STATISTICS/GRACEY
EXAM 3 PRACTICE/CH. 7–8

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

Find the P–value for the indicated hypothesis test.

1) A manufacturer claims that fewer than 6% of its fax machines are defective. In a random sample of 97 such fax machines, 5% are defective. Find the P–value for a test of the manufacturer's claim. 1) _____
A) 0.3409 B) 0.1591 C) 0.1736 D) 0.3264

2) A random sample of 139 forty–year–old men contains 26% smokers. Find the P–value for a test of the claim that the percentage of forty–year–old men that smoke is 22%. 2) _____
A) 0.1271 B) 0.2542 C) 0.1401 D) 0.2802

3) 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. Find the P–value for a test of 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. 3) _____
A) 0.0505 B) 0.1118 C) 0.0252 D) 0.0559

Assume that the data has a normal distribution and the number of observations is greater than fifty. Find the critical z value used to test a null hypothesis.

4) $\alpha = 0.05$ for a left–tailed test. 4) _____
A) ±1.96 B) ±1.645 C) –1.96 D) –1.645

5) $\alpha = 0.08$; H_1 is $\mu \neq 3.24$ 5) _____
A) 1.41 B) 1.75 C) ±1.75 D) ±1.41

6) $\alpha = 0.05$ for a two–tailed test. 6) _____
A) ±1.96 B) ±2.575 C) ±1.645 D) ±1.764

Find the indicated critical z value.

7) Find the value of $-z_{\alpha/2}$ that corresponds to a confidence level of 96.68%. 7) _____
A) –1.84 B) 2.13 C) –2.13 D) 0.0166

8) Find the critical value $z_{\alpha/2}$ that corresponds to a 98% confidence level. 8) _____
A) 1.75 B) 2.575 C) 2.05 D) 2.33

9) Find the value of $-z_{\alpha/2}$ that corresponds to a confidence level of 96.68%. 9) _____
A) –1.84 B) 0.0166 C) –2.13 D) 2.13

10) Find the critical value $z_{\alpha/2}$ that corresponds to a 98% confidence level. 10) _____
A) 1.75 B) 2.05 C) 2.33 D) 2.575

11) Find the critical value $z_{\alpha/2}$ that corresponds to a 91% confidence level. 11) _____
A) 1.75 B) 1.70 C) 1.34 D) 1.645

12) Find $z_{\alpha/2}$ for $\alpha = 0.09$. 12) _____

A) 1.34 B) 1.75 C) 2.61 D) 1.70

Use the given information 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).

13) With H_1: $p \neq 3/5$, the test statistic is $z = 0.78$. 13) _____

A) 0.4354; fail to reject the null hypothesis B) 0.4354; reject the null hypothesis
C) 0.2177 fail to reject the null hypothesis D) 0.2177; reject the null hypothesis

14) The test statistic in a left–tailed test is $z = -1.83$. 14) _____

A) 0.0336; reject the null hypothesis B) 0.0672; fail to reject the null hypothesis
C) 0.9664; fail to reject the null hypothesis D) 0.0672; reject the null hypothesis

15) The test statistic in a right–tailed test is $z = 0.52$. 15) _____

A) 0.0195; reject the null hypothesis B) 0.3015; reject the null hypothesis
C) 0.3015; fail to reject the null hypothesis D) 0.6030; fail to reject the null hypothesis

Use the confidence level and sample data to find the margin of error E. Round your answer to the same number of decimal places as the sample mean unless otherwise noted.

16) College students' annual earnings: 99% confidence; $n = 68$, $\bar{x} = \$3068$, $\sigma = \$818$ 16) _____

A) \$255 B) \$194 C) \$958 D) \$231

17) Weights of eggs: 95% confidence; $n = 45$, $\bar{x} = 1.50$ oz, $\sigma = 0.20$ oz 17) _____

A) 0.01 oz B) 0.44 oz C) 0.06 oz D) 0.05 oz

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

18) Claim: $\mu = 119$. Sample data: $n = 11$, $\bar{x} = 110$, $s = 15.2$. The sample data appear to come from a normally distributed population with unknown μ and σ. 18) _____

A) Neither B) Normal C) Student t

19) Claim: $\mu = 950$. Sample data: $n = 24$, $\bar{x} = 997$, $s = 27$. The sample data appear to come from a normally distributed population with $\sigma = 30$. 19) _____

A) Normal B) Neither C) Student t

20) Claim: $\mu = 77$. Sample data: $n = 22$, $\bar{x} = 101$, $s = 15.4$. The sample data appear to come from a population with a distribution that is very far from normal, and σ is unknown. 20) _____

A) Student t B) Neither C) Normal

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

Identify the null hypothesis, alternative hypothesis, test statistic, P–value, conclusion about the null hypothesis, and final conclusion that addresses the original claim.

