

Read these directions carefully. You may pick any part of a problem to omit by writing OMIT in the answer blank (any one multiple choice or any part of the other problems). If you do not, all parts will be graded. Relax and use your time wisely.

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

Identify the probability of each sample, and describe the sampling distribution of the sample means.

- 1) Personal phone calls received in the last three days by a new employee were 1, 6, and 5. Assume that samples of size 2 are randomly selected with replacement from this population of three values. 1) _____
- A) $1/8; 1/9; 1/8; 1/9; 1/8; 1/9; 1/8; 1/9; 1/8$ B) $1/9; 2/9; 1/9; 0/9; 1/9; 0/9; 1/9; 2/9; 1/9$
- C) $1/3; 1/3; 1/18; 1/6; 1/18; 1/9; 1/6; 1/18; 1/9$ D) $1/9; 1/9; 1/9; 1/9; 1/9; 1/9; 1/9; 1/9; 1/9$

Solve the problem.

- 2) The amount of snowfall falling in a certain mountain range is normally distributed with a mean of 104 inches, and a standard deviation of 16 inches. What is the probability that the mean annual snowfall during 64 randomly picked years will exceed 106.8 inches? 2) _____
- A) 0.0026 B) 0.0808 C) 0.4192 D) 0.5808
- 3) A study of the amount of time it takes a mechanic to rebuild the transmission for a 1992 Chevrolet Cavalier shows that the mean is 8.4 hours and the standard deviation is 1.8 hours. If 40 mechanics are randomly selected, find the probability that their mean rebuild time exceeds 8.7 hours. 3) _____
- A) 0.1285 B) 0.1469 C) 0.1946 D) 0.1346

Estimate the indicated probability by using the normal distribution as an approximation to the binomial distribution.

- 4) With $n = 20$ and $p = 0.60$, estimate $P(\text{fewer than } 8)$. 4) _____
- A) 0.4332 B) 0.0668 C) 0.0202 D) 0.4953

Use the normal distribution to approximate the desired probability.

- 5) Find the probability that in 200 tosses of a fair die, we will obtain at least 40 fives. 5) _____
- A) .1210 B) .0871 C) .3871 D) .2229

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

- 6) $n = 61, x = 19$; 95 percent 6) _____
- A) $0.214 < p < 0.408$ B) $0.194 < p < 0.428$
- C) $0.213 < p < 0.409$ D) $0.195 < p < 0.427$

Find the minimum sample size you should use to assure that your estimate of \hat{p} will be within the required margin of error around the population p .

- 7) Margin of error: 0.002; confidence level: 93%; \hat{p} and \hat{q} unknown 7) _____
A) 1 B) 410 C) 204,756 D) 204,757

Solve the problem.

- 8) Find the critical value $z_{\alpha/2}$ that corresponds to a degree of confidence of 91%. 8) _____
A) 1.75 B) 1.70 C) 1.34 D) 1.645

Use the confidence level and sample data to find a confidence interval for estimating the population μ .

- 9) A random sample of 100 full-grown lobsters had a mean weight of 22 ounces and a standard deviation of 3.7 ounces. Construct a 98 percent confidence interval for the population mean μ . 9) _____
A) $22 < \mu < 24$ B) $21 < \mu < 23$ C) $20 < \mu < 22$ D) $21 < \mu < 24$

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

- 10) $n = 12$, $\bar{x} = 26.8$, $s = 6.8$, 99 percent 10) _____
A) $21.46 < \mu < 32.14$ B) $20.70 < \mu < 32.90$
C) $20.58 < \mu < 33.02$ D) $20.72 < \mu < 32.88$

Use the given information to find the P-value.

- 11) The test statistic in a left-tailed test is $z = -2.05$. 11) _____
A) 0.5000 B) 0.4798 C) 0.0202 D) 0.0453

Assume that a hypothesis test of the given claim will be conducted. Identify the type I or type II error for the test.

- 12) An entomologist writes an article in a scientific journal which claims that fewer than 22 in ten thousand male fireflies are unable to produce light due to a genetic mutation. Identify the type I error for the test. 12) _____
A) The error of rejecting the claim that the true proportion is at least 22 in ten thousand when it really is at least 22 in ten thousand.
B) The error of failing to reject the claim that the true proportion is at least 22 in ten thousand when it is actually less than 22 in ten thousand.
C) The error of rejecting the claim that the true proportion is less than 22 in ten thousand when it really is less than 22 in ten thousand.

Determine whether the given conditions justify testing a claim about a population mean μ .

- 13) The sample size is $n = 22$, $\sigma = 6.20$, and the original population is normally distributed. 13) _____
A) Yes B) No

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

14) A nationwide study of American homeowners revealed that 65% have one or more lawn mowers. A lawn equipment manufacturer, located in Omaha, feels the estimate is too low for households in Omaha. Test the claim that the proportion with lawn mowers in Omaha is higher than 65%. Among 497 randomly selected homes in Omaha, 340 had one or more lawn mowers. (each part below is three points)

a) Write the null and alternative hypothesis in symbolic form.

b) Find the critical value(s)

c) Draw the curve and label the rejection region(s) "reject H_0 ". Place the critical values on the graph.

d) Find and evaluate the test statistic

e) Determine the p-value.

f) State your decision (exactly as we did repeatedly in class)

g) State your conclusion (exactly as we did repeatedly in class)

Test the given claim. Assume that the sample has been randomly selected from a population with a normal distribution.

15) A cereal company claims that the mean weight of the cereal in its packets is at least 14 oz. 15) _____
The weights (in ounces) of the cereal in a random sample of 8 of its cereal packets are listed below.

14.6 13.8 14.1 13.7 14.0 14.4 13.6 14.2

At the 0.01 significance level, test the claim that the mean weight is 14 ounces.

(each part below is three points)

a) Write the null and alternative hypothesis in symbolic form.

b) Find the critical value(s)

c) Draw the curve and label the rejection region(s) "reject H_0 ". Place the critical values on the graph.

d) Find and evaluate the test statistic

e) Determine the p-value.

f) State your decision (exactly as we did repeatedly in class)

g) State your conclusion (exactly as we did repeatedly in class)

Answer Key

Testname: UNTITLED1

- 1) D
- 2) B
- 3) B
- 4) C
- 5) A
- 6) D
- 7) D
- 8) B
- 9) B
- 10) B
- 11) C
- 12) A
- 13) A
- 14)

15) Test statistic: $t = 0.41$. Critical value: $t = -2.998$. Fail to reject H_0 : $\mu = 14$ ounces. There is not sufficient evidence to warrant rejection of the claim that the mean weight is 14 ounces.