Sample Exam 2

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

Question 1–3: The foreman of a bottling plant has observed that the amount of soda in each 32–ounce bottle is actually a normal distributed random variable, with a mean of 32.2 ounces and a standard deviation of 0.3 ounce. A customer buys a carton of four bottles.

1) What is the probability that the mean amount of the four bottles will be greater than 32.5 ounces?
   A) 0.9332 B) 0.9772 C) 0.0228 D) 0.0359

2) What is the probability that the mean amount of the four bottles will be between 31.8 and 32.4 ounces?
   A) 0.9044 B) 0.9734 C) 0.1332 D) 0.9082

3) Below what amount does 55.96% of the mean amount fall?
   A) 32.284 B) 32.223 C) 32.178 D) 32.116

4) A statistics practitioner took a random sample of 60 observations from a population whose standard deviation is 25 and computed the sample mean to be 100. The 90% confidence interval for the mean will be between _____ and _____.
   A) 94.69 and 105.31 B) 94.59 and 105.41 C) 91.67 and 108.33 D) 93.67 and 106.33

5) A statistics practitioner took a random sample of 60 observations from a population whose standard deviation is 25 and computed the sample mean to be 100. If the 95% confidence interval for the mean is 100 ± 6.33. Find the lower and upper limits and interpret this interval.
   A) We are 95% confidence that the sample mean is between 93.67 and 106.33
   B) 95% of the sample mean is between 93.67 and 106.33
   C) We are 95% confidence that the true proportion is between 93.67 and 106.33
   D) We are 95% confidence that the true mean is between 93.67 and 106.33

6) A university dean is interested in determining the proportion of students who receive some sort of financial aid. Rather than examine the records for all students, the dean randomly selects 200 students and finds that 118 of them are receiving financial aid. Use a 90% confidence interval to estimate the true proportion of students who receive financial aid.
   A) 0.59 ± 0.035 B) 0.59 ± 0.059 C) 0.59 ± 0.057 D) 0.59 ± 0.090

7) A university dean is interested in determining the proportion of students who receive some sort of financial aid. The dean randomly selects 200 students and finds that 118 of them are receiving financial aid. The 95% confidence interval for p is 0.59 ± 0.068. Find the lower and upper limits and interpret this interval.
   A) We are 95% confident that the true proportion of all students receiving financial aid is between 52.2% and 65.8%.
   B) We are 95% confident that 59% of the students are on some sort of financial aid.
   C) We are 95% confident that between 52.2% and 65.8% of the sampled students receive some sort of financial aid.
   D) 95% of the students get between 52.2% and 65.8% of their tuition paid for by financial aid.

8) A major department store chain is interested in estimating the average amount its credit card customers spent on their first visit to the chain's new store in the mall. Fifteen credit card accounts were randomly sampled and analyzed with the following results: $\overline{X} = \$60.50$ and $s^2 = 400$. Construct a 90% confidence interval for the mean.
   A) $\$60.50 \pm \$10.12$ B) $\$60.50 \pm \$11.08$ C) $\$60.50 \pm \$8.50$ D) $\$60.50 \pm \$9.10$

Question 9–11: The owner of a local nightclub has recently surveyed a random sampled of 100 customers of the club with: $\overline{X}$ = 21.73, s = 3.8. She would like to determine whether or not the mean age of her customers is over 21.

9) Give the null and alternative hypotheses.

A) H_0: $\mu \geq 21$ and H_1: $\mu < 21$

B) H_0: $\mu \leq 21$ and H_1: $\mu > 21$

C) H_0: $\mu = 21$ and H_1: $\mu \neq 21$

D) H_0: $\overline{X} \leq 21.73$ and H_1: $\overline{X} > 21.73$

10) Using the sample information provided, calculate the value of the test statistic.

A) $t = (21.73 - 21) / (3.8/10)$

B) $t = (21.73–21) / 3.8$

C) $t = (21–21.73) / (3.8/10)$

D) $t = (21.73–21) / (3.8/10^2)$

11) Suppose $\alpha = 0.05$. Which of the following is correct?

A) At $\alpha = 0.05$, we accept H_0.

B) At $\alpha = 0.05$, we fail to reject H_0.

C) At $\alpha = 0.05$, we reject H_0.

D) No decision should be make

12) If, as a result of a hypothesis test, we reject $H0$ when $H0$ is true, then we have committed

A) no error.

