Introduction to Statistics

Practice Exam 1 Fall 2006

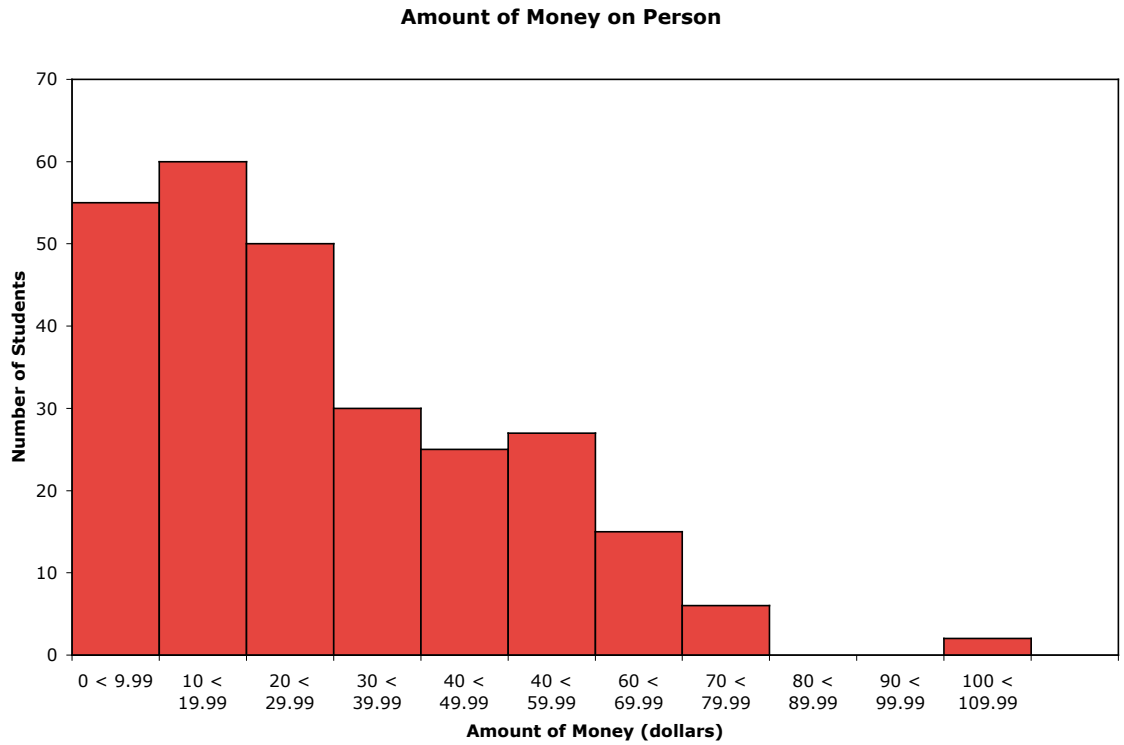
Name:_____

You may use a calculator and the "Tables and Formulas for Moore" handout (which will be provided for the exam). You may not share calculators, use your text or other notes, or talk during the exam. Cell phones must be turned off (you may not use the calculator on your cell phone). You have 65 minutes for the exam. The practice exam is longer than the actual exam, but accurately reflects the type of questions you might be asked.

Section 1: Short Answer

You should give a brief answer to each question and a 1 or 2 sentence justification of your answer.

Questions 1- 3: Here is a histogram representing how much money students had on their person. Use it to answer questions 1, 2, and 3.



1. Describe the shape, center and spread in general terms.

2 (still referring to the histogram). Are there any outliers? If so, what are they? If not, are there any potential outliers?

