

Name _____

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

A hypothesis test is to be performed. Determine the null and alternative hypotheses.

- 1) In the past, the mean running time for a certain type of flashlight battery has been 8.5 hours. The manufacturer has introduced a change in the production method and wants to perform a hypothesis test to determine whether the mean running time has changed as a result. 1) _____
- | | |
|-------------------------------|-------------------------------|
| A) $H_0 : \mu \neq 8.5$ hours | B) $H_0 : \mu \geq 8.5$ hours |
| $H_a : \mu = 8.5$ hours | $H_a : \mu = 8.5$ hours |
| C) $H_0 : \mu = 8.5$ hours | D) $H_0 : \mu = 8.5$ hours |
| $H_a : \mu \neq 8.5$ hours | $H_a : \mu > 8.5$ hours |

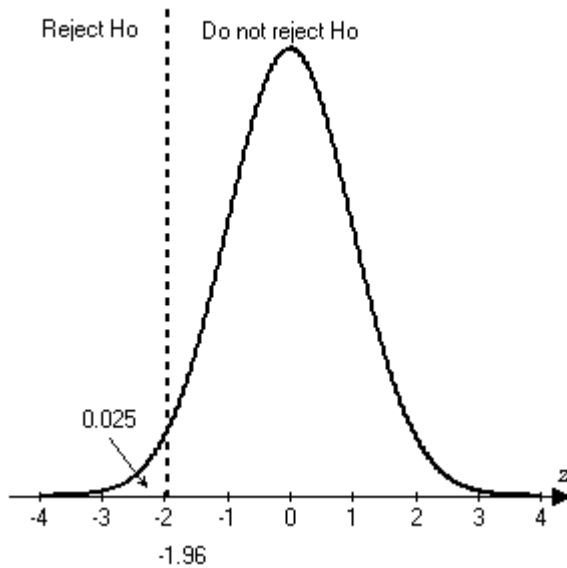
Classify the hypothesis test as two-tailed, left-tailed, or right-tailed.

- 2) In the past, the mean running time for a certain type of flashlight battery has been 8.8 hours. The manufacturer has introduced a change in the production method and wants to perform a hypothesis test to determine whether the mean running time has changed as a result. 2) _____
- | | | |
|---------------|----------------|-----------------|
| A) Two-tailed | B) Left-tailed | C) Right-tailed |
|---------------|----------------|-----------------|
- 3) The maximum acceptable level of a certain toxic chemical in vegetables has been set at 0.6 parts per million (ppm). A consumer health group measured the level of the chemical in a random sample of tomatoes obtained from one producer to determine whether the mean level of the chemical in these tomatoes exceeds the recommended limit. 3) _____
- | | | |
|---------------|----------------|-----------------|
| A) Two-tailed | B) Left-tailed | C) Right-tailed |
|---------------|----------------|-----------------|
- 4) The recommended dietary allowance (RDA) of vitamin C for women is 75 milligrams per day. A hypothesis test is to be performed to decide whether adult women are, on average, getting less than the RDA of 75 milligrams per day. 4) _____
- | | | |
|---------------|----------------|-----------------|
| A) Two-tailed | B) Left-tailed | C) Right-tailed |
|---------------|----------------|-----------------|

The graph portrays the decision criterion for a hypothesis test for a population mean. The null hypothesis is $H_0 : \mu = \mu_0$. The curve is the normal curve for the test statistic under the assumption that the null hypothesis is true. Use the graph to solve the problem.

5) A graphical display of the decision criterion follows.

5) _____



Determine the critical value(s).

- A) $z = \pm 1.96$ B) $z \leq -1.96$ C) $\alpha = 0.025$ D) $z = -1.96$

Classify the conclusion of the hypothesis test as a Type I error, a Type II error, or a correct decision.

6) In the past, the mean running time for a certain type of flashlight battery has been 8.0 hours. The manufacturer has introduced a change in the production method and wants to perform a hypothesis test to determine whether the mean running time has increased as a result. The hypotheses are:

$$H_0 : \mu = 8.0 \text{ hours}$$

$$H_a : \mu > 8.0 \text{ hours}$$

where μ is the mean running time of the new batteries

Suppose that the results of the sampling lead to nonrejection of the null hypothesis. Classify that conclusion as a Type I error, a Type II error, or a correct decision, if in fact the mean running time has increased.

- A) Type I error B) Correct decision C) Type II error

A hypothesis test is to be performed for a population mean with null hypothesis $H_0 : \mu = \mu_0$. The test statistic used

will be $z = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}}$. Find the required critical value(s).

7) A two-tailed test with $\alpha = 0.05$.

- A) ± 1.96 B) ± 2.575 C) ± 1.645 D) ± 1.764

7) _____

8) A left-tailed test with $\alpha = 0.05$.

- A) ± 1.645 B) -1.645 C) ± 1.96 D) -1.96

8) _____

A sample mean, sample size, and population standard deviation are given. Use the one-mean z-test to perform the required hypothesis test about the mean, μ , of the population from which the sample was drawn.

- 9) $\bar{x} = 54$, $n = 36$, $\sigma = 5.6$, $H_0: \mu = 56$; $H_a: \mu < 56$, $\alpha = 0.05$ 9) _____
- A) Reject H_0 if $z < -1.96$; $z = -2.14$; therefore reject H_0 and conclude that $\mu < 56$.
- B) Reject H_0 if $z > -1.645$; $z = -2.14$; therefore do not reject H_0 . The data do not provide sufficient evidence to support $H_a: \mu < 56$.
- C) Reject H_0 if $z < -1.645$; $z = -0.36$; therefore do not reject H_0 . The data do not provide sufficient evidence to support $H_a: \mu < 56$.
- D) Reject H_0 if $z < -1.645$; $z = -2.14$; therefore reject H_0 and conclude that $\mu < 56$.

