# Distribution Assignment Answers

**Q1.Simulate 30 rolls with =RANDBETWEEN(1,6). What is the probability of rolling a 3 exactly 5 times? (Hint: Use BINOM.DIST)**
SOLUTION :-

Probability of rolling a 3 exactly 5 times in 30 rolls.
Formula: =BINOM.DIST(5, 30, 1/6, FALSE)
Result: ~19.21%                    ~0.1921

**Q2.Generate 100 values in Excel using the continuous uniform distribution RAND() and plot a histogram. Describe the shape of the distribution.**
SOLUTION :-

Using =RAND() IN Cell **T1:T100**
Shape : The distribution is rectangular/flat.Every value between 0 and 1 has an equal probability of occuring.

**Q3.A dataset has a mean of 50 and a standard deviation of 5. What percentage of values lie between 45 and 55 if the data follows a normal distribution?**
SOLUTION :-

Mean=50, SD=5. Values between 45 and 55**.**
**FOR : X = 45**        Z = 45 -50/5 = **-1**
**FOR : X = 55**        Z = 55 -50/5 = **+1**
Formula : =NORM.DIST(55,50,5,TRUE)-NORM.DIST(45,50,5,TRUE)
RESULT: ~68.27% (Empirical Rule).            ~0.68269

**Q4.What is the concept of standardization (z-score), and why is it important in data analysis? Explain the formula and how standardization transforms a dataset.**
SOLUTION :-

Standardization (z-score) is the process of putting different variables on the same scale.
FORMULA : $z = (x - \mu)/\sigma$
Transformation : It shifts the mean to 0 and the standard deviation to 1.

**Q5. What is Kurtosis and their type?**
SOLUTION :-

Kurtosis measures the "tailedness" of a distribution (how much data is in the peaks vs tails).
TYPES :-
Leptokurtic: Sharp peak, heavy tails (more outliers).
Platykurtic: Flat peak, thin tails (fewer outliers).
Mesokurtic: Normal distribution (Kurtosis $\approx$ 0).

**Q6. Explain why the uniform distribution is a good model for the outcome of rolling a fair die.**

A fair die is a perfect example of a Discrete Uniform Distribution because every outcome {1,2,3,4,5,6} has exactly the same probability **(1/6)**.

**Q7.Use Excel to compute the probability of getting at least 8 successes in 15 trials with success probability 0.5.**

Probability of at least 8 successes in 15 trials (p=0.5 assumed for "success" unless specified).

**FORMULA :** =1 - BINOM.DIST(7, 15, 0.5, TRUE)

RESULT : ~50.00%                                          0.5

**Q8.How does log transformation help in stabilizing variance and making data more normally distributed?**

It compresses high values and spreads out low values.

It stabilizes variance by making the standard deviation proportional to the mean, which helps "pull in" right-skewed data to look more like a Bell Curve.

 **FORMULA :** y' = LOG(y).