

Exam

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Which of the following cannot be a probability?

1) _____

A) 0

B) $\frac{\sqrt{2}}{3}$

C) 0.001

D) -85

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

2) Identify the sample space of the probability experiment: tossing four coins and recording the number of heads

2) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

3) If sample points A, B, C, and D, are the only possible outcomes of an experiment, find the probability of D using the table below.

3) _____

Sample Point	A	B	C	D
Probability	1/11	1/11	1/11	

A) 8/11

B) 1/11

C) 3/11

D) 1/4

4) The table below represents a random sample of the number of deaths per 100 cases for a certain illness over time. If a person infected with this illness is randomly selected from all infected people, find the probability that the person lives 3-4 years after diagnosis.

4) _____

Years after Diagnosis	Number deaths
1-2	15
3-4	35
5-6	16
7-8	9
9-10	6
11-12	4
13-14	2
15+	13

A) $\frac{35}{100}$; 0.35

B) $\frac{7}{120}$; 0.058

C) $\frac{1}{35}$; 0.029

D) $\frac{35}{65}$; 0.538

5) A single die is rolled twice. The set of 36 equally likely outcomes is $\{(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6), (3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6), (4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6), (5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6)\}$. Find the probability of getting two numbers whose sum is greater than 9.

5) _____

A) $\frac{1}{6}$

B) 6

C) $\frac{1}{12}$

D) $\frac{1}{4}$

6) The events A and B are mutually exclusive. If $P(A) = 0.2$ and $P(B) = 0.3$, what is $P(A \text{ or } B)$? 6) _____
 A) 0.06 B) 0.5 C) 0 D) 0.1

7) The distribution of Master's degrees conferred by a university is listed in the table. 7) _____
 (assume that a student majors in only one subject)

Major	Frequency
Mathematics	230
English	208
Engineering	86
Business	176
Education	222

What is the probability that a randomly selected student with a Master's degree majored in English or Mathematics? Round your answer to three decimal places.

- A) 0.249 B) 0.226 C) 0.475 D) 0.525

8) Classify the following random variable according to whether it is discrete or continuous. 8) _____
 The speed of a car on a Los Angeles freeway during rush hour traffic

- A) discrete B) continuous

9) Classify the following random variable according to whether it is discrete or continuous. 9) _____
 The number of cups of coffee sold in a cafeteria during lunch

- A) continuous B) discrete

10) The complement of 4 heads in the toss of 4 coins is 10) _____

- A) All tails B) Exactly one tail C) At least one tail D) Three heads

11) A sample of 295 shoppers at a large suburban mall were asked two questions: (1) Did you see a television ad for the sale at department store X during the past 2 weeks? (2) Did you shop at department store X during the past 2 weeks? The responses to the questions are summarized in the table. 11) _____

	Shopped at X	Did Not Shop at X
Saw ad	135	40
Did not see ad	40	80

What is the probability that a randomly selected shopper from the 295 questioned did not shop at department store X?

- A) 0.593 B) 0.271 C) 0.407 D) 0.136

- 12) The amount of money collected by a snack bar at a large university has been recorded daily for the past five years. Records indicate that the mean daily amount collected is \$2800 and the standard deviation is \$500. The distribution is skewed to the right due to several high volume days (including football game days). Suppose that 100 days were randomly selected from the five years and the average amount collected from those days was recorded. Which of the following describes the sampling distribution of the sample mean? 12) _____
- A) normally distributed with a mean of \$280 and a standard deviation of \$50
 - B) skewed to the right with a mean of \$2800 and a standard deviation of \$500
 - C) normally distributed with a mean of \$2800 and a standard deviation of \$50
 - D) normally distributed with a mean of \$2800 and a standard deviation of \$500

- 13) Consider the discrete probability distribution to the right when answering the following question. Find the probability that x equals 5. 13) _____

x	3	5	7	8
P(x)	0.2	?	0.07	0.1

- A) 3.15
 - B) 1.85
 - C) 0.37
 - D) 0.63
- 14) A random variable is 14) _____
- A) Generated by a random number table.
 - B) The variable for which an algebraic equation is solved.
 - C) A numerical measure of the outcome of a probability experiment.
 - D) A qualitative attribute of a population.

- 15) You are dealt one card from a 52-card deck. Find the probability that you are not dealt a diamond. 15) _____
- A) $\frac{2}{5}$
 - B) $\frac{4}{13}$
 - C) $\frac{3}{4}$
 - D) $\frac{1}{4}$

- 16) A card is drawn from a standard deck of 52 playing cards. Find the probability that the card is an ace or a king. 16) _____
- A) $\frac{1}{13}$
 - B) $\frac{4}{13}$
 - C) $\frac{2}{13}$
 - D) $\frac{8}{13}$

- 17) The amount of corn chips dispensed into a 15-ounce bag by the dispensing machine has been identified as possessing a normal distribution with a mean of 15.5 ounces and a standard deviation of 0.1 ounce. Suppose 400 bags of chips were randomly selected from this dispensing machine. Find the probability that the sample mean weight of these 400 bags exceeded 15.6 ounces. 17) _____
- A) approximately 0
 - B) .6915
 - C) .3085
 - D) .1915