21) A manufacturer considers his production process to be out of control when defects exceed 3%. In a random sample of 85 items, the defect rate is 5.9% but the manager claims that this is only a sample fluctuation and production is not really out of control. At the 0.01 level of significance, test the manager's claim. 21) _____

22) In a sample of 167 children selected randomly from one town, it is found that 37 of them suffer from asthma. At the 0.05 significance level, test the claim that the proportion of all children in the town who suffer from asthma is 11%. 22) _____

23) The health of employees is monitored by periodically weighing them in. A sample of 54 employees has a mean weight of 183.9 lb. Assuming that σ is known to be 121.2 lb, use a 0.10 significance level to test the claim that the population mean of all such employees weights is less than 200 lb. 23) _____

24) A poll of 1068 adult Americans reveals that 48% of the voters surveyed prefer the Democratic candidate for the presidency. At the 0.05 level of significance, test the claim that at least half of all voters prefer the Democrat. 24) _____

25) A random sample of 100 pumpkins is obtained and the mean circumference is found to be 40.5 cm. Assuming that the population standard deviation is known to be 1.6 cm, use a 0.05 significance level to test the claim that the mean circumference of all pumpkins is equal to 39.9 cm. 25) _____

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

Solve the problem. Round the point estimate to the nearest thousandth.

26) 386 randomly selected light bulbs were tested in a laboratory, 97 lasted more than 500 hours. Find a point estimate of the proportion of all light bulbs that last more than 500 hours. 26) _____

A) 0.749 B) 0.251 C) 0.249 D) 0.201

27) Find the point estimate of the proportion of people who wear hearing aids if, in a random sample of 381 people, 76 people had hearing aids. 27) _____

A) 0.166 B) 0.199 C) 0.197 D) 0.801

Assume that a sample is used to estimate a population proportion p. Find the margin of error E that corresponds to the given statistics and confidence level. Round the margin of error to four decimal places.

28) 95% confidence; the sample size is 5700, of which 20% are successes 28) _____

A) 0.00780 B) 0.0104 C) 0.0120 D) 0.0137

29) 95% confidence; $n = 250$, $x = 130$ 29) _____

A) 0.0557 B) 0.0743 C) 0.0619 D) 0.0650

30) In a random sample of 158 college students, 104 had part–time jobs. Find the margin of error for the 95% confidence interval used to estimate the population proportion. 30) _____

A) 0.0666 B) 0.00279 C) 0.130 D) 0.0740

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

Assume that a simple random sample has been selected from a normally distributed population. Find the test statistic, P–value, critical value(s), and state the final conclusion.

31) Test the claim that for the population of history exams, the mean score is 80. Sample data are summarized as $n = 16$, $\bar{x} = 84.5$, and $s = 11.2$. Use a significance level of $\alpha = 0.01$. 31) _____

Assume that a simple random sample has been selected from a normally distributed population and test the given claim. Use either the traditional method or P–value method as indicated. Identify the null and alternative hypotheses, test statistic, critical value(s) or P–value (or range of P–values) as appropriate, and state the final conclusion that addresses the original claim.

32) A light–bulb manufacturer advertises that the average life for its light bulbs is 900 hours. A random sample of 15 of its light bulbs resulted in the following lives in hours. 32) _____

995 590 510 539 739 917 571 555
916 728 664 693 708 887 849

At the 10% significance level, test the claim that the sample is from a population with a mean life of 900 hours. Use the P–value method of testing hypotheses.

33) In tests of a computer component, it is found that the mean time between failures is 520 hours. A modification is made which is supposed to increase the time between failures. Tests on a random sample of 10 modified components resulted in the following times (in hours) between failures. 33) _____

518 548 561 523 536
499 538 557 528 563

At the 0.05 significance level, test the claim that for the modified components, the mean time between failures is greater than 520 hours. Use the P–value method of testing hypotheses.

