

Taibah University College of Computers science and Engineering		Date: Tue 26 Dec. 2023 Time: 09:00 — 10:00
الاحتمالات والاحصاء الهندسي STAT 305 YM2 – Final Exam		Total Marks: 40

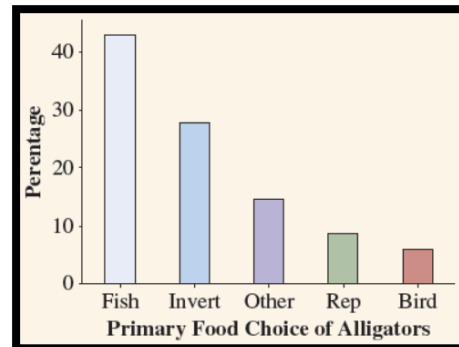
Question 01

[40 Marks]

- Which of the following best describes a **probability distribution**?
 - A rule that assigns probabilities to a set of events
 - A method to calculate the mean of a dataset.
 - A graphical representation of frequencies
 - A technique to predict future events.
- What is a key characteristic of a **binomial distribution**?
 - Continuous outcomes
 - Only two possible outcomes for each trial
 - Infinite number of trials
 - Dependent trials
- The mean and median in a **normal distribution** are:
 - Different
 - The same
 - Zero
 - Undefined
- The probability of success in a **Bernoulli distribution** is denoted by:
 - p
 - q
 - μ (mu)
 - σ (sigma)
- In a **Bernoulli distribution**, if p is the probability of success, the probability of failure is:
 - $1 - p$
 - p
 - $1/p$
 - p^2
- The **mean of a binomial distribution** is given by:
 - np
 - n/p
 - p/n
 - $np(1-p)$
- In a **normal distribution**, approximately 68% of the data falls within:
 - One standard deviation from the mean
 - Two standard deviations from the mean
 - Three standard deviations from the mean
 - Four standard deviations from the mean
- The probability mass function (PMF) applies to what type of random variable?
 - Continuous
 - Discrete
 - Both continuous and discrete
 - Neither continuous nor discrete
- The **normal distribution** is sometimes referred to as:
 - Poisson distribution
 - Gaussian distribution
 - Exponential distribution
 - Uniform distribution
- A trial with only two possible outcomes, success or failure, is modeled by a:
 - Normal distribution
 - Binomial distribution
 - Bernoulli distribution
 - Uniform distribution

- For a process to be modeled by a binomial distribution, each trial must be:
 - Dependent on the previous trial
 - Independent of the other trials
 - Have more than two possible outcomes
 - Have a varying probability of success.
- It describes how the observations fall across the range of possible values"
 - Correlation
 - Distribution
 - Regression
 - Variance
- A listing of possible values for a variable, together with the number of observations for each value"?
 - Frequency Table
 - Histogram
 - Scatter Plot
 - Box Plot
- Identify the type of variable represented by "The number of social media accounts you have (Facebook, Twitter, LinkedIn, Instagram, etc.)" in statistical terms.
 - Categorical
 - Discrete
 - Continuous
 - None of the above
- Considering the variable "Choice of diet (vegan, vegetarian, neither)," how would this variable be classified in statistical terms?
 - Categorical
 - Quantitative
 - Neither Categorical nor Quantitative

For questions 16 to 18 — For 219 alligators captured in four Florida lakes, researchers classified the primary food choice (in volume) found in the alligator's stomach in one of the categories



- Is primary food choice categorical or quantitative?
 - Categorical
 - quantitative
- Which is the **modal category** for primary food choice?
 - Fish
 - Invert
 - Bird
 - Rep
- About what percentage of alligators had fish as the primary food choice?
 - 43
 - 25
 - 18

- d) 5
19. In the following data set, what additional number should be included in the data set to yield a mean of 10?
5, 8, 10, 12, ____
- a) 8
b) 10
c) 12
d) 15

Based on records of automobile accidents in a recent year, the Department of Highway Safety and Motor Vehicles in Florida reported the counts who survived (S) and died (D), according to whether they wore a seat belt (Y = yes, N = no). The data are presented in the contingency table shown.

Outcome of auto accident by whether subject wore seat belt			
Wore Seat Belt	Survived (S)	Died (D)	Total
Yes (Y)	412,368	510	412,878
No (N)	162,527	1,601	164,128
Total	574,895	2,111	577,006

20. what is the total number of individuals who survived the accidents?
- a) 412,368
b) 162,527
c) 574,895
d) 577,006
21. what is the probability of an individual dying (D) in an auto accident, denoted as $P(D)$?
- a) $2,111/577,006$
b) $510/412,878$
c) $1,601/164,128$
d) $412,368/574,895$
22. Estimate the probability that an individual did not wear a seat belt, denoted as $P(N)$.
- a) $412,878/577,006$
b) $164,128/577,006$
c) $510/412,878$
d) $1,601/164,128$
23. Given the data, estimate the probability that an individual did not wear a seat belt and died in the accident, denoted as $P(N \text{ and } D)$.
- a) $1,601/577,006$
b) $1,601/164,128$
c) $2,111/577,006$
d) $510/412,878$
24. what is the conditional probability of an individual dying (D) given that they did not wear a seat belt (N), denoted as $P(D|N)$?
- a) $1,601/164,128$
b) $1,601/577,006$
c) $2,111/577,006$
d) $510/412,878$
25. Using the data, what is the conditional probability of an individual surviving (S) given that they wore a seat belt (Y), denoted as $P(S|Y)$?
- a) $412,368/412,878$
b) $412,368/574,895$
c) $510/412,878$
d) $162,527/164,128$
26. If $P(A) = 0.5$ and $P(B) = 0.4$, and A and B are mutually exclusive events, what is $P(A \cup B)$?
- a) 0.9
b) 0.2
c) 0.7
d) 0.5
27. If $P(A) = 0.3$ and $P(B) = 0.6$, and A and B are independent events, what is $P(A \cap B)$?

