Student: _____	**Instructor:** Darryl Allen	**Assignment:** Ch 8 Practice Test A
Date: _____	**Course:** Elementary Statistics 60157	
Time: _____	**Book:** Triola: Elementary Statistics, 11e	

1. If you want to construct a confidence interval to be used for testing the claim that college students have a mean IQ score that is greater than 100, and you want the test conducted with a 0.01 significance level, what confidence level should be used for the confidence interval?

Choose the correct answer below.

- ○ A. 98% or 0.98
- ○ B. 90% or 0.90
- ○ C. 95% or 0.95
- ○ D. 99% or 0.99

2. A survey of 61,649 people included several questions about office relationships. Of the respondents, 25.8% reported that bosses scream at employees. Use a 0.01 significance level to test the claim that more than 1 / 4 of people say that bosses scream at employees. How is the conclusion affected after learning that the survey is an online survey in which Internet users chose whether to respond? Identify the null hypothesis, alternative hypothesis, test statistic, P-value, conclusion about the null hypothesis, and final conclusion that addresses the original claim. Use the P-value method. Use the normal distribution as an approximation of the binomial distribution.

Identify the null and alternative hypotheses. Choose the correct answer below.

- ○ A. $H_0: p = 0.75$ $H_1: p > 0.75$
- ○ B. $H_0: p = 0.75$ $H_1: p < 0.75$
- ○ C. $H_0: p = 0.75$ $H_1: p \neq 0.75$
- ○ D. $H_0: p = 0.25$ $H_1: p > 0.25$
- ○ E. $H_0: p = 0.25$ $H_1: p < 0.25$
- ○ F. $H_0: p = 0.25$ $H_1: p \neq 0.25$

The test statistic is $z =$ ☐. (Round to two decimal places as needed.)

The P-value is ☐. (Round to four decimal places as needed.)

Identify the conclusion about the null hypothesis and the final conclusion that addresses the original claim.

☐ H_0. There ☐ sufficient evidence to support the claim that more than 1 / 4 of people say that bosses scream at employees. If the sample is a voluntary response sample, the conclusion ☐ valid.

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3. A simple random sample of 40 stainless steel sheet metal screws is obtained from those supplied by a particular company, and the length of each screw is measured using a vernier caliper. The lengths are listed in the accompanying data table. Use a 0.05 significance level to test the claim that the screws have a mean length equal to 3 / 4 in. (or 0.75 in.), as indicated on the package labels. Do the screw lengths appear to be consistent with the package label?

Click the icon to view the sample data.

Choose the correct answer below.

A. Fail to reject H_0. There is sufficient evidence to warrant rejection of the claim that the screws have a mean length equal to 3 / 4 in. The lengths do not appear to be consistent with the package label.

B. Reject H_0. There is sufficient evidence to warrant rejection of the claim that the screws have a mean length equal to 3 / 4 in. The lengths do not appear to be consistent with the package label.

C. Reject H_0. There is insufficient evidence to warrant rejection of the claim that the screws have a mean length equal to 3 / 4 in. The lengths appear to be consistent with the package label.

D. Fail to reject H_0. There is insufficient evidence to warrant rejection of the claim that the screws have a mean length equal to 3 / 4 in. The lengths appear to be consistent with the package label.

Sample data

Screw Lengths (inches)

0.726	0.729	0.762	0.738	0.769	0.741	0.733	0.776	0.738	0.765
0.740	0.740	0.724	0.739	0.772	0.735	0.760	0.752	0.726	0.727
0.744	0.740	0.761	0.752	0.729	0.732	0.760	0.759	0.761	0.738
0.741	0.732	0.744	0.734	0.760	0.754	0.744	0.742	0.734	0.750

4. 751 body temperature measurements were taken. The sample data resulted in a sample mean of 98.5°F and a sample standard deviation of 0.7°F. Use the traditional method and a 0.05 significance level to test the claim that the mean body temperature is less than 98.6°F.

Choose the correct answer below.