- 18) According to the law of large numbers, as more observations are added to the sample, the difference between the sample mean and the population mean _____
- A) Tends to become larger B) Remains about the same
C) Is inversely affected by the data added D) Tends to become smaller
- 19) The owner of a convenience store has determined that their daily revenue has mean \$7200 and standard deviation \$1200. The daily revenue totals for the next 30 days will be monitored. What is the probability that the mean daily revenue for the next 30 days will exceed \$7000?
- A) 0.5675 B) 0.4325 C) 0.8186 D) 0.1814
- 20) The lengths of pregnancies are normally distributed with a mean of 273 days and a standard deviation of 30 days. If 144 women are randomly selected, find the probability that they have a mean pregnancy between 273 days and 275 days.
- A) 0.7881 B) 0.2119 C) 0.2881 D) 0.5517
- 21) A random sample of 56 fluorescent light bulbs has a mean life of 645 hours with a population standard deviation of 31 hours. Construct a 95% confidence interval for the population mean.
- A) (636.9, 653.1) B) (539.6, 551.2) C) (712.0, 768.0) D) (112.0, 118.9)
- 22) In a sample of 10 randomly selected women, it was found that their mean height was 63.4 inches. From previous studies, it is assumed that the standard deviation, σ , is 2.4. Construct the 95% confidence interval for the population mean.
- A) (61.9, 64.9) B) (60.8, 65.4) C) (59.7, 66.5) D) (58.1, 67.3)
- 23) Compute the critical value $z_{\alpha/2}$ that corresponds to a 95% level of confidence.
- A) 2.575 B) 2.33 C) 1.645 D) 1.96
- 24) The critical value of a distribution is the value of _____
- A) $z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$
B) The parameter
C) $z_{\alpha/2}$
D) The area of the tail region of the distribution
- 25) In a random sample of 60 computers, the mean repair cost was \$150 with a population standard deviation of \$36. Construct a 99% confidence interval for the population mean.
- A) (\$537, \$654) B) (\$18, \$54) C) (\$238, \$274) D) (\$138, \$162)

- 31) The standard IQ test has a mean of 98 and a standard deviation of 14. We want to be 99% certain that we are within 4 IQ points of the true mean. Determine the required sample size. 31) _____
- A) 180 B) 82 C) 1 D) 10
- 32) The _____ hypothesis contains the "=" sign. 32) _____
- A) Null B) Conditional C) Explanatory D) Alternative
- 33) A hypothesis test is a "two-tailed" if the alternative hypothesis contains a _____ sign. 33) _____
- A) + B) > C) \neq D) <

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 34) Test the claim that $\mu > 33$, given that $\alpha = 0.05$ and the sample statistics are $n = 50$, $\bar{x} = 33.3$, and $\sigma = 1.2$. 34) _____
- 35) A trucking firm suspects that the mean lifetime of a certain tire it uses is less than 31,000 miles. To check the claim, the firm randomly selects and tests 54 of these tires and gets a mean lifetime of 30,380 miles with a standard deviation of 1200 miles. At $\alpha = 0.05$, test the trucking firm's claim. 35) _____
- 36) A local group claims that the police issue at least 60 speeding tickets a day in their area. To prove their point, they randomly select one month. Their research yields the number of tickets issued for each day. The data are listed below. At $\alpha = 0.01$, test the group's claim. 36) _____
- 70 48 41 68 69 55 70 57 60 83
 32 60 72 58 88 48 59 60 56 65
 66 60 68 42 57 59 49 70 75 63
 44

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- 37) In a one-tailed test of the hypothesis using the classical method, the critical region is the area under the graph located 37) _____
- A) Only at the critical value
 B) Between the critical value and the mean
 C) Below the mean on the side of the graph opposite the critical value
 D) In the tail
- 38) Suppose you are using $\alpha = 0.05$ to test the claim that $\mu > 4$ using a P-value. You are given the sample statistics $n = 50$, $\bar{x} = 4.3$, and $\sigma = 1.2$. Find the P-value. 38) _____
- A) 0.0128 B) 0.1321 C) 0.0384 D) 0.0012

39) Suppose you are using $\alpha = 0.01$ to test the claim that $\mu \leq 50$ using a P-value. You are given the sample statistics $n = 40$, $\bar{x} = 51.8$, and $\sigma = 4.3$. Find the P-value. 39) _____

- A) 0.1030 B) 0.0040 C) 0.0211 D) 0.9960

40) Given $H_0: \mu = 25$, $H_1: \mu \neq 25$, and $P = 0.028$. Do you reject or fail to reject H_0 at the 0.01 level of significance? 40) _____

- A) fail to reject H_0
B) not sufficient information to decide
C) reject H_0

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41) A local school district claims that the number of school days missed by its teachers due to illness is below the national average of 5. A random sample of 40 teachers provided the data below. At $\alpha = 0.05$, test the district's claim using P-values. 41) _____

0 3 6 3 3 5 4 1 3 5
7 3 1 2 3 3 2 4 1 6
2 5 2 8 3 1 2 5 4 1
1 1 2 1 5 7 5 4 9 3

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42) What is a p-value? 42) _____

- A) A probability of observing a population statistic more extreme than the one observed under the assumption that the null hypothesis is true.
B) A probability of observing a sample statistic more extreme than the one observed under the assumption that the null hypothesis is false.
C) A probability of observing a population statistic more extreme than the one observed under the assumption that the null hypothesis is false.
D) A probability of observing a sample statistic more extreme than the one observed under the assumption that the null hypothesis is true.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

43) Test the claim that $\mu \neq 750$, given that $\alpha = 0.01$ and the sample statistics are $n = 35$, $\bar{x} = 720$, and $\sigma = 82$. 43) _____