

ASSIGNMENT: DISTRIBUTIONS

Answers :

1. Probability of rolling a 3 exactly 5 times

This is a binomial experiment with $n = 30$ trials, probability of success $p = 1/6$.

Probability = BINOM.DIST(5,30,1/6,FALSE) in Excel.

This gives the probability of getting exactly 5 threes in 30 rolls.

2. Uniform Distribution using RAND()

When 100 values are generated using RAND() and plotted as a histogram, the shape appears approximately flat. This indicates a uniform distribution, where all values between 0 and 1 have equal probability.

3. Normal Distribution Percentage

Mean = 50, Standard deviation = 5.

Values between 45 and 55 are within ± 1 standard deviation.

Approximately 68% of values lie in this range according to the empirical rule.

4. Standardization (Z-score)

Standardization converts values to a common scale.

Formula: $z = (x - \mu) / \sigma$.

It helps compare values across different datasets and improves model performance.

5. Kurtosis

Kurtosis measures the peakedness of a distribution.

Types:

- Mesokurtic (normal)
- Leptokurtic (peaked)
- Platykurtic (flat)

6. Uniform Distribution and Fair Die

A fair die has equal probability ($1/6$) for each outcome, making uniform distribution an ideal model.

7. Probability of at least 8 successes

Use Excel formula:

$1 - \text{BINOM.DIST}(7,15,0.5,\text{TRUE})$

This calculates the probability of getting 8 or more successes.

8. Log Transformation

Log transformation reduces skewness and stabilizes variance.

It makes data more normally distributed and improves statistical analysis.