A. Reject H_0 since the test statistic -3.915 is less than the critical value -1.647.

B. Do not reject H_0 since the test statistic -3.915 is less than the critical value -1.647.

C. Reject H_0 since the test statistic is -0.255 not less than the critical value -1.647.

D. Do not reject H_0 since the test statistic -0.255 is not less than the critical value -1.647.

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5. Assume that the normal distribution applies and find the critical z value(s).

$\alpha = 0.07$; H_1 is $\mu \neq 98.6°F$

$z =$ ☐

(Round to two decimal places as needed. Use a comma to separate answers as needed.)

6. Test the following claim. Identify the null hypothesis, alternative hypothesis, test statistic, critical value(s), conclusion about the null hypothesis, and final conclusion that addresses the original claim.

Tests of older baseballs showed that when dropped 20 ft onto a concrete surface, they bounced an average of 233.8 cm. In a test of 40 new baseballs, the bounce heights had a mean of 230.6 cm. Assume that the standard deviation of bounce heights is 4.7 cm. Use a 0.05 significance level to test the claim that the new baseballs have bounce heights with a mean different from 233.8 cm. Are the new baseballs different?

What are the null and alternative hypotheses?

A. $H_0: \mu \leq 233.8$ cm
$H_1: \mu > 233.8$ cm

B. $H_0: \mu \geq 233.8$ cm
$H_1: \mu < 233.8$ cm

C. $H_0: \mu \neq 233.8$ cm
$H_1: \mu = 233.8$ cm

D. $H_0: \mu = 233.8$ cm
$H_1: \mu \neq 233.8$ cm

What is the value of the test statistic?

$z =$ ☐ (Round to two decimal places as needed.)

Identify the critical value(s) of z.

$z =$ ☐

(Round to two decimal places as needed. Use a comma to separate answers as needed.)

☐ H_0. There ☐ sufficient evidence to support the claim that the new baseballs are different.

7. Determine whether the following hypothesis test involves a sampling distribution of means that is a normal distribution, Student t distribution, or neither.

Claim: $\mu = 5.75$. Sample data: $n = 15$, $\bar{x} = 5.07$, $s = 0.19$. The sample data comes from a population that is not normally distributed and σ is unknown.

What kind of sampling distribution of means does the hypothesis test involve?

A. Normal distribution

B. Student t distribution

C. Neither Student t nor normal distribution

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8. Examine the given statement, then express the null hypothesis H_0 and the alternative hypothesis H_1 in symbolic form.

High school teachers have incomes with a standard deviation that is more than $17,250.

Which of the following is the hypothesis test to be conducted?

A. $H_0: \sigma < \$17{,}250$
$H_1: \sigma = \$17{,}250$

B. $H_0: \sigma = \$17{,}250$
$H_1: \sigma > \$17{,}250$

C. $H_0: \sigma = \$17{,}250$
$H_1: \sigma < \$17{,}250$

D. $H_0: \sigma > \$17{,}250$
$H_1: \sigma = \$17{,}250$

E. $H_0: \sigma = \$17{,}250$
$H_1: \sigma \neq \$17{,}250$

F. $H_0: \sigma \neq \$17{,}250$
$H_1: \sigma = \$17{,}250$

9. State the final conclusion in simple nontechnical terms.

Original claim: The proportion of male golfers is less than 0.6.
Initial conclusion: Reject the null hypothesis.

Which of the following is the correct conclusion?

A. There is sufficient evidence to support the claim that the proportion of male golfers is less than 0.6.

B. There is not sufficient evidence to support the claim that the proportion of male golfers is less than 0.6.

10. In 1997, a survey of 900 households showed that 168 of them use e-mail. Use those sample results to test the claim that more than 15% of households use e-mail. Use a 0.05 significance level. Use this information to answer the following questions.

a. Which of the following is the hypothesis test to be conducted?

A. $H_0: p = 0.15$
$H_1: p < 0.15$

B. $H_0: p < 0.15$
$H_1: p = 0.15$

C. $H_0: p = 0.15$
$H_1: p > 0.15$

D. $H_0: p = 0.15$
$H_1: p \neq 0.15$

E. $H_0: p \neq 0.15$
$H_1: p = 0.15$

F. $H_0: p > 0.15$
$H_1: p = 0.15$

b. What is the test statistic?

