Name_____

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

Provide an appropriate response.

1) A candidate for governor of a particular state claims to be favored by at least half of the   1) _____
voters. Write the null and alternative hypotheses.

2) The dean of a major university claims that the mean time for students to earn a Master's   2) _____
degree is at most 5.4 years. Write the null and alternative hypotheses.

3) The mean age of bus drivers in Chicago is 50.2 years. State this claim mathematically.   3) _____
Write the null and alternative hypotheses. Identify which hypothesis is the claim.

4) The mean score for all NBA games during a particular season was less than 110 points per   4) _____
game. State this claim mathematically. Write the null and alternative hypotheses. Identify
which hypothesis is the claim.

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

5) Given H_0: $p \geq 80\%$ and H_a: $p < 80\%$, determine whether the hypothesis test is left-tailed,   5) _____
right-tailed, or two-tailed.
   A) right-tailed   B) two-tailed   C) left-tailed

6) Given H_0: $\mu \leq 25$ and H_a: $\mu > 25$, determine whether the hypothesis test is left-tailed, right-tailed,   6) _____
or two-tailed.
   A) two-tailed   B) right-tailed   C) left-tailed

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

7) The mean age of bus drivers in Chicago is 59.1 years. Identify the type I and type II errors   7) _____
for the hypothesis test of this claim.

8) The mean score for all NBA games during a particular season was less than 109 points per game. Identify the type I and type II errors for the hypothesis test of this claim.

8) _____

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

9) The mean age of bus drivers in Chicago is 52.1 years. If a hypothesis test is performed, how should you interpret a decision that rejects the null hypothesis?

9) _____

A) There is not sufficient evidence to reject the claim $\mu = 52.1$.
B) There is not sufficient evidence to support the claim $\mu = 52.1$.
C) There is sufficient evidence to support the claim $\mu = 52.1$.
D) There is sufficient evidence to reject the claim $\mu = 52.1$.

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

10) A candidate for governor of a certain state claims to be favored by at least half of the voters. Identify the type I and type II errors for the hypothesis test of this claim.

10) _____

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

11) The mean age of bus drivers in Chicago is greater than 57.6 years. If a hypothesis test is performed, how should you interpret a decision that rejects the null hypothesis?

11) _____

A) There is not sufficient evidence to support the claim $\mu > 57.6$.
B) There is sufficient evidence to reject the claim $\mu > 57.6$.
C) There is not sufficient evidence to reject the claim $\mu > 57.6$.
D) There is sufficient evidence to support the claim $\mu > 57.6$.

12) The mean score for all NBA games during a particular season was less than 92 points per game. If a hypothesis test is performed, how should you interpret a decision that fails to reject the null hypothesis?

12) _____

A) There is sufficient evidence to reject the claim $\mu < 92$.
B) There is sufficient evidence to support the claim $\mu < 92$.
C) There is not sufficient evidence to support the claim $\mu < 92$.
D) There is not sufficient evidence to reject the claim $\mu < 92$.

13) Given H_0: $\mu \leq 12$, for which confidence interval should you reject H_0?

13) _____

A) (13, 16)　　　　　　　　B) (10, 13)　　　　　　　　C) (11.5, 12.5)

14) Given H_0: $p = 0.85$ and $\alpha = 0.10$, which level of confidence should you use to test the claim?

14) _____

A) 95%　　　　　　　　B) 80%　　　　　　　　C) 90%　　　　　　　　D) 99%

1) $H_0: p \geq 0.5$, $H_a: p < 0.5$

2) $H_0: \mu \leq 5.4$, $H_a: \mu > 5.4$

3) claim: $\mu = 50.2$; $H_0: \mu = 50.2$, $H_a: \mu \neq 50.2$; claim is H_0

4) claim: $\mu < 110$; $H_0: \mu \geq 110$, $H_a: \mu < 110$; claim is H_a

5) C

6) B

7) type I: rejecting $H_0: \mu = 59.1$ when $\mu = 59.1$

   type II: failing to reject $H_0: \mu = 59.1$ when $\mu \neq 59.1$

8) type I: rejecting $H_0: \mu \geq 109$ when $\mu \geq 109$

   type II: failing to reject $H_0: \mu \geq 109$ when $\mu < 109$

9) D

10) type I: rejecting $H_0: p \geq 0.5$ when $p \geq 0.5$

   type II: failing to reject $H_0: p \geq 0.5$ when $p < 0.5$

11) D

12) C

13) A

14) C

Name_____

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

Provide an appropriate response.