Assume that a simple random sample has been selected from a normally distributed population. Find the test statistic, P–value, critical value(s), and state the final conclusion.

34) Test the claim that for the population of female college students, the mean weight is given by $\mu = 132$ lb. Sample data are summarized as $n = 20$, $\bar{x} = 137$ lb, and $s = 14.2$ lb. Use a significance level of $\alpha = 0.1$. 34) _____

Assume that a simple random sample has been selected from a normally distributed population and test the given claim. Use either the traditional method or P–value method as indicated. Identify the null and alternative hypotheses, test statistic, critical value(s) or P–value (or range of P–values) as appropriate, and state the final conclusion that addresses the original claim.

35) A test of sobriety involves measuring the subject's motor skills. Twenty randomly selected sober subjects take the test and produce a mean score of 41.0 with a standard deviation of 3.7. At the 0.01 level of significance, test the claim that the true mean score for all sober subjects is equal to 35.0. Use the traditional method of testing hypotheses. 35) _____

36) A public bus company official claims that the mean waiting time for bus number 14 during peak hours is less than 10 minutes. Karen took bus number 14 during peak hours on 18 different occasions. Her mean waiting time was 7.7 minutes with a standard deviation of 1.9 minutes. At the 0.01 significance level, test the claim that the mean waiting time is less than 10 minutes. Use the P–value method of testing hypotheses. 36) _____

Assume that a simple random sample has been selected from a normally distributed population. Find the test statistic, P–value, critical value(s), and state the final conclusion.

37) Test the claim that the mean lifetime of car engines of a particular type is greater than 220,000 miles. Sample data are summarized as $n = 23$, $\bar{x} = 226{,}450$ miles, and $s = 11{,}500$ miles. Use a significance level of $\alpha = 0.01$. 37) _____

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

Use the given data to find the minimum sample size required to estimate the population proportion.

38) Margin of error: 0.027; confidence level: 98%; $\hat{p}$ and $\hat{q}$ unknown 38) _____

A) 1686 B) 1970 C) 863 D) 1862

39) Margin of error: 0.02; confidence level: 95%; from a prior study, $\hat{p}$ is estimated by the decimal equivalent of 52%. 39) _____

A) 2398 B) 4994 C) 4139 D) 2158

40) Margin of error: 0.008; confidence level: 99%; $\hat{p}$ and $\hat{q}$ unknown 40) _____

A) 15,900 B) 26,024 C) 25,894 D) 25,901

41) Margin of error: 0.04; confidence level: 95%; from a prior study, $\hat{p}$ is estimated by the decimal equivalent of 89%. 41) _____

A) 9 B) 209 C) 236 D) 708

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

42) A survey of 865 voters in one state reveals that 408 favor approval of an issue before the legislature. Construct the 95% confidence interval for the true proportion of all voters in the state who favor approval. 42) _____

A) $0.438 < p < 0.505$ B) $0.435 < p < 0.508$

C) $0.471 < p < 0.472$ D) $0.444 < p < 0.500$

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.

43) A savings and loan association needs information concerning the checking account balances of its local customers. A random sample of 14 accounts was checked and yielded a mean balance of $664.14 and a standard deviation of $297.29. Find a 98% confidence interval for the true mean checking account balance for local customers. 43) _____

A) $\$455.65 < \mu < \$872.63$ B) $\$492.52 < \mu < \$835.76$

C) $\$493.71 < \mu < \$834.57$ D) $\$453.59 < \mu < \$874.69$

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

44) $n = 117$, $x = 67$; 88% confidence 44) _____

A) $0.497 < p < 0.649$ B) $0.502 < p < 0.644$

C) $0.498 < p < 0.648$ D) $0.501 < p < 0.645$

45) Of 286 employees selected randomly from one company, 12.59% of them commute by carpooling. Construct a 90% confidence interval for the true percentage of all employees of the company who carpool. 45) _____

A) $9.36\% < p < 15.8\%$ B) $7.53\% < p < 17.6\%$

C) $8.02\% < p < 17.2\%$ D) $8.74\% < p < 16.4\%$

46) Of 80 adults selected randomly from one town, 64 have health insurance. Find a 90% confidence interval for the true proportion of all adults in the town who have health insurance. 46) _____

A) $0.696 < p < 0.904$ B) $0.712 < p < 0.888$

C) $0.685 < p < 0.915$ D) $0.726 < p < 0.874$

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.