$z =$ ☐
(Round the final answer to two decimal places as needed.)

c. What is the P-value?

P-value = ☐
(Round to four decimal places as needed.)

d. What is the conclusion?

- There is not sufficient evidence to support the claim that more than 15% of households use e-mail.
- There is sufficient evidence to support the claim that more than 15% of households use e-mail.

e. Is the conclusion valid today? Why or why not?

A. No, the conclusion is not valid today because the population characteristics of the use of e-mail are changing rapidly.

B. Yes, the conclusion is valid today because the requirements to perform the test are satisfied.

C. You can make no decisions about the validity of the conclusion today.

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11. In one study of smokers who tried to quit smoking with nicotine patch therapy, 32 were smoking one year after the treatment, and 31 were not smoking one year after the treatment. Use a 0.10 significance level to test the claim that among smokers who try to quit with nicotine patch therapy, the majority are smoking a year after the treatment. Use this information to answer the following questions.

a. Which of the following is the hypothesis test to be conducted?

○A. $H_0: p = 0.5$ $H_1: p < 0.5$

○B. $H_0: p = 0.5$ $H_1: p \neq 0.5$

○C. $H_0: p > 0.5$ $H_1: p = 0.5$

○D. $H_0: p = 0.5$ $H_1: p > 0.5$

○E. $H_0: p \neq 0.5$ $H_1: p = 0.5$

○F. $H_0: p < 0.5$ $H_1: p = 0.5$

b. What is the test statistic?

$z =$ ☐

(Round to two decimal places as needed.)

c. What is the P-value?

P-value = ☐

(Round to four decimal places as needed.)

d. What is the conclusion?

○ There is sufficient evidence to support the claim that among smokers who try to quit with nicotine patch therapy, the majority are smoking a year after the treatment.

○ There is not sufficient evidence to support the claim that among smokers who try to quit with nicotine patch therapy, the majority are smoking a year after the treatment.

e. Do these results suggest that the nicotine patch therapy is ineffective?

○A. No, there is insufficient evidence that the therapy is ineffective.

○B. Yes, there is sufficient evidence that the therapy is ineffective as the majority of people on this therapy will still be smoking after a year.

○C. Yes, there is sufficient evidence that the therapy is ineffective as less than 10% of the people on this therapy will not be smoking after a year.

12. When 14 different second-year medical students measured the systolic blood pressure of the same person, they obtained the results listed below (in mmHg). Assuming that the population standard deviation is known to be 10 mmHg, use a 0.05 significance level to test the claim that the mean blood pressure level is less than 140 mmHg. Hypertension is defined to be a blood pressure level that is too high because it is 140 mmHg or greater. Assume the blood pressure levels are normally distributed. Based on the hypothesis test results, can it be safely concluded that the person does not have hypertension?

138 130 135 130 120 125 130 140 120 144 143 120 120 150

(a) Identify the null hypothesis and alternative hypothesis.

A. $H_0: \mu = 140$ versus $H_1: \mu \neq 140$

B. $H_0: \mu = 140$ versus $H_1: \mu < 140$

C. $H_0: \mu = 140$ versus $H_1: \mu > 140$

(b) Identify the test statistic.

☐

(Round the final answer to two decimal places as needed. Round all intermediate values to two decimal places.)

(c) Identify the P-value.

☐ (Round to four decimal places as needed.)

(d) What is the final conclusion?

A. Reject H_0. There is not sufficient evidence to support the claim.

B. Fail to reject H_0. There is sufficient evidence to support the claim.

C. Fail to reject H_0. There is not sufficient evidence to support the claim.

D. Reject H_0. There is sufficient evidence to support the claim.

(e) Can it be safely concluded that the person does not have hypertension?

○ Yes

○ No

13. Assume that a simple random sample has been selected from a normally distributed population and test the given claim. Identify the null and alternative hypotheses, test statistic, P-value, critical value(s), and state the final conclusion that addresses the original claim.

