1. Which of the following probability distributions is discrete?

a) Normal distribution

b) Poisson distribution

c) Exponential distribution

d) Uniform distribution

2. What does conditional probability represent?

a) The probability of an event occurring given that another event has occurred

b) The probability of two independent events occurring simultaneously

c) The probability of an event occurring in isolation

d) The probability of an event occurring with absolute certainty

3. Bayes' theorem is used to:

a) Calculate the probability of an event occurring given prior knowledge

b) Determine the expected value of a random variable

c) Find the median of a probability distribution

d) Estimate the variance of a sample

4. In Bayes' theorem, P(A|B) represents:

a) The probability of event A occurring given event B has occurred

b) The probability of event B occurring given event A has occurred

c) The joint probability of events A and B occurring

d) The marginal probability of event A

5. Which of the following statements is true about the normal distribution?

a) It is a discrete probability distribution

b) It is symmetric around its mean

c) It is only applicable to small sample sizes

d) It has a fixed range of possible values

6. Which of the following statements about the Poisson distribution is true?

a) It is used to model continuous random variables.

b) It is only applicable to finite sample sizes.

c) It is characterised by a mean and standard deviation.

d) It is used to model the number of events occurring in a fixed interval of time or space.

7. If events A and B are independent, what is P(A and B)?

a) P(A) * P(B)

b) P(A) + P(B)

c) P(A) - P(B)

d) P(A) / P(B)

8. A conditional probability of 0 means:

a) The events are certain to occur together.

b) The events are independent.

c) The events cannot occur together.

d) The events have no relationship.

9. What does the variance of a probability distribution measure?

a) The spread or dispersion of the distribution

b) The likelihood of an event occurring

c) The average of the squared deviations from the mean

d) The probability of the mean value occurring

10. In a binomial distribution, the parameters are:

a) Mean and standard deviation

b) Sample size and probability of success

c) Median and mode

d) Variance and range

11. If two events are mutually exclusive, what is the probability of both events occurring?

a) 0

b) 1

c) 0.5

d) Depends on the specific events

12. What does the area under a probability density function (PDF) represent?

a) The probability of a specific outcome occurring

b) The mean of the distribution

c) The median of the distribution

d) The total probability space

13. Which of the following is a property of the exponential distribution?

a) It is symmetric around its mean.

b) It is used to model the time until the next event occurs.

c) It is a discrete distribution.

d) It has a fixed range of possible values.

14. When applying Bayes' theorem, what does P(B|A) represent?

a) The prior probability of event B occurring.

b) The probability of event A occurring given event B has occurred.

c) The joint probability of events A and B occurring.

d) The marginal probability of event B.

15. In a uniform distribution, the probability density function is:

a) Constant within a specified range.

b) Skewed to the left.

c) Skewed to the right.

d) Bell-shaped.

16. Which of the following statements about the Bernoulli distribution is true?

a) It models the number of successes in a fixed number of independent trials.

b) It is characterised by two parameters: mean and variance.

c) It is a continuous probability distribution.

d) It is used to model continuous random variables.

17. What is the formula for conditional probability?

a) P(A and B) = P(A) * P(B)

b) P(A | B) = P(A) + P(B) - P(A and B)

c) P(A | B) = P(A) * P(B)

d) P(A and B) = P(A | B) * P(B)

18. In a normal distribution, approximately what percentage of the data lies within one standard deviation of the mean?

a) 25%

b) 50%

c) 68%

d) 95%

19. When do we use the binomial distribution?

a) When the number of trials is fixed and the probability of success is constant.

b) When the number of trials is infinite.

c) When the probability of success changes with each trial.

d) When the outcomes are continuous.

20. What does the cumulative distribution function (CDF) represent?

a) The probability of an event occurring exactly at a specified value.

b) The probability of an event occurring within a specified range.

c) The mean of the distribution.

d) The total number of trials in the distribution.

21. Which of the following best describes a discrete random variable?
a) A variable that can take on any value within a specified range.
b) A variable that can take on only a countable number of distinct values.
c) A variable that can take on any value in a continuous interval.
d) A variable that can take on only integer values.

22. Which of the following is an example of a discrete random variable?
a) Height of individuals in a population.
b) Weight of oranges in a basket.
c) Number of cars passing through an intersection in a given hour.
d) Time taken for a computer program to execute.

23. What is the probability mass function (PMF) used to describe?
a) Continuous random variables.
b) Discrete random variables.
c) The cumulative distribution function.
d) The probability density function.

24. Which of the following best describes a continuous random variable?
a) A variable that can take on only a countable number of distinct values.
b) A variable that can take on any value within a specified range.
c) A variable that can take on only integer values.
d) A variable that can take on values from a finite set.

25. Which of the following is an example of a continuous random variable?
a) Number of students in a classroom.
b) Number of heads obtained when flipping a coin.
c) Temperature recorded in a city at noon.
d) Number of defective items produced in a factory.

26. The probability density function (PDF) is used to describe:
a) Discrete random variables.
b) Continuous random variables.
c) The cumulative distribution function.
d) The probability mass function.

27. Which of the following statements is true about the cumulative distribution function (CDF)?
a) It can only be defined for discrete random variables.
b) It represents the probability density function.

c) It provides the probability of a random variable taking a value less than or equal to a given value.
d) It is used to calculate the expected value of a random variable.

28. Which of the following is a characteristic of the expected value of a random variable?
a) It can be negative.
b) It represents the most frequently occurring value.
c) It is always greater than the variance.
d) It represents the long-term average value of the random variable.

29. Variance of a random variable measures:
a) The spread of the distribution.
b) The likelihood of a particular outcome.
c) The distance of each value from the mean.
d) The probability of each outcome occurring.

30. The standard deviation of a random variable is:
a) Always negative.
b) A measure of how spread out the values of the random variable are.
c) Equal to the mean of the random variable.
d) The same as the variance.