Stat 185 - Review problems for Exam 1

Our first exam is this coming Friday, September 22. Here are a few problems to get you thinking. There's a good chance that *most* or even all of these problems will be represented on the exam. There might be one or two more, as well.

1. A random sample of registered voters from Tampa, FL were asked if they support the DREAM Act, a proposed law which would provide a path to citizenship for people brought illegally to the US as children. The survey also collected information on the political ideology of the respondents. The results of the survey by political ideology are shown below as well as in figure 1.

	Political ideology			
	Conservative	Moderate	Liberal	Total
Support	186	174	114	474
Don't support	151	161	52	364
Not sure	35	28	9	72
Total	372	363	175	910

   (a) What percent of these Tampa, FL voters support the DREAM Act?

   (b) What percent of these Tampa, FL voters who identify themselves as conservatives are also in support the DREAM Act?

   (c) Do political ideology and views on immigration appear to be independent? Explain your reasoning.

2. Given the data set $\{2, 3, 6, 3, 10, 2, 0, 4, 2, 2\}$,

   (a) Compute the corresponding five point summary

   (b) Find the inter-quartile range

   (c) Draw the corresponding box-plot

3. Compute the mean and standard deviation of the set $\{8, 2, 1, 8, 3\}$.

4. According to `https://goo.gl/DanB3A`, Utah has the lowest percentage of adults who smoke at 9.1%. Turns out this is based on a CDC survey named BRFSS. Let's suppose that there are 120 individuals in that survey.

   (a) Identify the population.

   (b) Identify the sample.

   (c) I don't actually believe the 9.1% so I went down to Woody's Tavern and surveyed 11 customers. As it turned out, 5 of them smoked! Identify any problems that you see with my "study".

5. Suppose we are doing a study on the mercury concentration in adults' hair. We announce the study in Asheville's local newspaper and get 205 people willing to participate in our study. We take a snip of their hair and analyze it for mercury content and ask them to fill out a questionnaire about how many servings of fish they consume on average in a week in order to find out how much eating fish contributes to the amount of mercury in the body.

   (a) What is the population?

   (b) What type of sampling method was used?

   (c) What problems do you see with the sampling method?

   (d) What is the predictor variable and what is the response variable?

6. Suppose that a standardized tests' scores are normally distributed with a mean of 1500 and a standard deviation of 300.

   (a) According to the normal rules of thumb, what percentage of test takers score 2400 or above?

   (b) Use the normal table to compute the proportion of test takers whose scores are between 1400 and 1700.

7. Suppose that data sets X is a data set with mean 110 and standard deviation 15; Y is a data set with mean 84 and standard deviation 20. Furthermore, X and Y have a correlation of $r = 0.75$.

   (a) What is the regression line connecting Y to X?
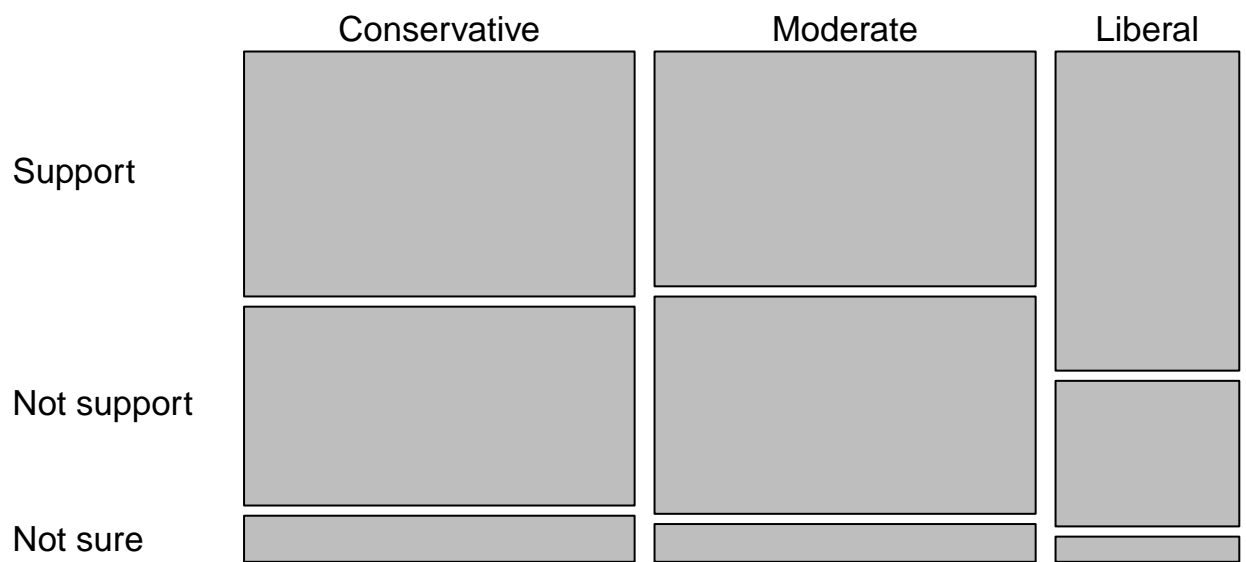
   (b) What value of Y does the regression line predict if $X = 85$?

Figure 1: The Mosaic plot for problem 1