The significance level and P-value of a hypothesis test are given. Decide whether the null hypothesis should be rejected.

- 10) $\alpha = 0.01$, P-value = 0.08 10) _____
- A) Reject the null hypothesis. B) Do not reject the null hypothesis.
- 11) $\alpha = 0.10$, P-value = 0.08 11) _____
- A) Reject the null hypothesis. B) Do not reject the null hypothesis.

A sample mean, sample size, and population standard deviation are given. Use the P-value approach to perform a one-mean z-test about the mean, μ , of the population from which the sample was drawn. Determine the strength of the evidence against the null hypothesis.

- 12) $\bar{x} = 137$, $n = 20$, $\sigma = 14.2$, $H_0: \mu = 132$, $H_a: \mu \neq 132$, $\alpha = 0.05$ 12) _____
- A) $z = 1.57$; P-value = 0.0582; Do not reject H_0 . The evidence against the null hypothesis is moderate
- B) $z = 1.57$; P-value = 0.1164; Do not reject H_0 . The evidence against the null hypothesis is weak or none.
- C) $z = 0.35$; P-value = 0.7263; Do not reject H_0 . The evidence against the null hypothesis is weak or none.
- D) $z = 2.57$; P-value = 0.0101; Reject H_0 . The evidence against the null hypothesis is strong.

Use a table of t-values to estimate the P-value for the specified one-mean t-test.

- 13) Right-tailed test, $n = 19$, $t = 2.218$ 13) _____
- A) $0.05 < P < 0.10$ B) $0.025 < P < 0.05$
- C) $P > 0.10$ D) $0.01 < P < 0.025$

Find the indicated margin of error.

- 14) Out of 420 trials, 150 turned out positive. Find the margin of error for the 90% confidence interval used to estimate the population proportion. 14) _____
- A) 0.0481 B) 0.0458 C) 0.0384 D) 0.0412

Assume that you wish to estimate a population proportion, p . For the given margin of error and confidence level, determine the sample size required.

- 15) You wish to estimate the proportion of all voters in California who plan to vote in favor of a certain ballot measure. Obtain a sample size that will ensure a margin of error of at most 0.04 for a 95% confidence interval. Assume that it is reasonable to presume that of the voters sampled, the proportion in favor of the measure will be between 0.71 and 0.82. 15) _____
- A) 355 B) 349 C) 495 D) 601

The number of successes and the sample size are given for a simple random sample from a population. Determine the sample proportion, \hat{p} .

16) $x = 11, n = 16$

A) $\hat{p} = 0.6875$

B) $\hat{p} = 0.6975$

C) $\hat{p} = 0.5875$

D) $\hat{p} = 0.688$

16) _____

Find the required sample size without making a guess for the observed value of \hat{p} .

17) A researcher wishes to estimate the proportion of all drivers who exceed the speed limit on a certain stretch of road where accidents frequently happen. Obtain a sample size that will ensure a margin of error of at most 0.020 for a 97% confidence interval.

A) 1357

B) 28

C) 59

D) 2944

17) _____

Use the one-proportion z-test to perform the specified hypothesis test.

18) $x = 684, n = 1200, H_0: p = 0.5, H_a: p > 0.5, \alpha = 0.05$

A) $z = 4.850$; critical value = 1.645; reject H_0

B) $z = 3.637$; critical value = 1.96; do not reject H_0

C) $z = 4.850$; critical value = 1.96; reject H_0

D) $z = 3.637$; critical value = 1.645; reject H_0

18) _____

A hypothesis test is to be performed for a population proportion. For the given sample data and null hypothesis,

compute the value of the test statistic, $z = \frac{\hat{p} - p_0}{\sqrt{p_0(1 - p_0)/n}}$

19) A drug company claims that over 70% of all physicians recommend their drug. 800 physicians were asked if they recommend the drug to their patients. 46% said yes. $H_0: p = 0.7$.

A) -29.63

B) -14.81

C) -13.33

D) -19.26

19) _____

20) In a school district with 10,000 high school students, 1100 students completed a special class designed to improve their math skills. 693 of these scored better than the district-wide median on a standardized math exam. Does the special class have some value? The hypotheses are $H_0: p = 0.5, H_a: p > 0.5$, where p is the proportion of all those taking the special class who score better than the district-wide median.

A) 8.623

B) 18.109

C) 6.467

D) 13.797

20) _____

Find the required sample size without making a guess for the observed value of \hat{p} .

21) A pollster wishes to estimate the proportion of U.S. voters that oppose capital punishment. Obtain a sample size that will ensure a margin of error of at most 0.07 for a 93% confidence interval.

A) 669

B) 167

C) 168

D) 12

21) _____

Answer Key

Testname: MATH181 EXAM4REVIEW

- 1) C
- 2) A
- 3) C
- 4) B
- 5) D
- 6) C
- 7) A
- 8) B
- 9) D
- 10) B
- 11) A
- 12) B
- 13) B
- 14) C
- 15) C
- 16) A
- 17) D
- 18) A
- 19) B
- 20) A
- 21) C