

Midterm 2 A**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- _____ 1. An approach of assigning probabilities which assumes that all outcomes of the experiment are equally likely is referred to as the:
- subjective approach
 - objective approach
 - classical approach
 - relative frequency approach
- _____ 2. If an experiment consists of five outcomes with $P(O_1) = 0.10$, $P(O_2) = 0.20$, $P(O_3) = 0.30$, $P(O_4) = 0.15$, then $P(O_5)$ is
- 0.75
 - 0.25
 - 0.50
 - Cannot be determined from the information given.
- _____ 3. The probability of event A given event B is denoted by
- $P(A \text{ and } B)$
 - $P(A \text{ or } B)$
 - $P(A|B)$
 - $P(B|A)$
- _____ 4. Given a binomial distribution with n trials and probability p of a success on any trial, a conventional rule of thumb is that the normal distribution will provide an adequate approximation of the binomial distribution if
- $np \geq 5$ and $n(1 - p) \geq 5$
 - $np \geq 5$ and $np(1 - p) \geq 5$
 - $np \leq 5$ and $n(1 - p) \leq 5$
 - None of these choices.
- _____ 5. If two events are independent, what is the probability that they both occur?
- 0
 - 0.50
 - 1.00
 - Cannot be determined from the information given
- _____ 6. Suppose $P(A) = 0.50$, $P(B) = 0.75$, and A and B are independent. The probability of the complement of the event $(A \text{ and } B)$ is:
- $.5 \times .25 = .125$
 - $0.50 + .25 = .75$
 - $1 - (.50 + .25) = .25$
 - $1 - (.5 \times .75) = .625$

- _____ 7. A and B are disjoint events, with $P(A) = 0.20$ and $P(B) = 0.30$. Then $P(A \text{ and } B)$ is:
- 0.50
 - 0.10
 - 0.00
 - 0.06
- _____ 8. If $P(A) = 0.25$ and $P(B) = 0.65$, then $P(A \text{ and } B)$ is:
- 0.25
 - 0.40
 - 0.90
 - cannot be determined from the information given

Pets

Suppose X = the number of pets owned by a family in the U.S. The probability distribution of X is shown in the table below.

X	0	1	2	3
Probability	0.56	0.23	0.12	0.09

- _____ 9. {Pets Narrative} Suppose you choose two families at random. What is the chance that they each own one pet? (That means family A owns a pet and family B owns a pet.)
- 0.23
 - $0.23 + 0.23 = 0.46$
 - $0.23 + 0.23 - (0.23)(0.23) = .4071$
 - $(0.23)(0.23) = 0.0529$
- _____ 10. Which of the following is a discrete random variable?
- The Dow Jones Industrial average.
 - The volume of water in Michigan Lakes.
 - The time it takes you to drive to school.
 - The number of employees of a soft drink company.
- _____ 11. The probability density function $f(x)$ for a uniform random variable X defined over the interval $[2, 10]$ is
- 0.125
 - 8
 - 6
 - None of these choices.
- _____ 12. Two events A and B are said to be mutually exclusive if:
- $P(A|B) = 1$
 - $P(A|B) = P(A)$
 - $P(A \text{ and } B) = 1$
 - $P(A \text{ and } B) = 0$

- _____ 13. The strength of the linear relationship between two interval variables can be measured by the:
- coefficient of variation.
 - coefficient of correlation.
 - slope of the regression line.
 - Y -intercept.
- _____ 14. A table, formula, or graph that shows all possible values a random variable can assume, together with their associated probabilities, is called a(n):
- discrete probability distribution.
 - discrete random variable.
 - expected value of a discrete random variable.
 - None of these choices.
- _____ 15. Which of the following is not a required condition for the distribution of a discrete random variable X that can assume values x_i ?
- $0 \leq p(x_i) \leq 1$ for all x_i
 - $\sum_{\text{all } x_i} p(x_i) = 1$
 - $p(x_i) > 1$ for all x_i
 - All of these choices are true.
- _____ 16. The following information regarding a portfolio of two stocks are given: $w_1 = .25$, $w_2 = .75$, $E(R_1) = .08$, and $E(R_2) = .15$. Which of the following regarding the portfolio expected return, $E(R_p)$, is correct?
- .3640
 - .2300
 - .1325
 - .1699
- _____ 17. Which of the following is true about $f(x)$ when X has a uniform distribution over the interval $[a, b]$?
- The values of $f(x)$ are different for various values of the random variable X .
 - $f(x)$ equals one for each possible value of X .
 - $f(x)$ equals one divided by the length of the interval from a to b .
 - None of these choices.
- _____ 18. If X has a normal distribution with mean 60 and standard deviation 6, which value of X corresponds with the value $z = 1.96$?
- $x = 71.76$
 - $x = 67.96$
 - $x = 61.96$
 - $x = 48.24$
- _____ 19. Given that Z is a standard normal random variable, a negative value (z) on its distribution would indicate:
- z is to the left of the mean.
 - the standard deviation of this Z distribution is negative.
 - the area between zero and the value z is negative.
 - None of these choices.