B) a Type I error.

C) a Type II error.

13) When testing $H_0 : \mu_1 - \mu_2 = 0$ versus $H_1 : \mu_1 - \mu_2 \neq 0$, the test statistic was found to be –2.13. Suppose $\alpha = 0.05$, which of the following is correct ?

A) with *p–value*=0.0332, we reject H_0

B) with *p–value*=0.9834, we fail to reject H_0

C) with *p–value*=0.0166, we reject H_0

D) with *p–value*=0.0332, we fail to reject H_0

Question 14–16: A corporation randomly selects 100 salespeople and finds that 70 salespeople would like to take a self–improvement course. The firm did a similar study 10 years ago in which 61 salespeople out of a random sample of 120 salespeople wanted a self–improvement course. The groups are assumed to be independent random samples. Let p_1 and p_2 represent the true proportion of workers who would like to attend a self–improvement course in the recent study and the past study, respectively.

14) If the firm wanted to test if this proportion has changed from the previous study, which represents hypotheses?

A) H_0: $p_1 - p_2 \neq 0$ versus H_1: $p_1 - p_2 = 0$

B) H_0: $p_1 - p_2 \leq 0$ versus H_1: $p_1 - p_2 > 0$

C) H_0: $p_1 - p_2 \geq 0$ versus H_1: $p_1 - p_2 < 0$

D) H_0: $p_1 - p_2 = 0$ versus H_1: $p_1 - p_2 \neq 0$

15) Which equation should be used to compute the value of the test statistic ?

A) eq 10.2

B) eq 10.9

C) eq 10.7

D) eq 10.16

16) The company tests to determine at the 0.05 level whether the population proportion has changed from the previous study. Which of the following is most correct if the test statistic is 2.884?

A) fail to reject the null hypothesis, there is not enough evidence to conclude that the proportion of employees who are interested in a self–improvement course has not changed over the intervening 10 years.

B) Reject the null hypothesis and conclude that the proportion of employees who are interested in a self–improvement course has changed over the intervening 10 years.

C) fail to reject the null hypothesis, there is not enough evidence to conclude that the proportion of employees who are interested in a self–improvement course has changed over the intervening 10 years.

D) Reject the null hypothesis and conclude that the proportion of employees who are interested in a self–improvement course has not changed over the intervening 10 years.

Question 17–18: We want to test H_0: $\mu = 55$ versus H_1: $\mu \neq 55$ at $\alpha = 0.01$. The population standard deviation equals to 18. Suppose that the sample of 36 observations indicates a sample mean of 50.

17) What is the test statistic of the test?

A) 31.667 B) –1.667 C) –2.500 D) 1.667

18) Which of the following is correct ($\alpha = 0.01$) ?

A) since the test statistic is greater than the critical value, we fail to reject H_0

B) since the test statistic is greater than the critical value, we reject H_0

C) since the test statistic is less than the critical value, we fail to reject H_0

D) since the test statistic is less than the critical value, we reject H_0

Question 19–20: A real estate company is interested in testing whether, on average, families in Gotham have been living in their current homes for less time than families in Metropolis have. A random sample of 35 families from Gotham and a random sample of 40 families in Metropolis yield the following data on length of residence in current homes.

Gotham: $\overline{X}_G = 35$ months, $S^2_G = 900$

Metropolis: $\overline{X}_M = 50$ months, $S^2_M = 1050$

19) Which of the following represents the relevant hypotheses tested by the real estate company?

A) $H_0 : \overline{X}_G - \overline{X}_M \geq 0$ versus $H_1 : \overline{X}_G - \overline{X}_M < 0$ B) $H_0 : \mu_G - \mu_M \leq 0$ versus $H_1 : \mu_G - \mu_M > 0$

C) $H_0 : \mu_G - \mu_M = 0$ versus $H_1 : \mu_G - \mu_M \neq 0$ D) $H_0 : \mu_G - \mu_M \geq 0$ versus $H_1 : \mu_G - \mu_M < 0$

20) Suppose $\alpha = 0.01$. Which of the following represents the result of the relevant hypothesis test if the test statistic $t_{cal} = -1.803$ *and* $df = 72.75$?

A) can't find the level of significant. B) reject H_0.

C) fail to reject H_0. D) no decision.

Answer Key
Testname: SAMPLE_TEST2.TST

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

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