Stats: Test 3 Review
Name_____

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

Provide an appropriate response.

1) Given H_0: $p \geq 80\%$ and H_a: $p < 80\%$, determine whether the hypothesis test is left–tailed, right–tailed, or two–tailed. 1) _____
   A) two–tailed B) right–tailed C) left–tailed

2) A researcher claims that 62% of voters favor gun control. Determine whether the hypothesis test for this claim is left–tailed, right–tailed, or two–tailed. 2) _____
   A) left–tailed B) right–tailed C) two–tailed

3) A car maker claims that its new sub–compact car gets better than 47 miles per gallon on the highway. Determine whether the hypothesis test for this is left–tailed, right–tailed, or two–tailed. 3) _____
   A) left–tailed B) two–tailed C) right–tailed

4) An elementary school claims that the standard deviation in reading scores of its fourth grade students is less than 4.35. Determine whether the hypothesis test for this claim is left–tailed, right–tailed, or two–tailed. 4) _____
   A) right–tailed B) left–tailed C) two–tailed

5) The mean age of bus drivers in Chicago is greater than 57.8 years. If a hypothesis test is performed, how should you interpret a decision that rejects the null hypothesis? 5) _____
   A) There is sufficient evidence to support the claim $\mu > 57.8$.
   B) There is sufficient evidence to reject the claim $\mu > 57.8$.
   C) There is not sufficient evidence to support the claim $\mu > 57.8$.
   D) There is not sufficient evidence to reject the claim $\mu > 57.8$.

6) The mean IQ of statistics teachers is greater than 150. If a hypothesis test is performed, how should you interpret a decision that fails to reject the null hypothesis? 6) _____
   A) There is sufficient evidence to support the claim $\mu > 150$.
   B) There is not sufficient evidence to support the claim $\mu > 150$.
   C) There is not sufficient evidence to reject the claim $\mu > 150$.
   D) There is sufficient evidence to reject the claim $\mu > 150$.

7) The dean of a major university claims that the mean time for students to earn a Master's degree is at most 5.1 years. If a hypothesis test is performed, how should you interpret a decision that fails to reject the null hypothesis? 7) _____
   A) There is sufficient evidence to support the claim $\mu \leq 5.1$.
   B) There is sufficient evidence to reject the claim $\mu \leq 5.1$.
   C) There is not sufficient evidence to support the claim $\mu \leq 5.1$.
   D) There is not sufficient evidence to reject the claim $\mu \leq 5.1$.

8) Given H_0: $\mu \leq 12$, for which confidence interval should you reject H_0? 8) _____
   A) (10, 13) B) (11.5, 12.5) C) (13, 16)

9) Given H_0: $p = 0.85$ and $\alpha = 0.10$, which level of confidence should you use to test the claim? 9) _____
   A) 80% B) 90% C) 99% D) 95%

10) Suppose you are using $\alpha = 0.05$ to test the claim that $\mu \neq 14$ using a P–value. You are given the sample statistics $n = 35$, $\bar{x} = 13.1$, and $s = 2.7$. Find the P–value. 10) _____

A) 0.1003 B) 0.0488 C) 0.0591 D) 0.0244

11) Suppose you are using $\alpha = 0.01$ to test the claim that $\mu \leq 32$ using a P–value. You are given the sample statistics $n = 40$, $\bar{x} = 33.8$, and $s = 4.3$. Find the P–value. 11) _____

A) 0.0040 B) 0.9960 C) 0.1030 D) 0.0211

12) Given H_0: $\mu \geq 18$ and $P = 0.070$. Do you reject or fail to reject H_0 at the 0.05 level of significance? 12) _____

A) not sufficient information to decide
B) reject H_0
C) fail to reject H_0

13) Find the critical value for a right–tailed test with $\alpha = 0.01$ and $n = 75$. 13) _____

A) 2.33 B) 2.575 C) 1.96 D) 1.645

14) Find the critical value for a left–tailed test with $\alpha = 0.05$ and $n = 48$. 14) _____

A) –2.575 B) –1.645 C) –1.96 D) –2.33

15) Find the critical value for a two–tailed test with $\alpha = 0.10$ and $n = 100$. 15) _____

A) ±2.575 B) ±1.96 C) ±2.33 D) ±1.645

16) You wish to test the claim that $\mu \neq 22$ at a level of significance of $\alpha = 0.05$ and are given sample statistics $n = 35$, $\bar{x} = 21.1$, and $s = 2.7$. Compute the value of the standardized test statistic. Round your answer to two decimal places. 16) _____

