

Instructions:

**Show work for every problem; work can be an explanation, definition, calculator sequence, or math work. Full credit may not be awarded for questions without work shown.**

Each problem has a point value shown for a total of 150 points for the exam.

You can either print out the test and write in the space given, or show your work on separate paper. If you use a separate paper, show a horizontal line after completing each "page" of the test, and number the "pages" to match the actual test..

The completed exam must be submitted to your instructor no later than 11:59 pm (Eastern Standard Time) Tuesday, 4/28.

**Determine whether the given description corresponds to an observational study or an experiment.**

**Points: 5**

- 1) A political pollster reports that his candidate has a 10% lead in the polls with 10% undecided.

\_\_\_\_\_

**Find the indicated probability.**

**Points: 5**

- 2) Among the contestants in a competition are 40 women and 20 men. If 4 winners are randomly selected, what is the probability that they are all men? Round to five decimal places.

P( choosing 4 men) = \_\_\_\_\_

**Points: 5**

- 3) The diameters of bolts produced by a certain machine are normally distributed with a mean of 0.30 inches and a standard deviation of 0.12 inches. What percentage of bolts will have a diameter greater than 0.32 inches?

\_\_\_\_\_

**Find the indicated probability. Round to the nearest thousandth.**

**Points: 5**

- 4) A study conducted at a certain college shows that 54% of the school's graduates find a job in their chosen field within a year after graduation. Find the probability that among 5 randomly selected graduates, at least one finds a job in his or her chosen field within a year of graduating.

P(at least one graduate finds a job in field) = \_\_\_\_\_

**Use the given degree of confidence and sample data to construct a confidence interval for the population proportion  $p$ .**

**Points: 5**

- 5) Of 113 randomly selected adults, 35 were found to have high blood pressure. Construct a 95% confidence interval for the true percentage of all adults that have high blood pressure. Round to 3 decimals.

confidence interval \_\_\_\_\_

**Use the given degree of confidence and sample data to construct a confidence interval for the population mean  $\mu$ . Assume that the population has a normal distribution.**

**Points: 5**

- 6) A sociologist develops a test to measure attitudes towards public transportation, and 27 randomly selected subjects are given the test. Their mean score is 76.2 and their standard deviation is 21.4. Construct the 95% confidence interval for the mean score of all such subjects.

confidence interval = \_\_\_\_\_

**Find the z-score corresponding to the given value and use the z-score to determine whether the value is unusual. Consider a score to be unusual if its z-score is less than -2.00 or greater than 2.00. Round the z-score to the nearest tenth if necessary. Each blank is worth three points.**

**Points: 6**

- 7) A weight of 107 pounds among a population having a mean weight of 159 pounds and a standard deviation of 15 pounds.

$z =$  \_\_\_\_\_ This z score \_\_\_\_\_ unusual. (Fill in the blank with is or is not)

**Find the mean, median, and standard deviation for the given sample data. Round to one decimal place. Each answer is worth 3 points.**

**Points: 9**

- 8) The ages (in years) of the eight passengers on a bus are listed below.

8 4 29 16 21 49 33 50

Mean \_\_\_\_\_

Median \_\_\_\_\_

Standard Deviation \_\_\_\_\_

**Use the given data to find the best predicted value of the response variable.**

**Points: 5**

- 9) The regression equation relating attitude rating ( $x$ ) and job performance rating ( $y$ ) for the employees of a company is  $\hat{y} = 11.7 + 1.32x$ . Ten pairs of data were used to obtain the equation. The same data yield  $r = 0.863$  and  $\bar{y} = 73.1$ . What is the best predicted job performance rating for a person whose attitude rating is 68? Use 0.01 for the significance level.

job performance rating = \_\_\_\_\_

**Given the linear correlation coefficient  $r$  and the sample size  $n$ , determine the critical values of  $r$  and use your finding to state whether or not the given  $r$  represents a significant linear correlation. Use a significance level of 0.05. Each blank is worth 2 points.**

**Points: 6**

- 10)  $r = .892$ ,  $n = 15$

critical value = \_\_\_\_\_

Since  $r$  \_\_\_\_\_ critical value, there \_\_\_\_\_ a significant linear correlation.

**Use the empirical rule to solve the problem.**

**Points: 5**

- 11) The amount of Jen's monthly phone bill is normally distributed with a mean of \$59 and a standard deviation of \$10. What percentage of her phone bills are between \$39 and \$79? \_\_\_\_\_%

**Use the data to create a stemplot.**

**Points: 5**

- 12) The midterm test scores for the seventh-period typing class are listed below.

85 77 93 91 74 65 68 97 85 65 74 74

**Determine whether the given value is a statistic or a parameter.**

**Points: 5**

- 13) A sample of 120 employees of a company is selected, and the average age is found to be 37 years.

