Statistics 20: Summer Session 2007
Quiz n. 1 *Friday July 6, 2007*

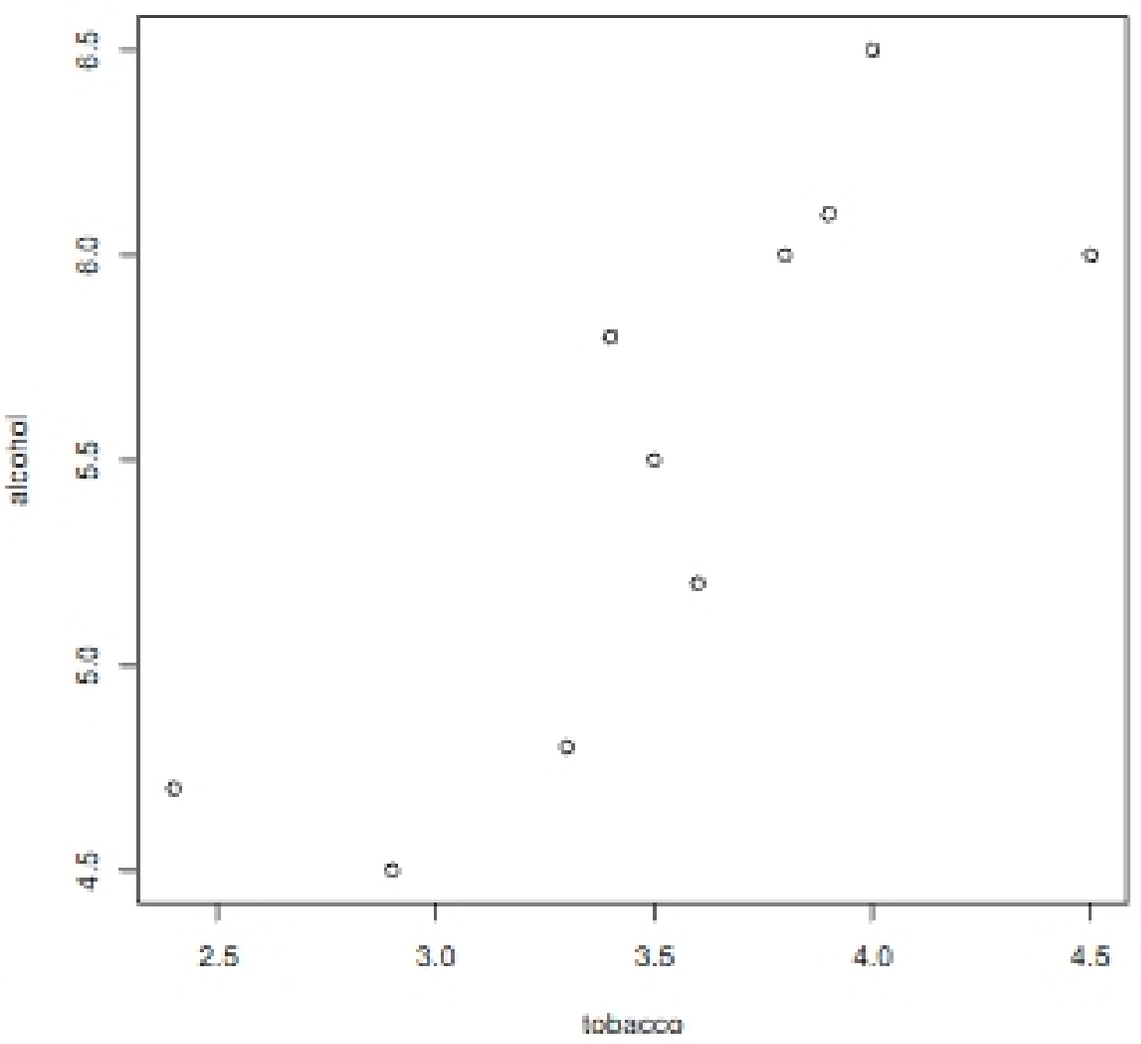
Full Name (Please print): _____ ID: _____ Lab: ____

YOU MUST SHOW WORK TO RECEIVE ANY CREDIT

1. The British government conducts regular surveys of household spending. The average weekly household spending on tobacco products and spending on alcoholic beverages for each of 10 regions in Great Britain were recorded.

   The following are a table and a scatterplot of the average tobacco and average alcohol spending (in pounds) for the 10 regions:

Region	Tobacco (x)	Alcohol (y)
1	2.4	4.7
2	2.9	4.5
3	3.3	4.8
4	3.4	5.8
5	3.5	5.5
6	3.6	5.2
7	3.8	6.0
8	3.9	6.1
9	4.0	6.5
10	4.5	6.0



You may use the following summary statistics in formulating your answers to the questions:

$$\bar{x} = 3.53,\ \bar{y} = 5.51,\ s_x = .589,\ s_y = .681,\ r = .817$$

(a) [3 points] Calculate a and b for the regression line: $\hat{y} = a + bx$
Hint: slope of the line is $r\frac{s_y}{s_x}$ *and intercept is* $\bar{y} - b\bar{x}$

(b) [3 points] What is the predicted average weekly household spending on alcohol for region 7 using this regression line?

(c) [3 points] What is the residual for region 4?

(d) [2 points] The fraction of variation that is explained by the least squares regression of alcohol on tobacco is approximately .6675. **TRUE or FALSE**

(e) [2 points] The correlation r between average tobacco spending and average alcohol spending would change if the average tobacco spending for each region is doubled. **TRUE or FALSE**

2. Chocolate bars produced by a certain machine are labeled with 8.0 oz. The distribution of the actual weights of these chocolate bars follow a normal distribution with mean $\mu = 8.1$ oz. and standard deviation $\sigma = .1$ oz.

   (a) [3 points] What proportion of chocolate bars weighs less than 8.0 oz.? (show all work)

   (b) [4 points] What proportion of chocolate bars weighs between 8.2 and 8.3 oz.? (show all work)

   (c) [5 points] Using the standard normal curve, find the 70th percentile for the weight of the chocolate bars, i.e., the value such that 70 percent of the chocolate bar weights fall at or below it (show all work).