Natural Statistics and Wildlife Probability

Statistics & Probability · Answer Key · 25 Questions

1. In a population of honeybees, the foraging range follows a distribution where the mean distance from the hive is approximately 2 to 3 kilometers. What statistical term describes the most frequently occurring value in this distance dataset?

A) Mean
B) Median
C) Mode
D) Standard Deviation

2. If a biologist tags 50 sea turtles in a bay and later recaptures 200, finding 10 with tags, what is the estimated total population size using the Lincoln-Peterson index formula?

A) 500
B) 1,000
C) 2,000
D) 2,500

3. The gestation period of African elephants has a normal distribution. If the mean is 660 days with a standard deviation of 15 days, what percentage of births fall within one standard deviation of the mean?

A) 68%
B) 95%
C) 99.7%
D) 50%

4. When calculating the probability of a bird species carrying a specific genetic mutation in a population where 1 in 50 individuals is affected, what is the probability that a randomly selected individual does NOT carry the mutation?

A) 0.02
B) 0.98
C) 0.05
D) 0.95

5. In a forest ecosystem, the frequency of tree heights often follows a specific statistical curve. Which distribution is most commonly used to model the number of occurrences of rare events, such as the sighting of a specific nocturnal predator in an hour?

A) Normal
B) Poisson
C) Binomial
D) Exponential

6. If the probability of a sea lion pup surviving its first year is 0.75, what is the probability of two independent pups both surviving their first year?

A) 0.5625
B) 1.50
C) 0.25
D) 0.80

7. Which statistical measure represents the square root of the variance in the annual rainfall data of the Amazon rainforest?

A) Range
B) Mean
C) Standard Deviation
D) Interquartile Range

8. In a study of 100 emperor penguins, 60 were male and 40 were female. What is the probability of selecting a female penguin at random?

A) 0.6
B) 0.4
C) 0.5
D) 0.2

9. The lifespan of a certain species of wildflower follows an exponential distribution. In this type of probability distribution, what is the relationship between the mean and the standard deviation?

A) Mean equals standard deviation
B) Mean is double the standard deviation
C) Mean is half the standard deviation
D) They are unrelated

10. If a coral reef survey shows that the number of fish species present increases logarithmically with the area sampled, which statistical relationship is being observed?

A) Linear regression
B) Species-area relationship
C) Normal distribution
D) Chi-square test

11. In a sample of 200 butterflies, the wingspans are measured. If the mean wingspan is 50mm and the median is 50mm, what does this suggest about the distribution of the data?

A) It is heavily skewed
B) It is perfectly symmetrical
C) It is bimodal
D) It has high outliers

12. What is the probability of picking an egg that will hatch into a female alligator if the sex ratio of the clutch is 1:1?

A) 0.25
B) 0.5
C) 0.75
D) 1.0

13. When researchers study the biodiversity of a soil sample, they use the Shannon Diversity Index. What does a higher value in this index statistically represent?

A) Lower species count
B) Higher species richness and evenness
C) Decreased environmental stability
D) A smaller sample size

14. If a population of wolves has a growth rate that is constant over time, which type of function best represents the total population size over years?

A) Linear
B) Exponential
C) Logarithmic
D) Inverse

15. In a data set of 1,000 birds, 250 are migratory. What is the relative frequency of migratory birds in this population?

A) 0.025
B) 0.25
C) 2.5
D) 25

16. Which statistical test is commonly used to compare the observed frequencies of animal diet choices against expected frequencies based on prey availability?

A) T-test
B) Chi-square test
C) ANOVA
D) Correlation coefficient

17. The body mass of a species of lizard is found to have a coefficient of variation of 10%. If the mean mass is 200g, what is the standard deviation?

A) 10g
B) 20g
C) 30g
D) 40g

18. When tracking the migration path of a whale, the distance covered per day fluctuates. What statistical measure would best indicate the 'typical' daily distance while minimizing the effect of extreme outliers?

A) Mean
B) Median
C) Range
D) Sum

19. In a box plot showing the distribution of nesting depths for turtles, what does the box itself represent?

A) The range
B) The interquartile range
C) The mean
D) The standard deviation

20. If there is a 5% chance that a rare orchid will bloom in a specific year, what is the probability it will NOT bloom?

A) 0.05
B) 0.95
C) 0.5
D) 0.99

21. Which term describes the data point that lies furthest from the mean in a dataset of animal migration speeds?

A) Mode
B) Outlier
C) Median
D) Quartile

22. In a population of 500 insects, 50 are predators. What is the probability of randomly choosing a non-predatory insect?

A) 0.1
B) 0.9
C) 0.5
D) 0.09

23. What is the sum of all probabilities in a sample space representing the possible weather conditions for a habitat (Sunny, Rainy, Cloudy)?

A) 0
B) 0.5
C) 1
D) 100

24. A researcher measures the concentration of pollutants in a stream. What statistical value is calculated by dividing the sum of all concentrations by the number of samples?

A) Median
B) Mode
C) Mean
D) Variance

25. If the correlation coefficient between local temperature and butterfly emergence date is -0.85, what does this indicate?

A) Strong positive correlation
B) Strong negative correlation
C) No correlation
D) Weak negative correlation