BUS 365 Second Exam. Sample 1. Answers

Name: _____

There are twelve questions on this exam, all graded on four (4) points. Infamous question 13 is graded on two points (2) only. The extra-credit problem is worth ten (10) points.

The first four questions relate to the following situation:

The Foxboro Company is considering moving its sales office to the area around the town of Pittsburgh, Pennsylvania. The company sells financial services to households that earn more than $ 100,000 a year. The management of Foxboro is interested in determining in which of the five counties it should locate its sales office.

County	Percentage of Households			Number of Households
	$ 100,000- $ 149,999	$ 150,000 $ 199,999	more than $ 200,000	
Allegheny	12.7	4.8	4.8	527,445
Armstrong	10.0	2.2	1.7	28,616
Butler	14.9	5.8	5.0	74,138
Clarion	8.6	2.1	1.9	15,846
Westmoreland	13.1	4.1	3.1	151,489

1. In which of the five counties is there the greatest number of households with an income above $200,000?

   *(a) Allegheny
   (b) Armstrong
   (c) Butler
   (d) Clarion
   (e) Westmoreland

2. What is the average percentage of households in Allegheny and Butler Counties that have an income above $150,000?

   (a) 10.2 percent
   *(b) 9.7 percent
   (c) 20.4 percent
   (d) 5.3 percent
   (e) 4.9 percent

3. What is the average percentage of all households, in all five counties, that have an income above $100,000?

   (a) 6.3 percent
   (b) 12.8 percent
   (c) 19.0 percent
   *(d) 21.7 percent
   (e) 11.9 percent

4. What is the percentage of all households, in all five counties, that have an income below $100,000?

   (a) 81.0 percent
   *(b) 78.3 percent
   (c) 88.1 percent
   (d) 93.7 percent
   (e) 87.2 percent

The next three questions relate to the following problem:

John Smith is a financial planner for Foxboro, and he has a potential customer who is interested in investing her retirement funds with the company. For his first meeting with the customer, John has gathered the following information:

	Percentage Return on Investment		
Year	S&P-500	3-mo T-Bills	10-year T-bonds
2001	−11.85	3.67	5.57
2002	−21.97	1.66	15.12
2003	28.36	1.03	0.38
2004	10.74	1.23	4.49
2005	4.83	3.01	2.87
2006	15.61	4.68	1.96
2007	5.48	4.64	10.21
2008	−36.55	1.59	20.10
2009	25.94	0.14	−11.12
2010	14.82	0.13	8.46
2011	2.10	0.03	16.04
2012	15.89	0.05	2.97
2013	32.15	0.07	−9.10
2014	13.52	0.05	10.75
2015	1.36	0.21	1.28

5. What has been the average annual return, over the past fifteen years, on an investment that is indexed to the S&P-500?

   *(a) 4.95 percent
   (b) 6.69 percent
   (c) 17.44 percent
   (d) 8.46 percent
   (e) 3.98 percent

6. What has been the average return, over the past fifteen years, for an investment that is placed in 10-year Treasury bonds?

   *(a) 5.00 percent
   (b) 5.33 percent
   (c) 7.88 percent
   (d) 3.65 percent
   (e) 2.61 percent

7. Assuming that the future returns of an investment that is indexed on the S&P-500 are similar to the average returns obtained over the past TEN years—since 2006, therefore—and assuming the customer has $75,000 in her retirement fund, how much should she anticipate having when she retires, 25 years from now?

   *(a) $ 431,223
   (b) $ 135,883
   (c) $ 80,435
   (d) $ 250,970
   (e) $ 725,127

8. Actually, the S&P-500 results are generally higher than they have been in the past fifteen years. The average over the period 1928 to 2015 has been 9.5 percent. Assuming the customer has $75,000 in her retirement fund, how much should she anticipate having when she retires, 25 years from now, if the historical average holds?

