Q1.

Probability Mass Function :

```
- The PMF is applicable to discrete random variables, which have
countable outcomes.
- Consider rolling a die , PMF is :
    P(X = 1) = 1/6
    P(X = 2) = 1/6
    P(X = 3) = 1/6
    P(X = 4) = 1/6
    P(X = 5) = 1/6
    P(X = 6) = 1/6
```

Probability Density Function :

```
- The PDF is used for continuous random variables, which can
take on any value in a given range.
- Example :
    - The PDF for the standard normal distribution is given by
the bell-shaped curve described by the standard normal
distribution formula.
```

Q2.

The Cumulative Distribution Function (CDF) is a function that describes the probability that a random variable takes on a value less than or equal to a given point. It provides a cumulative view of the probability distribution of a random variable.

Example - Rolling a die.

Uses : - Provides Cumulative information - Simplifies Probability Calculations - Useful in Statistical Analysis.

Q3.

- Height of a Population
- IQ Scores
- Measurement Errors
- Financial Returns

Mean : - The mean determines the center of the distribution.

Standard Deviation : - measures the spread or variability of the distribution.

Q4.

- Central Limit Theorem
- Statistical Inference
- Parameter Forecasting
- Quality Control

Real Life Examples :

```
- Body Temperature
- Financial Returns
- IQ Scores
- Height of a Population.
```

Q5.

Outcomes are binary.

Example : Tossing a fair Coin.

Bernoulli Distribution :

```
- experiment with only two possible outcomes.
- has one parameter, which represents the probability of
success.
```

Binomial Distribution :

```
- models the number of successes in a fixed number of
independent and identical Bernoulli trials.
- has two parameters , number of trials and probability of
success in each trial.
```

Q6.

z = x - mean/ std z = 60-50/10 = 1. From z-score table , its approx 0.1587.

Therefore, the probability that a randomly selected observation from the given dataset is greater than 60 is approximately 0.1587 or 15.87%.

Q7.

Describes an experiment where there is an arbitary outcome that lies certain bounds.The bounds by the parameters a and b, which are minimum and maximum values. The interval can either be closed or open.

Q8.

- is a measure of how many standard deviations a particular data point is from the mean of a dataset.

Importance :

```
- Standardization
- Identification of outliers
- Probability and Normal Distribution
- Data Transformation.
```

Q9.

- States that as the sample size increases, the sampling distribution of the sample mean tends to become normal, regardless of the shape of the population distribution.

Significance :

```
- Normality Approximation
- Statistical Inference
- Large Sample Sizes
- Sampling Distributions.
```

Q10.

- Random Sampling
- Independence
- Identically Distributed
- Population Distribution.