1) The P-value for a hypothesis test is P = 0.003. Do you reject or fail to reject H_0 when the level of significance is $\alpha = 0.01$?   1) _____
   A) fail to reject H_0

   B) reject H_0

   C) not sufficient information to decide

2) Find the P-value for the hypothesis test with the standardized test statistic z. Decide whether to reject H_0 for the level of significance α.   2) _____

  Right-tailed test
  $z = 0.52$
  $\alpha = 0.05$
   A) 0.3015; Reject H_0 B) 0.6030; Fail to reject H_0

   C) 0.3015; Fail to reject H_0 D) 0.0195; Reject H_0

3) Find the P-value for the hypothesis test with the standardized test statistic z. Decide whether to reject H_0 for the level of significance α.   3) _____

  Left-tailed test
  $z = -1.83$
  $\alpha = 0.05$
   A) 0.0672; reject H_0 B) 0.9664; fail to reject H_0

   C) 0.0672; fail to reject H_0 D) 0.0336; reject H_0

4) Find the P-value for the hypothesis test with the standardized test statistic z. Decide whether to reject H_0 for the level of significance α.   4) _____

  Two-tailed test
  $z = 1.95$
  $\alpha = 0.05$
   A) 0.0256; reject H_0 B) 0.0512; fail to reject H_0

   C) 0.0512; reject H_0 D) 0.9744; fail to reject H_0

5) Find the critical value and rejection region for the type of z-test with level of significance α.   5) _____

  Right-tailed test, $\alpha = 0.01$
   A) $z_0 = 1.96; ; z > 1.96$ B) $z_0 = 2.575; z > 2.575$

   C) $z_0 = 2.33; z > 2.33$ D) $z_0 = 1.645; z > 1.645$

6) Find the critical value and rejection region for the type of z–test with level of significance α.   6) _____

Left–tailed test, $\alpha = 0.05$
  A) $z_0 = -2.33$; $z < -2.33$ B) $z_0 = -1.96$; $z < -1.96$
  C) $z_0 = -1.645$; $z < -1.645$ D) $z_0 = -2.575$; $z < -2.575$

7) Find the critical value and rejection region for the type of z–test with level of significance α.   7) _____

Two–tailed test, $\alpha = 0.01$
  A) $-z_0 = -2.33$, $z_0 = 2.33$; $z < -2.33$, $z > 2.33$
  B) $-z_0 = -2.575$, $z_0 = 2.575$; $z < -2.575$, $z > 2.575$
  C) $-z_0 = -1.96$, $z_0 = 1.96$; $z < -1.96$, $z > 1.96$
  D) $-z_0 = -1.645$, $z_0 = 1.645$; $z < -1.645$, $z > 1.645$

8) Test the claim about the population mean μ at the level of significance α. Assume the population is   8) _____
normally distributed.

Claim: $\mu > 21$; $\alpha = 0.05$; $\sigma = 1.2$
Sample statistics: $\bar{x} = 21.3$, $n = 50$
  A) Fail to reject H_0. There is not enough evidence at the 5% level of significance to support the

    claim.
  B) Not enough information to decide.
  C) Reject H_0. There is enough evidence at the 5% level of significance to support the claim.

9) Test the claim about the population mean μ at the level of significance α. Assume the population is   9) _____
normally distributed.

Claim: $\mu \neq 39$; $\alpha = 0.05$; $\sigma = 2.7$
Sample statistics: $\bar{x} = 38.1$, $n = 35$
  A) Fail to reject H_0. There is not enough evidence at the 5% level of significance to support the

    claim.
  B) Not enough information to decide.
  C) Reject H_0. There is enough evidence at the 5% level of significance to support the claim.

10) You wish to test the claim that $\mu \neq 36$ at a level of significance of $\alpha = 0.05$ and are given sample   10) _____

statistics $n = 35$, $\bar{x} = 35.1$. Assume the population standard deviation is 2.7. Compute the value of
the standardized test statistic. Round your answer to two decimal places.
  A) –3.12   B) –1.97   C) –1.83   D) –2.86

2

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

11) 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. Assume the population standard deviation is 12.2 tickets. At $\alpha = 0.01$, test the group's claim.

11) _____

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

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

12) Test the claim about the population mean μ at the level of significance α. Assume the population is normally distributed.

12) _____

Claim: $\mu \leq 33$; $\alpha = 0.01$; $\sigma = 4.3$
Sample statistics: $\bar{x} = 34.8$, n = 40
   A) Fail to reject H_0. There is enough evidence at the 1% level of significance to support the claim.
   B) Reject H_0. There is enough evidence at the 1% level of significance to reject the claim.
   C) Not enough information to decide.

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

13) A fast food outlet claims that the mean waiting time in line is less than 3.5 minutes. A random sample of 60 customers has a mean of 3.6 minutes with a population standard deviation of 0.6 minute. If $\alpha = 0.05$, test the fast food outlet's claim using confidence intervals.

