MSBA 620 – Statistical Foundations of Business Analytics – 2nd Assignment.

1a. This is a one-sample t-test, on the population, 'average weekly amount spent on food by 150 households during the past year'. Using the t-test calculator provided for us in blackboard, I got the answer depicted below.

Estimate: Mean value ± margin of error

Estimate = 270.255 ± 6.84
(LCL, UCL) = (263.415, 277.095)

mean	270.2551	Use average(datarange)	
stdev	42.39393	Use stdev.s(datarange)	
n	150		
se	3.46145	se=stdev/sqrt(n)	
Conf level	95	%	
alpha	0.05	alpha=1-CL (as a decimal)	
One or two tailed:	2	Enter 1 or 2 for whether the test is 1 or 2 tailed	
t_crit	1.976013	Use t.inv.2t(alpha,df) with df = n - 1	
me	6.839871	me=t_crit*se	
Confidence interval:			
	270.255	±6.84	
	LCL	UCL	
	263.415	277.095	

1b. For this we would run a simple linear regression analysis on the two variables to get the variable coefficient.

The Variable coefficient (B_1): 1.96

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	153.8985946	17.01994055	9.04225218	7.94473E-16	120.2651072	187.532082
Income	1.95820496	0.281901224	6.946422351	1.1047E-10	1.401133611	2.515276309
B0 (y-intercept):	153.898					
B1 (variable coefficient):	1.958					

1c. Prediction interval for a household whose annual income is $40,000.

Prediction interval = (LCL, UCL)

Estimate: 232.219 ± 74.026

Prediction interval: (LCL, UCL) = (158.193, 306.245)

2a. We accept the null hypothesis because the full model is the same as the reduced model, therefore we can use the reduced model. Meaning we do not have to use the full model.

F: 0.054. At a 95% confidence level we would accept the null hypothesis that there is no difference between using the full or the reduced model, therefore we are better off using the reduced model which is less.

2b. B_0: Average cost for a meal for center city restaurants when all other independent variables equal zero (0) – this is also called the intercept. (B_0 = - $52.6)

B_1: For every 1 unit increase in Décor there is a $1.47 increase in the average expected price.

B_2: For every 1 unit increase in service there is a $3.2 increase in the average expected price.

B_3: If the restaurant is in the city center there is a $12.66 increase in price.

2c. $40.78 ± 21.04

3a. B_0: Average price of a Toyota Corolla when all other independent variables equal zero (0) or when the odometer is 0 – this is also called the intercept.

B_1: If the car is a Honda Civic there is a $602.70 increase in average price of the car.

B_2: For every 1-mile increase in the odometer there a $0.88 decrease in the average price of the car.

3b. The R square on the ANOVA table is used to tell us how much of the variation in the dependent variable is explained by the model. According to the analysis done **76.9%** of the variation in the dependent variable is explained by our model.

3c. Estimate for a used Corolla that has 15, 000 miles on it: 15893.22 ± 1522.86

3d. Estimate for the average sales of Civics with 15,000 miles on them: 16495.92 ± 135.65