

KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DEPARTMENT OF MATHEMATICAL SCIENCES

DHAHRAN, SAUDI ARABIA

STAT 212: BUSINESS STATISTICS II

Term 211

First Major Exam

Tuesday October 5, 2021

Section #	Class time
1	10:00 AM
2	11:00 AM
3	9:00 AM

Name:

ID#:

Section:

Serial:

Answer Sheet

1	a	b	c	d	e
2	a	b	c	d	e
3	a	b	c	d	e
4	a	b	c	d	e
5	a	b	c	d	e
6	a	b	c	d	e

13	a	b	c	d	e
14	a	b	c	d	e
15	a	b	c	d	e
16	a	b	c	d	e
17	a	b	c	d	e
18	a	b	c	d	e

7	a	b	c	d	e
8	a	b	c	d	e
9	a	b	c	d	e
10	a	b	c	d	e
11	a	b	c	d	e
12	a	b	c	d	e

19	a	b	c	d	e
20	a	b	c	d	e
21	a	b	c	d	e
22	a	b	c	d	e
23	a	b	c	d	e
24	a	b	c	d	e

1. If a hypothesis test leads to rejecting the null hypothesis, then
 - a. a type I error might have been committed.
 - b. a type II error might have been committed.
 - c. a type I error is committed.
 - d. a type II error is committed
 - e. we cannot tell.

2. In a hypothesis test, the p-value measures
 - a. the area of the region beyond the test statistic value.
 - b. the probability that the alternative hypothesis is true.
 - c. the area of the rejection region.
 - d. the probability of a type II error.
 - e. the size of the test.

3. In two-tailed hypothesis test is used when the null hypothesis looks like the following
 - a. $H_0: \mu_1 - \mu_2 = 2$.
 - b. $H_0: \mu_1 - \mu_2 \leq 2$.
 - c. $H_0: p > 0.5$.
 - d. $H_0: \pi_1 - \pi_2 \neq 2$.
 - e. $H_0: \bar{x} = 0.5$

4. A hypothesis test for the difference between two means is considered a two-tailed test when:
 - a. The null hypothesis states that the population means are equal.
 - b. The population variances are equal.
 - c. The alpha level is 0.05 or higher.
 - d. The p-value less than alpha.
 - e. None of the choices.

5. A hypothesis test is to be conducted using an alpha = .05 level. This means:
 - a. There is a maximum 5% chance that a true null hypothesis will be rejected.
 - b. There is a 5% chance that the null hypothesis is true.
 - c. There is a 5% chance that the alternative hypothesis is true.
 - d. There is a maximum 5% chance that a Type II error has been committed.
 - e. The maximum power of the test is 5%.

6. For testing the null hypothesis $H_0: \pi_1 - \pi_2 \leq 0$, given that $n_1 = 265$, $n_2 = 285$, $x_1 = 106$, $x_2 = 57$, the **test statistic** value equals to
 - a. 5.132
 - b. 5.322
 - c. 2.344
 - d. 4.863
 - e. 4.368

A company manager wishes to investigate the effectiveness of two methods for training new sales people, namely type A training & type B training. To conduct his investigation, he selected a number of trainees who were randomly divided into two experimental groups – one receives type A and the other type B training. When he reviewed the performances of the salespeople in the two groups, he found the following results:

	A group	B group
Number of trainees	25	36
Average weekly sales (in \$)	1500	1300
Standard deviation (in \$)	225	251

Use the above information to answer the following questions

7. If the manager wanted to test that the mean weekly sales of the type B group exceeds \$1220, then the **null hypothesis** is
 - a. $H_0: \mu_B \leq 1220$.
 - b. $H_0: \mu_B > 1220$.
 - c. $H_0: \bar{x}_B > 1220$.
 - d. $H_0: \bar{x}_B = 1220$.
 - e. $H_0: \bar{x}_B \leq 1220$

8. If the manager wanted to test that the mean weekly sales of the type B group exceeds \$1220, then the **p-value** of the test is
 - a. 0.0279.
 - b. 0.9721
 - c. 0.0139
 - d. 0.0558
 - e. 0.0391

9. The manager claimed that type A training would increase the weekly sales by more than \$50 rather than type B training. At the 2% level of significance, the **alternative hypothesis** is
 - a. $H_1: \mu_A - \mu_B > 50$.
 - b. $H_1: \mu_A - \mu_B \leq 50$.
 - c. $H_1: \mu_A - \mu_B \geq 50$.
 - d. $H_1: \mu_A - \mu_B < 50$.
 - e. $H_1: \mu_B - \mu_A > 50$.