\_\_\_\_\_

**Find the linear regression equation and the value of the linear correlation coefficient  $r$ .**

**Points: 6**

- 14) The paired data below consist of the costs of advertising (in thousands of dollars) and the number of products sold (in thousands):

|        |    |    |    |    |    |    |    |    |
|--------|----|----|----|----|----|----|----|----|
| Cost   | 7  | 2  | 3  | 4  | 2  | 5  | 9  | 10 |
| Number | 85 | 52 | 55 | 68 | 67 | 86 | 83 | 73 |

$$\hat{y} = \underline{\hspace{4cm}}$$

$$r = \underline{\hspace{4cm}}$$

**Solve the problem.**

**Points: 5**

- 15) The organizer of a television show must select 4 people to participate in the show. The participants will be selected from a list of 24 people who have written in to the show. If the participants are selected randomly, what is the probability that the 4 youngest people will be selected?

\_\_\_\_\_

**Points: 5**

- 16) The scores on a certain test are normally distributed with a mean score of 66 and a standard deviation of 4. What is the probability that a sample of 50 students will have a mean score of more than 66.4216?

\_\_\_\_\_

**Points: 5**

- 17) The probability that a person has immunity to a particular disease is 0.8. Find the mean number who have immunity in samples of size 38.

Mean = \_\_\_\_\_

**Use the table to find the probability.**

**Points: 5**

18)

|           | Cause of Death |               |       | Total |
|-----------|----------------|---------------|-------|-------|
|           | Cancer         | Heart Disease | Other |       |
| Smoker    | 135            | 310           | 205   | 650   |
| Nonsmoker | 55             | 155           | 140   | 350   |
| Total     | 190            | 465           | 345   | 1,000 |

\_\_\_\_\_

If one of the subjects is chosen at random, find the probability that the person chosen is a smoker given that they had heart disease. Round to the nearest thousandth.

**Provide an appropriate response.**

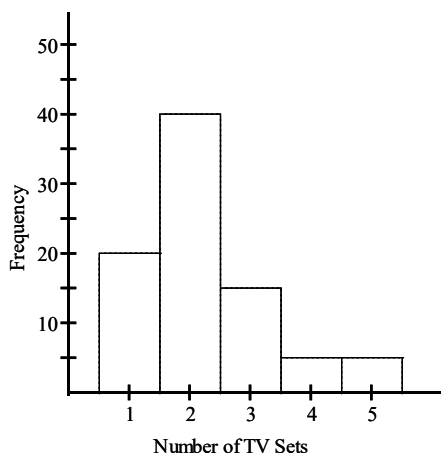
**Points: 5**

- 19) The frequency distribution for the weekly incomes of students with part-time jobs is given below. Construct the corresponding relative frequency distribution. Round relative frequencies to the nearest hundredth of a percent if necessary.

| Income (\$) | Frequency |
|-------------|-----------|
| 201-300     | 70        |
| 301-400     | 64        |
| 401-500     | 79        |
| 501-600     | 67        |
| 601-700     | 17        |

**Points: 5**

- 20) The histogram below represents the number of television sets per household for a sample of U.S. households. How many households are included in the histogram? \_\_\_\_\_ households



**Fill in the blank for a hypothesis test. Each blank is worth three points.**

**Points: 12**

- 21) A manufacturer claims that more than 96% of its fax machines are good. In a random sample of 97 such fax machines, 98% are good. Fill in the blanks for a hypothesis test.

State the claim in words:

\_\_\_\_\_

$H_0$  \_\_\_\_\_

$H_1$  \_\_\_\_\_

What calculator function is needed? \_\_\_\_\_

**Determine whether the given value is from a discrete or continuous data set.**

**Points: 5**

- 22) The weight of 2-year-old maple tree is 28.3 lbs.

\_\_\_\_\_

**Assume that a simple random sample has been selected from a normally distributed population and test the given claim. Each blank is worth two points.**

**Points: 10**

- 23) A researcher wants to test the claim that convicted burglars spend an average of 18.7 months in jail. She takes a random sample of 11 such cases from court files and finds that  $\bar{x} = 20.3$  months and  $s = 5.7$  months. Test the claim that  $\mu = 18.7$  months at the 0.05 significance level. Use the traditional method of testing hypotheses.

State the claim in words: Convicted Burglars spend an average of 18.7 months in jail.

$$H_0: \mu = 18.7$$

$$H_1: \mu \neq 18.7$$

What calculator function is needed? \_\_\_\_\_

p value = \_\_\_\_\_

Since p \_\_\_\_\_  $\alpha$ , \_\_\_\_\_ the null hypothesis.

Final conclusion:

\_\_\_\_\_  
\_\_\_\_\_

**Find the mean and standard deviation of the given probability distribution. Each blank is worth three points.**

**Points: 6**

- 24) The number of golf balls ordered by customers of a pro shop has the following probability distribution.

| x  | P(x) |
|----|------|
| 3  | 0.14 |
| 6  | 0.12 |
| 9  | 0.36 |
| 12 | 0.28 |
| 15 | 0.10 |

$$\mu = \quad \quad \quad \sigma = \quad \quad \quad$$

**Use the given data to find the minimum sample size required to estimate the population proportion.**

**Points: 5**

- 25) Margin of error: 0.09; confidence level: 90%; from a prior study,  $\hat{p}$  is estimated by 0.24.

$$n = \quad \quad \quad$$

Find the indicated z score. The graph depicts the standard normal distribution with mean 0 and standard deviation 1.

Points: 5

26) Shaded area is 0.9299.