47) n = 10, $\bar{x}$ = 14.4, s = 4.3, 95% confidence 47) _____

A) 11.91 < μ < 16.89 B) 11.34 < μ < 17.46

C) 11.32 < μ < 17.48 D) 11.37 < μ < 17.43

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

48) Of 147 randomly selected adults, 32 were found to have high blood pressure. Construct a 95% confidence interval for the true percentage of all adults that have high blood pressure. 48) _____

A) 16.2% < p < 27.4% B) 13.0% < p < 30.6%

C) 13.8% < p < 29.7% D) 15.1% < p < 28.4%

49) n = 62, x = 19; 95% confidence 49) _____

A) 0.210 < p < 0.402 B) 0.190 < p < 0.422

C) 0.191 < p < 0.421 D) 0.209 < p < 0.403

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.

50) The football coach randomly selected ten players and timed how long each player took to perform a certain drill. The times (in minutes) were: 50) _____

7.5 10.3 9.3 8.1 11.1

7.9 6.9 11.4 10.7 12.2

Determine a 95% confidence interval for the mean time for all players.

A) 8.28 min < μ < 10.80 min B) 10.90 min < μ < 8.18 min

C) 8.18 min < μ < 10.90 min D) 10.80 min < μ < 8.28 min

Express the null hypothesis and the alternative hypothesis in symbolic form. Use the correct symbol(μ, p, σ) for the indicated parameter.

51) A cereal company claims that the mean weight of the cereal in its packets is at least 14 oz. 51) _____

A) H_0: μ = 14 B) H_0: μ > 14 C) H_0: μ = 14 D) H_0: μ < 14

H_1: μ < 14 H_1: μ ≤ 14 H_1: μ > 14 H_1: μ ≥ 14

52) The manufacturer of a refrigerator system for beer kegs produces refrigerators that are supposed to maintain a true mean temperature, μ, of 40°F, ideal for a certain type of German pilsner. The owner of the brewery does not agree with the refrigerator manufacturer, and claims he can prove that the true mean temperature is incorrect. 52) _____

A) H_0: μ ≠ 40° B) H_0: μ ≥ 40° C) H_0: μ ≤ 40° D) H_0: μ = 40°

H_1: μ = 40° H_1: μ < 40° H_1: μ > 40° H_1: μ ≠ 40°

53) A psychologist claims that more than 6.1 percent of the population suffers from professional problems due to extreme shyness. Use p, the true percentage of the population that suffers from extreme shyness. 53) _____

A) H_0: p < 6.1% B) H_0: p = 6.1% C) H_0: p > 6.1% D) H_0: p = 6.1%

H_1: p ≥ 6.1% H_1: p < 6.1% H_1: p ≤ 6.1% H_1: p > 6.1%

54) An entomologist writes an article in a scientific journal which claims that fewer than 14 in ten thousand male fireflies are unable to produce light due to a genetic mutation. Use the parameter p, the true proportion of fireflies unable to produce light. 54) _____

A) H_0: $p < 0.0014$ H_1: $p \geq 0.0014$

B) H_0: $p = 0.0014$ H_1: $p > 0.0014$

C) H_0: $p = 0.0014$ H_1: $p < 0.0014$

D) H_0: $p > 0.0014$ H_1: $p \leq 0.0014$

Find the value of the test statistic z using $z = \dfrac{\hat{p} - p}{\sqrt{\dfrac{pq}{n}}}$.

55) A claim is made that the proportion of children who play sports is less than 0.5, and the sample statistics include n = 1469 subjects with 30% saying that they play a sport. 55) _____

A) 31.29 B) −31.29 C) −15.33 D) 15.33

56) The claim is that the proportion of accidental deaths of the elderly attributable to residential falls is more than 0.10, and the sample statistics include n = 800 deaths of the elderly with 15% of them attributable to residential falls. 56) _____

A) −4.71 B) 4.71 C) 3.96 D) −3.96

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

57) A psychologist claims that more than 7.1% of adults suffer from extreme shyness. Identify the type II error for the test. 57) _____

A) Reject the claim that the percentage of adults who suffer from extreme shyness is equal to 7.1% when that percentage is actually greater than 7.1%.

