain (Exam Scores)

We consider a class of students with:

Mean (Average) = 70 marks

Standard Deviation (σ) = 10 marks

Most students score around the average, and scores decrease gradually as we move away from the mean.

2. Shape of Normal Distribution

The graph is symmetrical (left side = right side)

Mean = Median = Mode

The highest point is at the mean

Values decrease equally on both sides

3. Empirical Rule (68–95–99.7 Rule)

1. 68% Rule (Within 1 Standard Deviation)

Range: 60 to 80 marks (70 ± 10)

About 68% of students fall in this range

Most students score near the average

2. 95% Rule (Within 2 Standard Deviations)

Range: 50 to 90 marks (70 ± 20)

About 95% of students fall in this range

Almost all students are included

3. 99.7% Rule (Within 3 Standard Deviations)

Range: 40 to 100 marks (70 ± 30)

About 99.7% of students fall in this range

Very few students lie outside this range

4. Graph Representation (Explanation)

X-axis represents marks (40 to 100)

Y-axis represents number of students

The curve peaks at 70 (mean)

The distribution is symmetrical on both sides

5. Real-Life Interpretation

Students scoring 60–80 are average performers

Students scoring 80–90 are above average

Students scoring above 90 are top performers

Students scoring below 50 need improvement

Conclusion

Normal distribution helps in analyzing exam scores effectively

The Empirical Rule helps predict student performance

Most values lie close to the mean

It is useful for identifying different performance levels

It is widely used in statistics and education