- _____ 20. The Student t distribution with parameter $\nu = 2$ has a mean $E(t)$ equal to:
- 2
 - 1
 - 0
 - None of these choices.
- _____ 21. A sample of size 40 is taken from an infinite population whose mean and standard deviation are 68 and 12, respectively. The probability that the sample mean is larger than 70 equals
- $P(Z > 70)$
 - $P(Z > 2)$
 - $P(Z > 0.17)$
 - $P(Z > 1.05)$
- _____ 22. Random samples of size 81 are taken from an infinite population whose mean and standard deviation are 45 and 9, respectively. The mean and standard error of the sampling distribution of the sample mean are:
- 45 and 9
 - $45/81$ and $9/81$
 - 45 and $9/\sqrt{81}$
 - $45/\sqrt{81}$ and $9/\sqrt{81}$
- _____ 23. Which of the following is true regarding the sampling distribution of the mean for a large sample size? Assume the population distribution is not normal.
- It has the same shape, mean and standard deviation as the population.
 - It has the same shape and mean as the population, but a different standard deviation.
 - It the same mean and standard deviation as the population, but a different shape.
 - It has the same mean as the population, but a different shape and standard deviation.
- _____ 24. For sample sizes greater than 30, the sampling distribution of the mean is approximately normally distributed:
- regardless of the shape of the population.
 - only if the shape of the population is symmetric.
 - only if the population is normally distributed.
 - None of these choices.
- _____ 25. Suppose that the probability p of success on any trial of a binomial distribution equals 0.90. Then for which of the following number of trials, n , would the normal distribution provide a good approximation to the binomial distribution?
- 35
 - 45
 - 55
 - All of these choices are true.

- _____ 26. A councilman claims that 40% of residents support a tax increase on alcoholic beverages. A polling agent is going to sample 30 residents. Let X be the number of people out of 30 who are in favor of the tax. Use this information to answer the next **FIVE** questions (question 26-30). **Note: The questions continue onto the next page.** What is the probability that at least ten but less than twenty-five of the residents sampled would support such a tax increase on alcoholic beverages?
- a. $=\text{BINOMDIST}(25, 30, 0.4, 1) - \text{BINOMDIST}(10, 30, 0.4, 1)$
 - b. $=\text{BINOMDIST}(24, 30, 0.4, 1) - \text{BINOMDIST}(9, 30, 0.4, 1)$
 - c. $=\text{BINOMDIST}(24, 30, 0.4, 1) - \text{BINOMDIST}(10, 30, 0.4, 1)$
 - d. $=\text{BINOMDIST}(25, 30, 0.4, 1) - \text{BINOMDIST}(9, 30, 0.4, 1)$
- _____ 27. What is the probability that more than eighteen residents sampled would support such a tax increase on alcoholic beverages?
- a. 0.991698416
 - b. 0.997146117
 - c. 0.002853883
 - d. 0.008301584
- _____ 28. Of thirty residents, how many residents would one expect to support such a tax increase on alcoholic beverages?
- a. 2.7
 - b. 7.2
 - c. 12
 - d. 18
- _____ 29. What is the standard deviation of the number of residents out of 30 supporting such a tax increase on alcoholic beverages?
- a. 2.68
 - b. 3.46
 - c. 4.24
 - d. 7.20
- _____ 30. The best description of the histogram that represents the above distribution is a histogram that is
- a. left-skewed with 31 columns.
 - b. symmetric with 30 columns.
 - c. a bell-shaped curve with 30 columns.
 - d. right-skewed with 31 columns.

- ____ 31. Suppose the time period required to complete a final exam is normally distributed with mean 90 minutes and standard deviation 10 minutes. Suppose the course instructor decides to set the examination period to 80 minutes, what is the proportion of students that will complete the exam during the allotted time?
- a. 0% since the allotted time period is less than the mean time required.
 - b. 0.841344746
 - c. 0.341344746
 - d. 0.158655254
- ____ 32. A sample of size 50 is taken from an infinite population whose mean and standard deviation are 68 and 12, respectively. The probability that the sample mean is larger than 70 equals
- a. 13.02%
 - b. 12.01%
 - c. 11.93%
 - d. 10.45%

**Midterm 2 A
Answer Section****MULTIPLE CHOICE**

1. ANS: C	PTS: 1	REF: SECTION 6.1
2. ANS: B	PTS: 1	REF: SECTION 6.1
3. ANS: C	PTS: 1	REF: SECTION 6.2
4. ANS: A	PTS: 1	REF: SECTION 9.2
5. ANS: D	PTS: 1	REF: SECTION 6.2
6. ANS: D	PTS: 1	REF: SECTION 6.2
7. ANS: C	PTS: 1	REF: SECTION 6.2
8. ANS: D	PTS: 1	REF: SECTION 6.2
9. ANS: D	PTS: 1	REF: SECTION 6.2
10. ANS: D	PTS: 1	REF: SECTION 7.1
11. ANS: A	PTS: 1	REF: SECTION 8.1
12. ANS: D	PTS: 1	REF: SECTION 6.3
13. ANS: B	PTS: 1	REF: SECTION 4.4
14. ANS: A	PTS: 1	REF: SECTION 7.1
15. ANS: C	PTS: 1	REF: SECTION 7.1
16. ANS: C	PTS: 1	REF: SECTION 7.3
17. ANS: C	PTS: 1	REF: SECTION 8.1
18. ANS: A	PTS: 1	REF: SECTION 8.2
19. ANS: A	PTS: 1	REF: SECTION 8.2
20. ANS: C	PTS: 1	REF: SECTION 8.4
21. ANS: D	PTS: 1	REF: SECTION 9.1
22. ANS: C	PTS: 1	REF: SECTION 9.1
23. ANS: D	PTS: 1	REF: SECTION 9.1
24. ANS: A	PTS: 1	REF: SECTION 9.1
25. ANS: C	PTS: 1	REF: SECTION 9.2
26. ANS: B	PTS: 1	
27. ANS: D	PTS: 1	
28. ANS: C	PTS: 1	
29. ANS: A	PTS: 1	
30. ANS: D	PTS: 1	
31. ANS: D	PTS: 1	
32. ANS: C	PTS: 1	