B) Fail to reject the claim that the percentage of adults who suffer from extreme shyness is equal to 7.1% when that percentage is actually greater than 7.1%.

C) Fail to reject the claim that the percentage of adults who suffer from extreme shyness is equal to 7.1% when that percentage is actually less than 7.1%.

D) Reject the claim that the percentage of adults who suffer from extreme shyness is equal to 7.1% when that percentage is actually 7.1%.

58) A medical researcher claims that 3% of children suffer from a certain disorder. Identify the type I error for the test. 58) _____

A) Fail to reject the claim that the percentage of children who suffer from the disorder is equal to 3% when that percentage is actually different from 3%.

B) Reject the claim that the percentage of children who suffer from the disorder is different from 3% when that percentage really is different from 3%.

C) Reject the claim that the percentage of children who suffer from the disorder is equal to 3% when that percentage is actually 3%.

D) Fail to reject the claim that the percentage of children who suffer from the disorder is equal to 3% when that percentage is actually 3%.

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

Test the given claim. Use the P–value method or the traditional method as indicated. Identify the null hypothesis, alternative hypothesis, test statistic, critical value(s) or P–value, conclusion about the null hypothesis, and final conclusion that addresses the original claim.

59) The maximum acceptable level of a certain toxic chemical in vegetables has been set at 0.4 parts per million (ppm). A consumer health group measured the level of the chemical in a random sample of tomatoes obtained from one producer. The levels, in ppm, are shown below. 59) _____

0.31	0.47	0.19	0.72	0.56
0.91	0.29	0.83	0.49	0.28
0.31	0.46	0.25	0.34	0.17
0.58	0.19	0.26	0.47	0.81

Do the data provide sufficient evidence to support the claim that the mean level of the chemical in tomatoes from this producer is greater than the recommended level of 0.4 ppm? Use a 0.05 significance level to test the claim that these sample levels come from a population with a mean greater than 0.4 ppm. Use the P–value method of testing hypotheses. Assume that the standard deviation of levels of the chemical in all such tomatoes is 0.21 ppm.

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

Determine whether the given conditions justify using the margin of error $E = z_{\alpha/2}\,\sigma/\sqrt{n}$ when finding a confidence interval estimate of the population mean μ.

60) The sample size is $n = 14$, σ is not known, and the original population is normally distributed. 60) _____
A) No B) Yes

61) The sample size is $n = 259$ and $\sigma = 17$. 61) _____
A) Yes B) No

Use the given information to find the minimum sample size required to estimate an unknown population mean μ.

62) How many weeks of data must be randomly sampled to estimate the mean weekly sales of a new line of athletic footwear? We want 95% confidence that the sample mean is within \$200 of the population mean, and the population standard deviation is known to be \$1300. 62) _____
A) 115 B) 281 C) 163 D) 230

63) How many women must be randomly selected to estimate the mean weight of women in one age group. We want 90% confidence that the sample mean is within 2.7 lb of the population mean, and the population standard deviation is known to be 22 lb. 63) _____
A) 181 B) 178 C) 180 D) 256

64) Margin of error: \$140, confidence level: 95%, σ = \$589 64) _____
A) 60 B) 96 C) 68 D) 48

Assume that a sample is used to estimate a population mean μ. Use the given confidence level and sample data to find the margin of error. Assume that the sample is a simple random sample and the population has a normal distribution. Round your answer to one more decimal place than the sample standard deviation.

65) 95% confidence; $n = 91$; $\bar{x} = 24$, $s = 14.7$ 65) _____
A) 5.26 B) 2.75 C) 3.06 D) 2.62

66) 95% confidence; $n = 51$; $\bar{x} = 240$; $s = 242$ 66) _____

A) 88.5 B) 143.0 C) 61.3 D) 68.1

Solve the problem.