3. For this data, which is a better measure of center: mean or median? or doesn't it matter?

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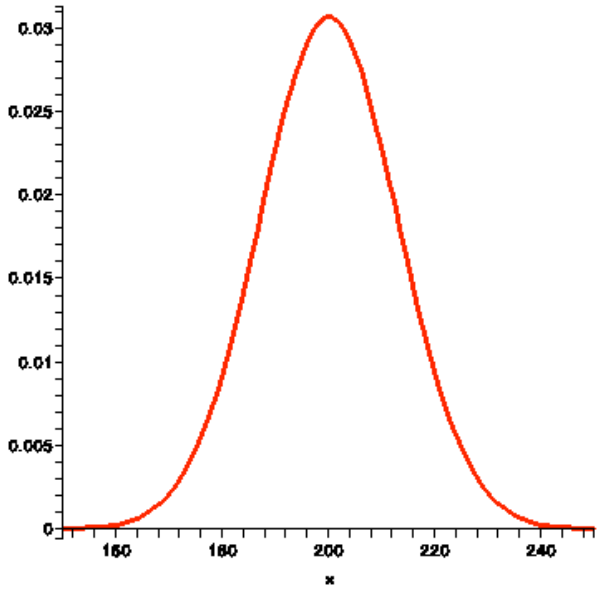
4. Why are density curves useful?

5. Here is a normal density curve with mean 200 and standard deviation 13. What percentage of x values fall below 161?



Questions 6 - 7: Scientists measured the length of male and female fish in various Canadian lakes. The explanatory variable is "Length of female fish". The response variable is "Length of male fish". The correlation is 0.737 and the squared correlation is 0.54.

6. What does the correlation tell you about the variables? (Hint: What would the form and strength of the scatterplot be?)

7. What does the squared correlation tell you about the changes in lengths of male fish?

9. Here is a 2-way table comparing the percentages of working days with or without accidents for jobs with 1 or 2 weeks of vacation per year. The table seems to suggest that there are fewer working days with an accident if the workers have less vacation time.

% of working days with/without accidents given number of weeks of vacation per year

	1 week vacation	2 weeks vacation
Accident	15 %	20 %
No Accident	85 %	80 %
Totals	100 %	100 %

What lurking variables might there be? Given that the measurements are correct, could more vacation time actually be better for the safety of the workers? Explain your answer.

10. A CNN/USA Today/Gallup poll conducted on April 26, 2006 asked people if they approved of President Bush's performance. 32% said they approve, 60% said they disapprove, and 8% said they did not know. The poll interviewed 1,012 adult Americans by telephone on April 21 - 23, 2006 (Friday - Sunday). The exact question was:

"Do you approve or disapprove of the way George W. Bush is handling his job as president?"

Discuss the strengths and weaknesses of the way the poll was conducted. Do you think the results of this poll accurately reflect the opinions of all Americans (not just those interviewed). If you don't have enough information to evaluate, discuss what other pieces of information you would need in order to decide on the trustworthiness of the poll.

11. (This question requires a lengthier answer) Design an experiment to determine whether or not eating a candy bar before an exam helps students to perform better.

Section 2: Calculations

You need to show your work for the calculations, so that it is clear how you got your answers. You may use a calculator to perform any arithmetic.

For Questions 12 - 14: Some scientists[1] measured the lengths of fish from various Canadian lakes. The following lengths (in *mm*) were reported for 2-year old females:

160
166
189
189
190
197
200

12. Calculate the 5-number summary of this data. Be sure to explain how you got your answer.

13. Calculate the .mean of this data (this will be different from the mean reported in the following table).

14. Calculate standard deviation.

[1] Magnan, Proulx, Plante. "Integrating the effects of fish exploitation and interspecific competition into current life history theories", *Can. J. Fish. Aquat. Sci.* **62:** 747-757 (2005)

Questions 15-16. The scientists also measured the length of the male fish from the lakes. Here are the lengths. The correlation between them is $r = 0.737$.

Lake	Female Length	Male Length
Arlequin	189	205
Bellerive	200	210
Baie-verte	197	195
Theode	166	168
Franciscains	190	156
Petit	210	183
Vautour	160	173
Grillon	189	205
Sud-est	211	241
Michelin	201	203
Ford	201	216
Alphonse	196	200
Archange	163	174
Formont	223	207
Lajoie	183	173
Sauterelle	229	253
Vert	207	205
Mean Length	195	198.06
Standard Deviation	19.36	25.4

15. Notice that the standard deviations and the correlation are provided. Find the equation for the least-squares regression line, using the length of the female fish as the explanatory variable. Use your calculator to do the arithmetic, but write down your steps.

16. If the female fish in a certain lake is 206mm long, how long do you predict the male fish will be?

Questions 17 - 18. Suppose that the lengths of fish in Canadian lakes are normally distributed with mean 195mm and standard deviation 20mm.

17. What percentage of fish are less than 180mm?

18. How long are the longest 10% of fish?