In a manual on how to have a number one song, it is stated that a song must be no longer than 210 seconds. A simple random sample of 40 current hit songs results in a mean length of 222.0 sec and a standard deviation of 56.26 sec. Use a 0.05 significance level and the accompanying Minitab display to test the claim that the sample is from a population of songs with a mean greater than 210 sec. What do these results suggest about the advice given in the manual?

Click the icon to view the Minitab display.

What are the hypotheses?

A. $H_0: \mu = 210$ sec
$H_1: \mu \leq 210$ sec

B. $H_0: \mu < 210$ sec
$H_1: \mu > 210$ sec

C. $H_0: \mu > 210$ sec
$H_1: \mu \leq 210$ sec

D. $H_0: \mu = 210$ sec
$H_1: \mu > 210$ sec

Identify the test statistic.

☐ (Round to two decimal places as needed.)

Identify the P-value.

☐ (Round to three decimal places as needed.)

Identify the critical value(s).

☐
(Round to three decimal places as needed. Use a comma to separate answers as needed.)

State the final conclusion that addresses the original claim. Choose the correct answer below.

A. Fail to reject H_0. There is insufficient evidence to support the claim that the sample is from a population of songs with a mean length greater than 210 sec.

B. Fail to reject H_0. There is sufficient evidence to support the claim that the sample is from a population of songs with a mean length greater than 210 sec.

C. Reject H_0. There is insufficient evidence to support the claim that the sample is from a population of songs with a mean length greater than 210 sec.

D. Reject H_0. There is sufficient evidence to support the claim that the sample is from a population of songs with a mean length greater than 210 sec.

What do the results suggest about the advice given in the manual?

13. (cont.)

A. The results suggest that the advice should be that a song must be longer than 210 seconds.

B. The results are inconclusive.

C. The results suggest that the advice of writing a song that must be no longer than 210 seconds is not sound advice.

D. The results suggest that the advice of writing a song that must be no longer than 210 seconds is sound advice.

Minitab display

One-Sample T

Test of mu = 210 vs > 210

N	Mean	StDev	SE Mean	95% Lower Bound	T	P
40	222.00	56.26	8.90	207.01	1.35	0.093

14. When the clinical trial of the XSORT method of gender selection is completed, a formal hypothesis test will be conducted with the alternative hypothesis of $p > 0.5$, which corresponds to the claim that the XSORT method increases the likelihood of having a girl, so that the proportion of girls is greater than 0.5. If you are responsible for developing the XSORT method and you want to show its effectiveness, which of the following P-values whould you prefer?

Choose the correct answer below.

A. 0.01

B. 0.001

C. 0.05

D. 0.5

E. 0.999

F. 0.95

15. Make a decision about the given claim. Use only the rare event rule, and make subjective estimates to determine whether events are likely. For example, if the claim is that a coin favors heads and sample results consist of 11 heads in 20 flips, conclude that there is not sufficient evidence to support the claim that the coin favors heads (because it is easy to get 11 heads in 20 flips by chance with a fair coin).

Claim: The mean age of students in a large calculus class is greater than 21. A simple random sample of the students has a mean age of 26.1.

Choose the correct answer below.

- ○ A. Since the event is not likely if the claim were true, there is not sufficient evidence to support the claim.
- ○ B. Since the event is likely if the claim were true, there is not sufficient evidence to support the claim.
- ○ C. Since the event is likely if the claim were true, there is sufficient evidence to support the claim.
- ○ D. Since the event is not likely if the claim were true, there is sufficient evidence to support the claim.

16. A recent broadcast of a television show had a 10 share, meaning that among 6000 monitored households with TV sets in use, 10% of them were tuned to this program. Use a 0.01 significance level to test the claim of an advertiser that among the households with TV sets in use, less than 25% were tuned into the program. Identify the null hypothesis, alternative hypothesis, test statistic, P-value, conclusion about the null hypothesis, and final conclusion that addresses the original claim. Use the P-value method. Use the normal distribution as an approximation of the binomial distribution.

Identify the null and alternative hypotheses. Choose the correct answer below.

