KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF MATHEMATICS & STATISTICS
DHAHRAN, SAUDI ARABIA

STAT 212: Statistics for Business II
Semester 161
Second Major Exam
Wednesday November 09, 2016
8:30 pm

Please circle your instructor's name:

Abbas Al-Sawi

Name: ID #: Section #: Serial #:

Question No	Full Marks	Marks Obtained
1	**27**	
2	**15**	
3	**11**	
4	**07**	
Total	**60**	

Note: In Q1 round up to at least 6 decimal points. In the other questions, round up to 4 decimal points (if needed).

Q.No.1:- The management of a chain electronic store would like to develop a model for predicting the weekly sales (in thousand of dollars) for individual stores based on the number of customers who made purchases. A random sample of 12 stores yields the following results:

	Customers	Sales ($1000)	$(\text{Customers})^2$	$(\text{Sales})^2$	(Customers)*(Sales)
1	907	11.2	822649	125.44	10158.4
2	926	11.05	857476	122.1025	10232.3
3	713	8.21	508369	67.4041	5853.73
4	741	9.21	549081	84.8241	6824.61
5	780	9.42	608400	88.7364	7347.6
6	898	10.08	806404	101.6064	9051.84
7	510	6.73	260100	45.2929	3432.3
8	529	7.02	279841	49.2804	3713.58
9	460	6.12	211600	37.4544	2815.2
10	872	9.52	760384	90.6304	8301.44
11	650	7.53	422500	56.7009	4894.5
12	603	7.25	363609	52.5625	4371.75
Sum	**8589**	**103.34**	**6450413**	**922.035**	**76997.25**

(i) What is the value of the sample coefficient of correlation? Interpret it. (5 pts.)

(ii) Estimate the mean change in weekly sales for each additional purchasing customer. (2 pts.)

(iii) Find the least square regression line equation? (2 pts.)

(iv) Find an estimate for the error variance? (2 pts.)

(v) How much of the total variation in weekly sales can be explained by the variation in the number of customers who make purchases? (2 pts.)

(vi) Test the claim “increase in the number of customers who make a purchase, increases weekly sales” at 1% probability of committing a type I error. (5 pts.)

(vii) Construct a 95% confidence interval for the mean change in weekly sales for each additional purchasing customer. (4 pts.)

(viii) Predict the weekly sales when the number of customers who make purchases is 603. Also find the magnitude of corresponding residual? (2 pts.)

(ix) Construct a 95% confidence interval for the mean weekly sales when the number of customers who make purchases is 603. (3 pts.)

Q.No.2:- According to an article in Marketing News, fewer checks are being written at the grocery store checkout than in the past. To determine whether there is a difference in the proportion of shoppers who pay by check among three consecutive years at a 0.05 level of significance, the results of a survey of 500 shoppers in three consecutive years are obtained and presented below.

Check Written	Year		
	Year 1	Year 2	Year 3
Yes	225	175	125
No	275	325	375

(a) What is your conclusion based the above data?

The hypotheses (1 pts.):

Decision Rule (1 pt.):

The test statistic (4 pts.):

Critical value(s) (1 pts.):

Decision and Conclusion (2 pts.):

(b) If appropriate, use the Marascuilo procedure at 1% level of significance to determine which proportions are different. (6 points)

Q.No.3:- Recent studies have found that American children are more obese (fat) than in the past. The amount of time children spent watching television has received much of the blame. A survey of 100 ten-year-olds revealed the following with regards to weights and average number of hours a day spent watching television. We are interested in testing whether the mean number of hours spent watching TV and weights are independent at 1% level of significance.

Weights	TV Hours			**Total**
	0-3	3-6	6+	
More than 10 lbs. overweight	1	9	20	**30**
Within 10 lbs. of normal weight	20	15	15	**50**
More than 10 lbs. underweight	10	5	5	**20**
Total	**31**	**29**	**40**	**100**

(a) If there is no connection between weights and average number of hours spent watching TV, we should expect how many children to be spending 3-6 hours on average watching TV and are more than 10 lbs. underweight? (2 pts.)

(b) Can we conclude that mean number of hours spent watching TV and weights are independent at 1% level of significance.

The Hypotheses: (1 pt.)

Decision Rule: (1 pts.)

Test Statistic: (4 pts.)

Critical value(s): (1 pt.)

Decision and conclusion: (2 pts.)

Q.No.4:- A fast food restaurant that sells burritos is concerned about the variability in the amount of filling that different employees place in the burritos. To achieve product consistency they need the variance to be no more than 1.7 ounces^2. A sample of $n = 18$ burritos showed a sample variance of 2.89 ounces^2. Using a 0.10 level of significance, what can you conclude about the product consistency?

The Hypotheses: (1 pt.)

Decision Rule: (1 pt.)

Test Statistic: (2 pts.)

Critical value(s): (1 pt.)

Decision and conclusion: (2 pts.)