- a) 0.18
b) 0.9
c) 0.5
d) 0.2
28. If $P(A) = 0.4$, $P(B) = 0.5$, and $P(A \cap B) = 0.2$, what is $P(A \cup B)$?
- a) 0.7
b) 0.9
c) 0.5
d) 0.3
29. If $P(A) = 0.5$, $P(B) = 0.4$, and A and B are mutually exclusive, what is $P(A \cap B)$?
- a) 0.0
b) 0.2
c) 0.5
d) 0.9
30. If $P(A) = 0.5$, $P(B) = 0.4$, and $P(A \cup B) = 0.6$, what is $P(A \cap B)$?
- a) 0.2
b) 0.3
c) 0.4
d) 0.1
31. Alice and Bob are playing a game with a six-sided die. Alice will win if the die shows a 1 or 2, and Bob will win if it shows a 3 or 4. If the die shows a 5 or 6, they will roll again. What is the probability of Alice winning on the first roll?
- a) $1/2$
b) $1/4$
c) $1/6$
d) $1/3$
32. The distribution of IQ scores in the general population is typically modeled as a:
- a) Normal distribution
b) Binomial distribution
c) Uniform distribution
d) Bernoulli distribution
33. In a clinical trial, the effectiveness of a new medication is being tested. If the probability of a positive outcome is known, the results can be modeled using a:
- a) Normal distribution
b) Binomial distribution
c) Exponential distribution
d) Uniform distribution
34. In computer science, a bit that can be either 0 or 1 is an example of a variable following:
- a) Normal distribution
b) Bernoulli distribution
c) Binomial distribution
d) Uniform distribution
35. The heights of students in a school are **normally distributed**. This means that the heights are:
- a) Uniformly spread out
b) Centered around an average value,
c) All the same
d) Random and unpredictable
36. Lisa is attempting 10 free throws in basketball. Each throw has a 60% chance of success. The distribution of her successful throws follows a:
- a) Normal distribution
b) Uniform distribution
c) Binomial distribution
d) Bernoulli distribution
37. In a game show, a contestant picks one of two doors, behind one is a car (win) and the other is empty (lose). This situation is an example of:
- a) Binomial distribution

- b) Normal distribution
 - c) Bernoulli distribution
 - d) Poisson distribution
38. In a soccer match, the random variable Y represents the total number of goals scored. This random variable is:
- a) Continuous
 - b) Discrete
 - c) Uniform
 - d) Normal
39. A company sends out 200 advertisements, each with a 10% chance of resulting in a sale. The number of sales can be modeled with a:
- a) Bernoulli distribution
 - b) Normal distribution
 - c) Binomial distribution
 - d) Uniform distribution
40. In a factory, the probability of a product being defective is 5%. The distribution of defective products in a sample of 100 is a:
- a) Normal distribution
 - b) Binomial distribution
 - c) Bernoulli distribution
 - d) Poisson distribution

Name	ID

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1 (A) (B) (C) (D) 17 (A) (B) (C) (D) 33 (A) (B) (C) (D)

2 (A) (B) (C) (D) 18 (A) (B) (C) (D) 34 (A) (B) (C) (D)

3 (A) (B) (C) (D) 19 (A) (B) (C) (D) 35 (A) (B) (C) (D)

4 (A) (B) (C) (D) 20 (A) (B) (C) (D) 36 (A) (B) (C) (D)

5 (A) (B) (C) (D) 21 (A) (B) (C) (D) 37 (A) (B) (C) (D)

6 (A) (B) (C) (D) 22 (A) (B) (C) (D) 38 (A) (B) (C) (D)

7 (A) (B) (C) (D) 23 (A) (B) (C) (D) 39 (A) (B) (C) (D)

8 (A) (B) (C) (D) 24 (A) (B) (C) (D) 40 (A) (B) (C) (D)

9 (A) (B) (C) (D) 25 (A) (B) (C) (D)

10 (A) (B) (C) (D) 26 (A) (B) (C) (D)

11 (A) (B) (C) (D) 27 (A) (B) (C) (D)

12 (A) (B) (C) (D) 28 (A) (B) (C) (D)

13 (A) (B) (C) (D) 29 (A) (B) (C) (D)

14 (A) (B) (C) (D) 30 (A) (B) (C) (D)

15 (A) (B) (C) (D) 31 (A) (B) (C) (D)

16 (A) (B) (C) (D) 32 (A) (B) (C) (D)

Mostafa 40 MCQ (6451)

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