- ○ A. $H_0: p = 0.75$ $H_1: p > 0.75$
- ○ B. $H_0: p = 0.75$ $H_1: p \neq 0.75$
- ○ C. $H_0: p = 0.75$ $H_1: p < 0.75$
- ○ D. $H_0: p = 0.25$ $H_1: p > 0.25$
- ○ E. $H_0: p = 0.25$ $H_1: p < 0.25$
- ○ F. $H_0: p = 0.25$ $H_1: p \neq 0.25$

The test statistic is $z =$ ☐. (Round to two decimal places as needed.)

The P-value is ☐. (Round to four decimal places as needed.)

Identify the conclusion about the null hypothesis and the final conclusion that addresses the original claim.

☐ H_0. There ☐ sufficient evidence to support the claim that less than 25% of the TV sets in use were tuned to the program.

17. Suppose the USGA requires that the standard deviation of the diameter of a golf ball must be less than 0.004 inch. Determine whether these balls conform to this requirement at the $\alpha = 0.01$ level of significance. Assume that the population is normally distributed.

1.681	1.676	1.684
1.681	1.682	1.683
1.683	1.683	1.677
1.677	1.679	1.677

Do the golf balls meet the requirement? Choose the correct answer below.

- A. Yes, because the test statistic is in the critical region.
- B. Yes, because the test statistic is not in the critical region.
- C. No, because the test statistic is not in the critical region.
- D. No, because the test statistic is in the critical region.

18. Quarters are currently minted with weights having a mean of 5.879 and a standard deviation of 0.062. New equipment is being tested in an attempt to improve quality by reducing variation. A simple random sample of 20 quarters is obtained from those manufactured with the new equipment, and this sample has a standard deviation of 0.048. Use a 0.025 significance level to test the claim that quarters manufactured with the new equipment have weights with a standard deviation less than 0.062. Does the new equipment appear to be effective in reducing the variation of weights?

What can be said about the effectiveness of the new equipment?

- A. Since H_0: $\sigma < 0.062$ is not rejected, the new equipment is not more effective.
- B. Since H_0: $\sigma = 0.062$ is not rejected, the new equipment is not more effective.
- C. Since H_0: $\sigma < 0.062$ is rejected, the new equipment is more effective.
- D. Since H_0: $\sigma = 0.062$ is rejected, the new equipment is more effective.

19. Use the information given below to find the P-value. Also, use a 0.05 significance level and state the conclusion about the null hypothesis (reject the null hypothesis or fail to reject the null hypothesis).

The test statistic in a left-tailed test is $z = -1.04$.

What is the P-value?

P-value = ☐ (Round to four decimal places as needed.)

State the conclusion about the null hypothesis. Choose the correct answer below.

- A. Fail to reject the null hypothesis. The P-value is greater than the level of significance.
- B. Reject the null hypothesis. The P-value is less than the level of significance.
- C. Fail to reject the null hypothesis. The P-value is less than the level of significance.
- D. Reject the null hypothesis. The P-value is greater than the level of significance.

20. When 109,857 arrests for federal offenses were randomly selected, it was found that 32,473 of them were drug offenses. When testing the claim that more than 29% of federal crimes were for drug offenses, the accompanying calculator display was obtained. Use the results from the display to test the given claim at a 0.05 level of significance.

1-PropZTest
prop > 0.29
z = 4.08563
p = 0.00002
$\hat{p}$ = 0.29559
n = 109,857

Which of the following is the correct conclusion?

A. There is sufficient evidence to support the claim that more than 29% of federal crimes were for drug offenses.

B. There is not sufficient evidence to support the claim that more than 29% of federal crimes were for drug offenses.

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1. A

2. D
4.59
0.0000
Reject
is
might not be

3. B

4. A

5. 1.81, − 1.81

6. D
− 4.31
− 1.96,1.96
Reject
is

7. C

8. B

9. A

10. C
3.08
0.0010
the second choice
A

11. D
0.13
0.4499
the second choice
A

12. B
− 3.07
0.0011
D
the first choice

13. D
1.35
0.093
1.685
A
D

14. B

15. C

16. E
− 26.83
0.0000
Reject
is

17. C

18. B

19. 0.1492
A

20. A