Name: *Caleb McWhorter — Solutions* **MAT 222**
Quiz 8 **Spring 2017**

Problem 1: A student is studying the effects of the amount of drinks on student's B.A.C. (blood alcohol content). After examining the data, they believe there is a linear relationship between one's B.A.C. and the amount of drinks one consumes. The student uses a computer system to analyze the data but is late to class and only has a chance to jot down a few of the values. Complete the missing entries.

The regression equation is

BAC = 0.02944 Drinks – 0.04069

Predictor	Coef	SE Coef	T	P
Constant	-0.04069	0.05158	-0.78882	0.43710
Drinks	0.02944	0.00940	3.13	0.00413

S = 0.1385 R-Sq = % 0.26670

Analysis of Variance

Source	DF	SS	MS	F	P
Model	1	0.18836	0.18836	9.81962	0.004
Error	27	0.51792	0.01918		
Total	28	0.70628	0.02522		

Number of data points = 29

We know that DFT $= n - 1 = 28$ *so that* $n = 29$*. Because the model uses only one variable, DFM is 1. Therefore, DFE is* $28 - 1 = 27$*. We know from the table, the coefficient of* x *is* 0.02944 *and the constant term is* -0.04069*. This gives the model. We know* $t = \dfrac{b_1}{SE_{b_1}} = \dfrac{0.02944}{0.00940} = 3.13$*. Now* $MSE = \dfrac{SSE}{DFE}$ *so that* $SSE = DFE \cdot MSE = 27 \cdot 0.01918 = 0.5179$*. We have* $MST = \dfrac{SST}{DFT} = \dfrac{0.70628}{28} = 0.02522$*. Furthermore,* $F = \dfrac{MSM}{MSE} = \dfrac{0.18836}{0.01918} = 9.82$*. Finally,* $S = \sqrt{MSE} = \sqrt{0.01918} = 0.1385$ *and* $R^2 = \dfrac{SSM}{SST} = \dfrac{0.18836}{0.70628} = 0.2667$*.*