STA-209 Practice Exam

Name:_____

Directions

- You **do not** need to fill all the space provided. In many cases, large amounts of white space only exist to correct for general spacing of the exam

- You **do not** need to write in complete sentences: bullet points are completely acceptable and even preferred

- Have fun

Question 1

Answer the following questions in 1-2 sentences

Part A Briefly describe the *statistical framework*. In particular, what is a *parameter*, what is a *statistic*, and how are these two related to one another?

Part B What two things do a *distribution* tell us about a variable?

Part C What is the utility of using *z-scores*? In particular, how is a standardized score used for an individual observation?

Part D If I have a variable containing 750 individual observations, with a median value of $m = 27.6$ and $IQR = 9.1$, how many observations would fall between the 35th and 65th percentiles?

Question 2

A survey of incomes for 1000 individuals with graduate degrees in business was conducted five years following graduation, the distribution of which is demonstrated in the box plot below.
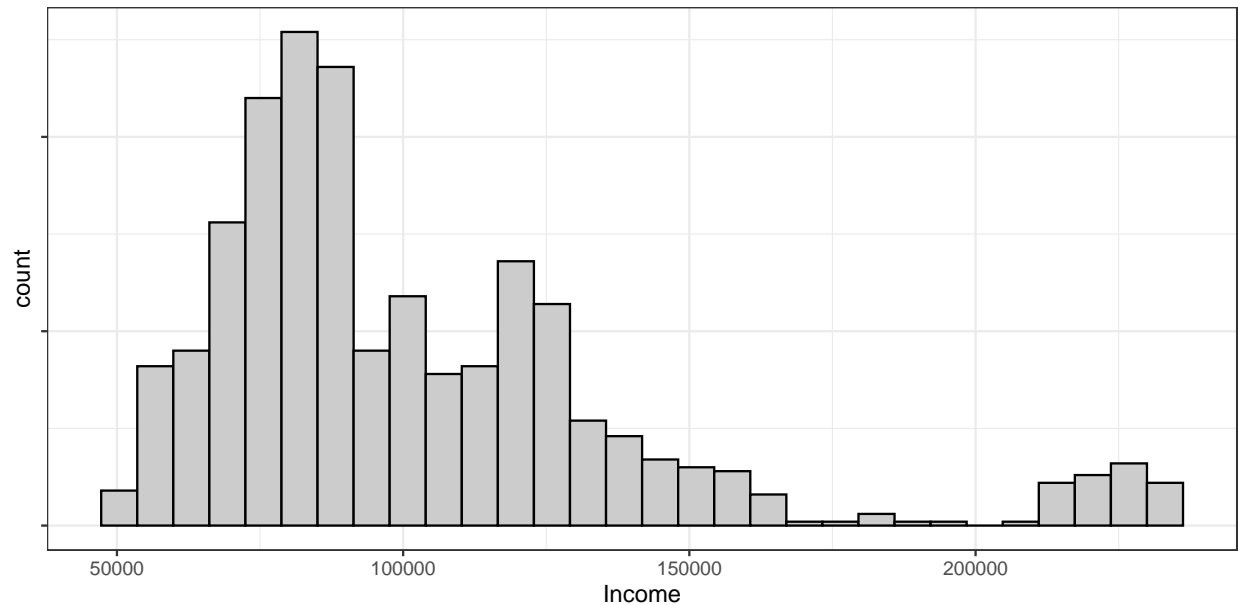
Part A: Sketch a boxplot displaying the same distribution of incomes given in the figure above. It does not need to be exact, though it should include all of the components that make up a boxplot.

Part B: Do you suspect that the mean or median will be larger for this distribution? Clearly state "mean" or "median" and justify your answer.

Question 3

The table below presents the results from the 2006 General Social Survey conducted by the National Opinion Research Center polling 1,009 respondents on their age and level of job satisfaction. Row totals have been added in the last column.

For the questions below, you do not need complete sentences but you must show the calculations used to derive your answer

Age	Job Satisfaction			Total
	Low	Medium	High	Sum
<30	34	53	88	175
30-50	80	174	304	558
>50	29	75	172	276

Part A: What percentage of respondents were between 30-50 years old and indicated that they had *low* job satisfaction?

Part B: Which age demographic had the highest proportion of respondents indicate that they had *high* job satisfaction?

Question 4

The table below shows the results for drivers and passengers in auto accidents in Florida in 2008, classified according to injury status and whether or not the individual was wearing a seatbelt.

Seat-Belt Use	Injury	
	Fatal	Nonfatal
No	1085	55,623
Yes	703	441,239

Part A What are the odds of being involved in a fatal crash for individuals who *were* wearing a seatbelt? What are the odds of being involved in a fatal crash for individuals who *were not* wearing a seatbelt?

Part B Find the odds ratio comparing the odds of having a fatal accident for those wearing a seatbelt compared to those not wearing a seatbelt. If necessary, modify your answer so that the odds ratio is greater than 1. Does wearing a seatbelt and fatality status appear to be associated? Justify your answer.

Question 5

In Canada, about 0.35% of women over 40 will develop breast cancer in a given year. A mammogram is a low-cost, non-invasive procedure for testing for breast cancer, but it is not perfect. In about 11% of patients with breast cancer, it will return a **false negative**. Similarly, the test will give a **false positive** in 7% of patients who do not have breast cancer.

If a random woman over 40 is tested for breast cancer using a mammogram and the test comes back positive, what is the probability that the patient actually has developed breast cancer?