Prince Sultan University
Mathematics Department

STAT 271

Second Major

Fall, Term 171

December 12, 2017

Time Allowed: **90** minutes

Student Name: _____

Student ID #: _____

Time:

Teacher Dr. Benson

Important Instructions:

1. You may use a scientific calculator that does not have programming or graphing capabilities.
2. You may NOT borrow a calculator from anyone.
3. You may NOT use notes or any textbook.
4. There should be NO talking during the examination.
5. Your exam will be taken immediately if your mobile phone is seen or heard
6. Looking around or making an attempt to cheat will result in your exam being cancelled
7. This examination has 15 problems, some with several parts. Make sure your paper has all these problems.

Problems	Max points	Student's Points
1	10	
2	15	
3	20	
4	10	
5	15	
6	10	
Total	**80**	**/80 = %**

10 points

1. Two methods of memorizing difficult material are being tested to determine if one produces better retention. Nine pairs of students are included in the study. The students in each pair are matched according to IQ and academic background and then assigned to the two methods at random. A memorization test is given to all the students, and the following scores are obtained:

	Pair								
	1	2	3	4	5	6	7	8	9
Method *A*	90	86	72	65	44	52	66	38	83
Method *B*	85	87	70	62	44	53	62	35	86

At $\alpha = 0.05$ test to determine if there is a significant difference in the effectiveness of the two methods. **(5 Points)**

15 points

2. A survey was conducted to study people's attitude toward television programs that show violence. A random sample of 1200 adults was selected and classified according to gender and response to the question: Do you think there is a link between violence on TV and crime? **(15 Points)**

	Response		
	Yes	No	Not Sure
Male	361	228	17
Female	433	141	20

Do the survey data show a significant association between attitude and gender?

20 points

3. The U.S. Department of Labor collects data on unemployment insurance payments. Suppose that during 2009 a random sample of 70 unemployed people in Alabama received an average weekly benefit of $199.65, whereas a random sample of 65 unemployed people in Mississippi received an average weekly benefit of $187.93. Assume that the population standard deviations of all weekly unemployment benefits in Alabama and Mississippi are $32.48 and $26.15, respectively.
   a. Let μ_1 and μ_2 be the means of all weekly unemployment benefits in Alabama and Mississippi paid during 2009, respectively. What is the point estimate of $\mu_1 - \mu_2$?**(5 points)**

   b. Construct a 96% confidence interval for $\mu_1 - \mu_2$. **(5 points)**

   c. Using the 4% significance level, can you conclude that the means of all weekly unemployment benefits in Alabama and Mississippi paid during 2009 are different? **(5 points)**

   d. Find the p-value of this test. **(5 points)**

10 points

4. **Carbohydrates in Fast Foods** The number of carbohydrates found in a random sample of fast-food entrees is listed below. Is there sufficient evidence to conclude that the variance differs from 100? Use the 0.05 level of significance. **(10 Points)**

53	46	39	39	30
47	38	73	43	41

Source: Fast Food Explorer (www.fatcalories.com).

15 points

5. The following statistics were calculated: **(Data are summarized)**

Sample				
Statistic	1	2	3	4
n	7	14	9	16
$\overline{x}$	30	35	33	42
s^2	10	20	10	15

Complete the **ANOVA** table, and use it to test **(15 Points)**

$H_0 : \mu_1 = \mu_2 = \mu_3 = \mu_4$ *vs* H_A : at least one differs Use $\alpha = 0.05$

10 points

6. Khaled is the budget director for Nuxus Media, Inc. He would like to compare the daily travel expenses for the sales staff and the audit staff. He collected the following sample information. **Use Traditional Method Only**

Sales($)	131	135	146	165	136	142	
Audit($)	130	102	129	143	149	120	139

a. At the .10 significance level, can he conclude that the mean daily expenses are greater for the sales staff than the audit staff? **Assume equal population variances** **(5 Points)**

b. Construct a 95% confidence interval for the difference between the population means. **(5 Points)**