67) A newspaper article about the results of a poll states: "In theory, the results of such a poll, in 99 cases out of 100 should differ by no more than 2 percentage points in either direction from what would have been obtained by interviewing all voters in the United States." Find the sample size suggested by this statement. 67) _____

A) 2402 B) 4145 C) 3394 D) 165

68) The following confidence interval is obtained for a population proportion, p: (0.862, 0.894). Use these confidence interval limits to find the point estimate, $\hat{p}$. 68) _____

A) 0.885 B) 0.862 C) 0.894 D) 0.878

Use the confidence level and sample data to find a confidence interval for estimating the population μ. Round your answer to the same number of decimal places as the sample mean.

69) 48 packages are randomly selected from packages received by a parcel service. The sample has a mean weight of 10.1 pounds and a standard deviation of 2.9 pounds. What is the 95% confidence interval for the true mean weight, μ, of all packages received by the parcel service? 69) _____

A) 9.0 lb < μ < 11.2 lb B) 9.3 lb < μ < 10.9 lb

C) 9.1 lb < μ < 11.1 lb D) 9.4 lb < μ < 10.8 lb

70) A random sample of 112 full–grown lobsters had a mean weight of 22 ounces and a standard deviation of 3.8 ounces. Construct a 98% confidence interval for the population mean μ. 70) _____

A) 21 oz < μ < 23 oz B) 21 oz < μ < 24 oz

C) 20 oz < μ < 22 oz D) 22 oz < μ < 24 oz

71) Test scores: $n = 99$, $\bar{x} = 88.6$, $\sigma = 7.7$; 99% confidence 71) _____

A) 86.6 < μ < 90.6 B) 87.1 < μ < 90.1 C) 87.3 < μ < 89.9 D) 86.8 < μ < 90.4

Do one of the following, as appropriate: (a) Find the critical value $z_{\alpha/2}$, (b) find the critical value $t_{\alpha/2}$, (c) state that neither the normal nor the t distribution applies.

72) 99%; $n = 17$; σ is unknown; population appears to be normally distributed. 72) _____

A) $t_{\alpha/2} = 2.898$ B) $z_{\alpha/2} = 2.583$ C) $t_{\alpha/2} = 2.921$ D) $z_{\alpha/2} = 2.567$

73) 98%; $n = 7$; $\sigma = 27$; population appears to be normally distributed. 73) _____

A) $t_{\alpha/2} = 1.96$ B) $t_{\alpha/2} = 2.575$ C) $z_{\alpha/2} = 2.33$ D) $z_{\alpha/2} = 2.05$

74) 90%; $n = 9$; $\sigma = 4.2$; population appears to be very skewed. 74) _____

A) $z_{\alpha/2} = 2.365$

B) Neither the normal nor the t distribution applies.

C) $z_{\alpha/2} = 2.306$

D) $z_{\alpha/2} = 2.896$

Formulate the indicated conclusion in nontechnical terms. Be sure to address the original claim.

75) Carter Motor Company claims that its new sedan, the Libra, will average better than 21 miles per gallon in the city. Assuming that a hypothesis test of the claim has been conducted and that the conclusion is to reject the null hypothesis, state the conclusion in nontechnical terms. 75) _____

A) There is not sufficient evidence to support the claim that the mean is greater than 21 miles per gallon.
B) There is not sufficient evidence to support the claim that the mean is less than 21 miles per gallon.
C) There is sufficient evidence to support the claim that the mean is greater than 21 miles per gallon.
D) There is sufficient evidence to support the claim that the mean is less than 21 miles per gallon.

76) A skeptical paranormal researcher claims that the proportion of Americans that have seen a UFO, p, is less than 2 in every ten thousand. Assuming that a hypothesis test of the claim has been conducted and that the conclusion is failure to reject the null hypothesis, state the conclusion in nontechnical terms. 76) _____

A) There is sufficient evidence to support the claim that the true proportion is greater than 2 in ten thousand.
B) There is sufficient evidence to support the claim that the true proportion is less than 2 in ten thousand.
C) There is not sufficient evidence to support the claim that the true proportion is greater than 2 in ten thousand.
D) There is not sufficient evidence to support the claim that the true proportion is less than 2 in ten thousand.