   (a) $ 431,223
   (b) $ 135,883
   (c) $ 80,435
   (d) $ 250,970
   *(e) $ 725,127

The next four questions refer to the following problem:

We created in class a linear regression model that was meant to forecast the operating revenues of all U.S. airlines. We started with a model that had four independent variables and obtained the results below. The dependent variable (airlines' revenues) was expressed in thousands of dollars.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.846113237
R Square	0.71590761
Adjusted R Square	0.691729534
Standard Error	4151539.905
Observations	52

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	2.04133E+15	5.10333E+14	29.60978438	2.55447E-12
Residual	47	8.10058E+14	1.72353E+13		
Total	51	2.85139E+15			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-107198023.5	70883091.94	-1.512321494	0.137147608
Passengers	-0.819835978	0.48975718	-1.673964184	0.100780923
Number of Flights	-34.62054016	15.01209487	-2.306176484	0.025558596
Load Factors	1868371.103	1167838.109	1.599854541	0.116332304
Seat Miles	1.085458149	0.2146667	5.05648127	6.94793E-06

Figure 1: First Regression Results

9. From these results, what can you conclude about the influence of the variable called "passengers," which refers to passenger volume per quarter?

   (a) Its coefficient is -0.8198, which means that, for each additional passenger transported, the airlines lose \$ 819.80.

   *(b) The p-value of the t-test for this variable is 0.10078, which means that the coefficient of this variable is 0, and passenger volume has no impact on airline revenues.

   (c) The t-test for this variable is 1.6739, which means that for every additional passenger, the airline lose $1,673.90$.

   (d) The R squared is 0.7159 which indicates that 71.59 percent of the variation in the airlines' revenues is explained by variations in the number of passengers.

   (e) I am so confused, it's not funny.

10. What is the variable about which researchers could disagree on whether it has an influence on airline revenues?

    (a) Intercept
    (b) Passengers
    *(c) Number of Flights
    (d) Load Factors
    (e) Seat Miles

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.990905938
R Square	0.981894577
Adjusted R Square	0.962286734
Standard Error	5936660.38
Observations	52

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	9.74789E+16	9.74789E+16	2765.835625	1.94129E-45
Residual	51	1.79744E+15	3.52439E+13		
Total	52	9.92764E+16			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0	#N/A	#N/A	#N/A
Seat Miles	0.180327981	0.003428861	52.59121244	4.20692E-46

Figure 2: Final Regression Results

11. After running the regression again with some variables removed, what can be said about U.S. airlines' operating revenues when seat miles are $1,000,000$—that is, when airlines carry 1,000,000 passengers for an average of 1,000 miles? (Remember that the dependent variable was expressed in thousands of dollars.)

    (a) Airlines' revenues are $0
    *(b) Airlines' revenues are $ 180 million
    (c) Airlines' revenues are $ 180 billion
    (d) Airlines' revenues are $ 180,000
    (e) I have no idea

12. What percentage of the variation in the U.S. airlines' operating revenues is explained by factors other than seat-miles?

    (a) 98.18 percent
    *(b) 1.82 percent
    (c) 99.09 percent
    (d) 0.91 percent
    (e) 96.23 percent

13. What's the correct name?

    (a) Antonin Scalia
    (b) Antonino Scalia
    (c) Antonin Skalia
    (d) Antonin Scaliyah
    (e) Antoine Schalliah

Extra-Credit Problem

The independent variables used to forecast the U.S. airlines' combined quarterly revenues (in $ thousands) were:

- the number of passengers (monthly data)
- the number of flights (monthly data)
- the load factors (average percentage of seats sold on flights)(monthly data)
- the seat-miles offered (multiplication of number of seats available and number of miles flown, expressed in thousands) (monthly data)

Answer the following three questions (on the back of one of the exam's pages):

1. The first linear regression ran was called "contemporary." What does this term mean? What was done to the independent variables?
2. The second linear regression ran was called "ahead." What does this term mean? What was done to the independent variables?
3. A third alternative linear regression would have been called "lagged." What does the term mean? What would have been done to the independent variables? Why wasn't this model run?