A) –1.97 B) –1.83 C) –2.86 D) –3.12

17) Suppose you want to test the claim that $\mu \neq 3.5$. Given a sample size of $n = 47$ and a level of significance of $\alpha = 0.10$, when should you reject H_0 ? 17) _____

A) Reject H_0 if the standardized test statistic is greater than 2.575 or less than –2.575.
B) Reject H_0 if the standardized test statistic is greater than 1.645 or less than –1.645.
C) Reject H_0 if the standardized test statistic is greater than 2.33 or less than –2.33
D) Reject H_0 if the standardized test statistic is greater than 1.96 or less than –1.96

18) Suppose you want to test the claim that $\mu \geq 65.4$. Given a sample size of $n = 35$ and a level of significance of $\alpha = 0.05$, when should you reject H_0? 18) _____

A) Reject H_0 if the standardized test statistic is less than –2.575.
B) Reject H_0 if the standardized test statistic is less than –1.28.
C) Reject H_0 if the standardized test is less than –1.96.
D) Reject H_0 if the standardized test statistic is less than –1.645.

19) Find the critical values for a sample with $n = 15$ and $\alpha = 0.05$ if H_0: $\mu \leq 20$. 19) _____

A) 2.977 B) 1.761 C) 1.345 D) 2.625

20) Find the standardized test statistic t for a sample with $n = 10$, $\bar{x} = 9.7$, $s = 1.3$, and $\alpha = 0.05$ if H_0: $\mu \geq 10.6$. Round your answer to three decimal places. 20) _____

A) –2.617 B) –3.186 C) –2.189 D) –3.010

21) Determine the critical value, z_0, to test the claim about the population proportion $p = 0.250$ given $n = 48$ and $\hat{p} = 0.231$. Use $\alpha = 0.01$. 21) _____

A) ±1.645 B) ±1.96 C) ±2.33 D) ±2.575

22) Find the critical X^2 –value to test the claim $\sigma^2 \geq 1.8$ if $n = 15$ and $\alpha = 0.05$. 22) _____

A) 6.571 B) 5.629 C) 4.660 D) 4.075

23) Find the critical X^2 –value to test the claim $\sigma^2 > 1.9$ if $n = 18$ and $\alpha = 0.01$. 23) _____

A) 33.409 B) 27.587 C) 35.718 D) 30.181

24) Compute the standardized test statistic, X^2, to test the claim $\sigma^2 = 21.5$ if $n = 12$, $s^2 = 18$, and $\alpha = 0.05$. 24) _____

A) 0.492 B) 9.209 C) 18.490 D) 12.961

25) Compute the standardized test statistic, X^2, to test the claim $\sigma^2 < 50.4$ if $n = 28$, $s^2 = 31.5$, and $\alpha = 0.10$. 25) _____

A) 16.875 B) 14.324 C) 21.478 D) 18.132

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

26) Test the claim that $\sigma^2 \geq 1.8$ if $n = 15$, $s^2 = 1.5$, and $\alpha = 0.05$. Assume that the population is normally distributed. 26) _____

27) The data below are the final exam scores of 10 randomly selected statistics students and the number of hours they studied for the exam. Construct a scatter plot for the data. 27) _____

Hours, x	3	5	2	8	2	4	4	5	6	3
Scores, y	65	80	60	88	66	78	85	90	90	71

28) The data below are the number of absences and the final grades of 9 randomly selected students from a statistics class. Construct a scatter plot for the data. 28) _____

Number of absences, x	0	3	6	4	9	2	15	8	5
Final grade, y	98	86	80	82	71	92	55	76	82

29) Calculate the coefficient of correlation, r, letting Row 1 represent the x–values and Row 2 represent the y–values. Now calculate the coefficient of correlation, r, letting Row 2 represent the x–values and Row 1 represent the y–values. What effect does switching the explanatory and response variables have on the correlation coefficient? 29) _____

Row 1	–7	–5	2	–1	–3	–4	–2	0	1	–6
Row 2	–3	15	16	8	5	1	6	10	13	15

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

30) Find the equation of the regression line for the given data. 30) _____

x	−5	−3	4	1	−1	−2	0	2	3	−4
y	−10	−8	9	1	−2	−6	−1	3	6	−8

A) $\hat{y} = 2.097x + 0.552$ B) $\hat{y} = 2.097x - 0.552$

C) $\hat{y} = 0.522x - 2.097$ D) $\hat{y} = -0.552x + 2.097$

31) The data below are the final exam scores of 10 randomly selected statistics students and the number of hours they studied for the exam. Find the equation of the regression line for the given data. 31) _____