13) _____

1) B
2) C
3) D
4) B
5) C
6) C
7) B
8) C
9) C
10) B
11) $\bar{x} = 60.4$, standardized test statistic ≈ 0.18; critical value $z_0 = 2.33$; fail to reject H_0; There is not sufficient evidence to reject the claim.
12) B
13) Confidence interval (3.47, 3.73); 3.5 lies in the interval, fail to reject H_0; There is not enough evidence to support the fast food outlet's claim.

Name_____

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

Provide an appropriate response.

1) Find the standardized test statistic t for a sample with n = 12, $\bar{x}$ = 30.2, s = 2.2, and α = 0.01 if   1) _____
   H_0: μ = 29. Round your answer to three decimal places.

   A) 1.991   B) 2.132   C) 2.001   D) 1.890

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

2) A local group claims that the police issue more than 60 speeding tickets a day in their area.   2) _____
   To prove their point, they randomly select two weeks. Their research yields the number of
   tickets issued for each day. The data are listed below. At α = 0.01, test the group's claim.

   70 48 41 68 69 55 70
   57 60 83 32 60 72 58

3) A manufacturer claims that the mean lifetime of its fluorescent bulbs is 1000 hours. A   3) _____
   homeowner selects 25 bulbs and finds the mean lifetime to be 980 hours with a standard
   deviation of 80 hours. If α = 0.05, test the manufacturer's claim using confidence intervals.

4) A trucking firm suspects that the mean life of a certain tire it uses is less than 32,000 miles.   4) _____
   To check the claim, the firm randomly selects and tests 18 of these tires and gets a mean
   lifetime of 31,400 miles with a standard deviation of 1200 miles. At α = 0.05, test the
   trucking firm's claim.

5) A local school district claims that the number of school days missed by its teachers due to   5) _____
   illness is below the national average of μ = 5. A random sample of 28 teachers provided the
   data below. At α = 0.05, test the district's claim using P-values.

   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

1) D

2) $\overline{x} = 60.21$, s = 13.43; critical value $t_0 = 2.650$; standardized test statistic ≈ 0.060; fail to reject H_0; There is not sufficient evidence to support the claim.

3) Confidence interval (946.98, 1013.02); 1000 lies in the interval, fail to reject H_0; There is not sufficient evidence to reject the manufacturer's claim.

4) critical value $t_0 = -1.740$; standardized test statistic –2.121; reject H_0; There is sufficient evidence to support the trucking firm's claim.

5) standardized test statistic ≈ –4.522; Therefore, at a degree of freedom of 27, P must lie between 0.0001 and 0.00003. P < α, reject H_0. There is sufficient evidence to support the school district's claim.

Name_____

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

Provide an appropriate response.

1) Determine the standardized test statistic, z, to test the claim about the population proportion $p \geq$ 1) _____
   0.700 given n = 50 and $\hat{p}$ = 0.612. Use α = 0.10.

     A) −1.36   B) −2.18   C) −1.28   D) −3.01

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

2) An airline claims that the no−show rate for passengers is less than 5%. In a sample of 420   2) _____
   randomly selected reservations, 19 were no−shows. At α = 0.01, test the airline's claim.

3) A recent study claimed that at least 15% of junior high students are overweight. In a   3) _____
   sample of 160 students, 18 were found to be overweight. At α = 0.05, test the claim.

4) The engineering school at a major university claims that 20% of its graduates are women.   4) _____
   In a graduating class of 210 students, 58 were women. Does this suggest that the school is
   believable? Use α = 0.05.

5) A coin is tossed 1000 times and 530 heads appear. At $\alpha = 0.05$, test the claim that this is not   5) _____
   a biased coin. Use a P-value. Does this suggest the coin is fair?

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

6) Determine whether the normal sampling distribution can be used. The claim is $p < 0.25$ and the   6) _____
   sample size is n = 18.
      A) Do not use the normal distribution.   B) Use the normal distribution.

7) Determine whether the normal sampling distribution can be used. The claim is $p \leq 0.700$ and the   7) _____
   sample size is n = 20.
      A) Do not use the normal distribution.   B) Use the normal distribution.

1) A
2) critical value z_0 = –2.33; standardized test statistic ≈ –0.45; fail to reject H_0; There is not sufficient evidence to support the airline's claim.
3) critical value z_0 = –1.645; standardized test statistic ≈ –1.33; fail to reject H_0; There is not sufficient evidence to reject the claim.
4) critical value z_0 = ±1.96; standardized test statistic ≈ 2.76; reject H_0; There is enough evidence to reject the university's claim. The school is not believable.
5) α = 0.05; P–value = 0.0574; P > α; fail to reject H_0; There is not enough evidence to reject the claim that this is not a biased coin. The coin is fair.
6) A
7) B