10. The manager claimed that type A training would increase the weekly sales by more than \$50 rather than type B training. At the 2% level of significance, the **pooled standard deviation** is
 - a. 240.763
 - b. 420.333
 - c. 342.019
 - d. 273.406
 - e. 326.247

11. The manager claimed that type A training would increase the weekly sales by more than \$50 rather than type B training. At the 2% level of significance, the **test statistic** is
- 2.393
 - 2.301
 - 3.209
 - 3.922
 - 3.765

A telephone company wants to determine whether the demand on a new security system varies between homeowners and renters. Two independent random samples of 25 homeowners and 20 renters were randomly selected. It was found that 10 out of the 25 homeowners (H) and 6 out of the 20 renters (R) would buy the new security system. Use these information to answer the following questions

12. The company wanted to test that the percentage of homeowners (H) is different from 30%. At the 6% level of significance, the **critical value of the test** is
- 1.88
 - 2.075
 - 1.555
 - 0.53
 - 2.51
13. The company wanted to test that the percentage of homeowners (H) is different from 30%. At the 6% level of significance, the **decision of the test** is
- There is no evidence that the percentage of homeowners is different from 30%.
 - There is evidence that the percentage of homeowners is different from 30%.
 - There is no evidence that the percentage of homeowners is 30%.
 - There is evidence that the percentage of homeowners is 30%.
 - None of the choices.
14. The company wanted to test that the percentage of homeowners (H) who would buy the security system is different from the percentage of renters (R). At the 4% level of significance, the **critical value of the test** is
- 2.05
 - 2.33
 - 1.75
 - 1.96
 - 2.85
15. The company wanted to test that the percentage of homeowners (H) who would buy the security system is different from the percentage of renters (R). At the 4% level of significance, the **test statistic** is
- 0.6964
 - 0.7054
 - 0.6497
 - 0.7288
 - 0.7524

The headquarters of a chain of stores collected the following data on customer ages from random samples taken at two store locations

	Location I	Location II
Sample size	19	11
Sample mean	40 years	35 years
Sample standard deviation	7 years	10 years

16. At the 2% significance level, the headquarters thought that there is no difference between the variances of the customers' ages of Location I and Location II stores. To test the claim of the headquarters, the **test statistic** is
- 2.041
 - 1.427
 - 1.143
 - 1.306
 - 2.983
17. At the 2% significance level, the headquarters thought that there is no difference between the variances of the customers' ages of Location I and Location II stores. To test the claim of the headquarters, the **degrees of freedom** are
- 10 & 18
 - 18 & 10
 - 11 & 19
 - 19 & 11
 - 9 & 6
18. At the 2% significance level, the headquarters thought that there is no difference between the variances of the customers' ages of Location I and Location II stores. To test the claim of the headquarters, the **critical value** is
- 3.508
 - 4.405
 - 3.366
 - 4.099
 - 7.976
19. At the 2.5% significance level, the headquarters thought that the variance of the customers' ages of Location-I stores don't exceed 81. To test the claim of the headquarters, the **alternative hypothesis** is
- $H_1: \sigma^2_I \leq 81$.
 - $H_1: \sigma^2_I \neq 81$.
 - $H_1: \sigma^2_I \geq 81$.
 - $H_1: \sigma^2_I > 81$.
 - $H_1: \sigma^2_I < 81$.

20. At the 2.5% significance level, the headquarters thought that the variance of the customers' ages of Location-I stores don't exceed 81. To test the claim of the headquarters, the **critical value** is
- 1.237
 - 1.635
 - 14.449
 - 12.592
 - 1.690
21. At the 2.5% significance level, the headquarters thought that the variance of the customers' ages of Location-I stores don't exceed 81. To test the claim of the headquarters, the **test statistic** is
- 10.889
 - 35.280
 - 14.000
 - 11.494
 - 14.778

A study of educational levels of **200** voters and their political party affiliations yielded the following results

Party Affiliation	Educational Level		
	Less than High School	High School Degree	College Degree
Democratic	40	30	30
Republican	20	35	45

	Less than High School	High School Degree	College Degree
Democratic	40	30	30
	30.00		37.50
	3.333	0.192	1.500
Republican	20	35	45
		32.50	
	3.333	0.192	

Cell Contents: Count
 Expected count
 Contribution to Chi-square

Using the above Minitab output and information, answer the following questions

22. Using a 2.5% level of significance, if you want to test that the Educational Level and the Party Affiliation are not related to each other, then the **expected frequency** of the Democratic voters with High School degree is
- 32.5
 - 30.0
 - 37.5
 - 1.50
 - 0.33
23. Using a 2.5% level of significance, if you want to test that the Educational Level and the Party Affiliation are not related to each other, then the **test contribution** of the Republican voters with College degree is
- 1.50
 - 30.0
 - 37.5
 - 32.5
 - 0.33
24. Using a 2.5% level of significance, if you want to test that the Educational Level and the Party Affiliation are not related to each other, then the **degrees of freedom** of the test is
- 2
 - 4
 - 5
 - 6
 - 3
25. Using a 2.5% level of significance, if you want to test that the Educational Level and the Party Affiliation are not related to each other, then the **test statistic** is
- 10.051
 - 4.890
 - 10.592
 - 5.117
 - 5.711