Hours, x	3	5	2	8	2	4	4	5	6	3
Scores, y	65	80	60	88	66	78	85	90	90	71

A) $\hat{y} = 5.044x + 56.113$ B) $\hat{y} = -56.113x - 5.044$

C) $\hat{y} = 56.113x - 5.044$ D) $\hat{y} = -5.044x + 56.113$

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

32) The frequency distribution shows the ages for a sample of 100 employees. Find the expected frequencies for each class to determine if the employee ages are normally distributed. 32) _____

Class boundaries	Frequency, f
29.5–39.5	14
39.5–49.5	29
49.5–59.5	31
59.5–69.5	18
69.5–79.5	8

33) A new coffeehouse wishes to see whether customers have any preference among 5 different brands of coffee. A sample of 200 customers provided the data below. Test the claim that the distribution is uniform. Use $\alpha = 0.01$. 33) _____

Brand	1	2	3	4	5
Customers	18	32	55	30	65

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

34) A teacher figures that final grades in the statistics department are distributed as: A, 25%; B, 25%; C, 40%; D, 5%; F, 5%. At the end of a randomly selected semester, the following number of grades were recorded. Find the critical value χ_0^2 to determine if the grade distribution for the department is different than expected. Use $\alpha = 0.01$. 34) _____

Grade	A	B	C	D	F
Number	42	36	60	8	14

A) 9.488 B) 13.277 C) 7.779 D) 11.143

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

Perform the indicated goodness–of–fit test.

35) You roll a die 48 times with the following results. 35) _____

Number	1	2	3	4	5	6
Frequency	3	13	4	2	14	12

Use a significance level of 0.05 to test the claim that the die is fair.

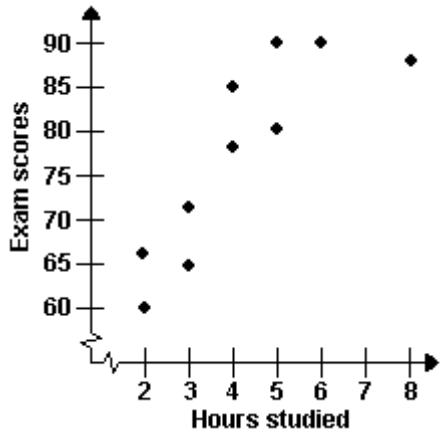
36) In studying the responses to a multiple–choice test question, the following sample data were obtained. At the 0.05 significance level, test the claim that the responses occur with the same frequency. 36) _____

Response	A	B	C	D	E
Frequency	12	15	16	18	19

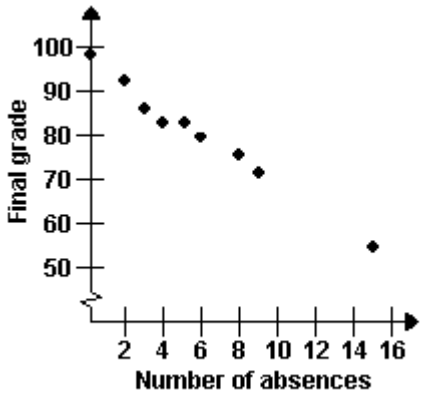
1) C
2) C
3) C
4) B
5) A
6) B
7) D
8) C
9) B
10) B
11) A
12) C
13) A
14) B
15) D
16) A
17) B
18) D
19) B
20) C
21) D
22) A
23) A
24) B
25) A

26) critical value $X_0^2 = 6.571$; standardized test statistic $X^2 \approx 11.667$; fail to reject H_0; There is not sufficient evidence to reject the claim.

27)



28)



29) The correlation coefficient remains unchanged.
30) B
31) A
32) 11, 26, 32, 21, and 7, respectively.
33) critical value $\chi^2_0 = 13.277$; chi–square test statistic $\chi^2 \approx 37.45$; reject H_0; There is sufficient evidence to reject the claim that the distribution is uniform.
34) B
35) H_0: The die is fair (all numbers occur with equal frequency).
H_1: The die is not fair.
Test statistic: $\chi^2 = 19.25$. Critical value: $\chi^2 = 11.070$. Reject the null hypothesis. There is sufficient evidence to warrant rejection of the claim that the die is fair.
36) H_0: The proportions of responses are all equal.
H_1: The proportions of responses are not all equal.
Test statistic: $\chi^2 = 1.875$. Critical value: $\chi^2 = 9.488$. Fail to reject the null hypothesis. There is not sufficient evidence to warrant rejection of the claim that the responses occur with the same frequency.