### Quiz: Advanced Statistics

1. What is the difference between a probability mass function (PMF) and a probability density function (PDF)?

- A) A PMF is continuous, while a PDF is discrete.

- B) A PMF is used for continuous random variables, while a PDF is used for discrete random variables.

- C) A PMF gives the probability of a specific outcome, while a PDF gives the probability density of an outcome.

- D) A PMF and a PDF are equivalent terms.

2. What does the cumulative density function (CDF) represent?

- A) The probability of a specific outcome.

- B) The probability density of an outcome.

- C) The cumulative probability up to a specific value.

- D) The expected value of a random variable.

3. Which of the following is an example of a normal distribution?

- A) The distribution of the number of heads obtained from flipping a fair coin.

- B) The distribution of the sum of two dice rolls.

- C) The distribution of heights of adult humans.

- D) The distribution of the number of cars passing through a toll booth in one hour.

4. What is the formula for the cumulative distribution function (CDF)?

- A) F(x) = P(X > x)

- B) F(x) = P(X < x)

- C) F(x) = P(X = x)

- D) F(x) = P(X >= x)

5. What is the Bernoulli distribution?

- A) A distribution used to model the number of successes in a sequence of independent trials.

- B) A distribution used to model the number of occurrences of a particular event in a fixed interval of time.

- C) A distribution used to model the number of people in a certain age group.

- D) A distribution used to model the number of defective items in a production batch.

6. What is the Uniform distribution?

- A) A distribution used to model the number of occurrences of a particular event in a fixed interval of time.

- B) A distribution used to model the number of people in a certain age group.

- C) A continuous probability distribution with a constant probability density between two limits.

- D) A discrete probability distribution with equal probabilities for all outcomes.

7. What are Z-scores used for?

- A) To standardize a normal distribution.

- B) To compute the probability of a specific outcome in a normal distribution.

- C) To determine if a sample mean is significantly different from a population mean.

- D) To determine the range of values that a random variable is likely to take on.

### Answers

1. \*\*C) A PMF gives the probability of a specific outcome, while a PDF gives the probability density of an outcome.\*\*

- PMF is for discrete random variables and provides the probability of specific outcomes.

- PDF is for continuous random variables and provides the density function, not direct probabilities.

2. \*\*C) The cumulative probability up to a specific value.\*\*

- CDF represents the probability that a random variable takes on a value less than or equal to a specific value.

3. \*\*C) The distribution of heights of adult humans.\*\*

- Heights of adult humans typically follow a normal distribution.

4. \*\*B) F(x) = P(X < x)\*\*

- The CDF, F(x), gives the probability that the random variable X is less than or equal to x.

5. \*\*A) A distribution used to model the number of successes in a sequence of independent trials.\*\*

- The Bernoulli distribution models a binary outcome (success/failure) in a single trial.

6. \*\*C) A continuous probability distribution with a constant probability density between two limits.\*\*

- Uniform distribution means every outcome in the interval has an equal chance of occurring.

7. \*\*A) To standardize a normal distribution.\*\*

- Z-scores transform data to fit a standard normal distribution, with a mean of 0 and standard deviation of 1.