1) A
2) B
3) D
4) D
5) C
6) A
7) C
8) D
9) C
10) C
11) B
12) D
13) A
14) A
15) C
16) A
17) C
18) C
19) A
20) B
21) H_0: $p = 0.03$. H_1: $p > 0.03$. Test statistic: $z = 1.57$. P–value: $p = 0.0582$.
Critical value: $z = 2.33$. Fail to reject null hypothesis. There is not sufficient evidence to warrant rejection of the manager's claim that production is not really out of control.
22) H_0: $p = 0.11$. H_1: $p \neq 0.11$. Test statistic: $z = 4.61$. P–value: $p = 0.0001$.
Critical values: $z = \pm 1.96$. Reject null hypothesis. There is sufficient evidence to warrant rejection of the claim that the proportion of all children in the town who suffer from asthma is 11%.
23) H_0: $\mu = 200$; H_1: $\mu < 200$; Test statistic: $z = -0.98$. P–value: 0.1635. Fail to reject H_0. There is not sufficient evidence to support the claim that the mean is less than 200 pounds.
24) H_0: $p = 0.5$. H_1: $p < 0.5$. Test statistic: $z = -1.31$. P–value: $p = 0.0951$.
Critical value: $z = -1.645$. Fail to reject null hypothesis. There is not sufficient evidence to warrant rejection of the claim that at least half of all voters prefer the Democrat.
25) H_0: $\mu = 39.9$; H_1: $\mu \neq 39.9$. Test statistic: $z = 3.75$. P–value: 0.0002. Reject H_0. There is sufficient evidence to warrant rejection of the claim that the mean equals 39.9 cm.
26) B
27) B
28) B
29) C
30) D
31) $\alpha = 0.01$
Test statistic: $t = 1.607$
P–value: $p = 0.1289$
Critical values: $t = \pm 2.947$
Because the test statistic, $t < 2.947$, we do not reject the null hypothesis. There is not sufficient evidence to warrant rejection of the claim that the mean score is 80.
32) H_0: $\mu = 900$ hrs. H_1: $\mu \neq 900$ hrs. Test statistic: $t = -4.342$. P–value < 0.01. Reject H_0. There is sufficient evidence to warrant rejection of the claim that the sample is from a population with a mean life of 900 hours. The light bulbs do not appear to conform to the manufacturer's specifications.

33) H_0: $\mu = 520$ hrs. H_1: $\mu > 520$ hrs. Test statistic: $t = 2.612$.
$0.01 <$ P–value < 0.025. Reject H_0. There is sufficient evidence to support the claim that the mean is greater than 520 hours.
34) $\alpha = 0.1$
Test statistic: $t = 1.57$
P–value: $p = 0.1318$
Critical values: $t = \pm 1.729$
Because the test statistic, $t < 1.729$, we fail to reject the null hypothesis. There is not sufficient evidence to warrant rejection of the claim that $\mu = 132$ lb.
35) H_0: $\mu = 35.0$. H_1: $\mu \neq 35.0$. Test statistic: $t = 7.252$. Critical values: $t = -2.861, 2.861$. Reject H_0. There is sufficient evidence to warrant rejection of the claim that the mean is equal to 35.0.
36) H_0: $\mu = 10$ min. H_1: $\mu < 10$ min. Test statistic: $t = -5.136$. P–value < 0.005. Reject H_0. There is sufficient evidence to support the claim that the mean is less than 10 minutes.
37) $\alpha = 0.01$
Test statistic: $t = 2.6898$
P–value: $p = 0.0066$
Critical value: $t = 2.508$
Because the test statistic, $t > 2.508$, we reject the null hypothesis. There is sufficient evidence to accept the claim that $\mu > 220{,}000$ miles.
38) D
39) A
40) D
41) C
42) A
43) D
44) B
45) A
46) D
47) C
48) D
49) C
50) A
51) A
52) D
53) D
54) C
55) C
56) B
57) B
58) C
59) H_0: $\mu = 0.4$ ppm
H_1: $\mu > 0.4$ ppm
Test statistic: $z = 0.95$
P–value: 0.1711
Do not reject H_0; At the 5% significance level, the data do not provide sufficient evidence to support the claim that the mean level of the chemical in tomatoes from this producer is greater than the recommended level of 0.4 ppm.
60) A
61) A
62) C

63) C
64) C
65) C
66) D
67) B
68) D
69) B
70) A
71) A
72) C
73) C
74) B
75) C
76) D