Mine Çağlar November 3, 2006

Math 202: Statistics for Social Sciences

Fall 2006 EXAM 1

Calculator OK, 90 min.

Instructions: There are five parts to this exam I-IV. Please inspect the exam and make sure you have all 5 pages of questions. Do all your work on these pages. If you use the back of a page, make sure to indicate that.

Remember: ***You must show your work to get proper credit.***

Academic Honesty Code: Koç University Academic Honesty Code stipulates that "copying from others or providing answers or information, written or oral, to others is cheating." By taking this exam, you are assuming full responsibility for observing the Academic Honesty Code.

NAME: _____

Part I:	/20
Part II:	/20
Part III:	/20
Part IV:	/20
Part V:	/20
Total:	/100

Part I. (20 points) Answer the following short questions.

1. (3 points) Define "statistics" as a discipline in at most 2 sentences (Please note that any other sentences will be ignored).

2. (3 points) The results of what type of a study is generalizable to the whole population?

Observational Study or Randomized Experiment

Consider the following information to answer questions 3 to 6.

A statistics student hypothesizes that eating more fruits and vegetables may prevent cancer. She conducts a survey in Sarıyer by visiting the households she finds at home and asking each individual two questions:

i) How many portions of fruits and vegetables do you eat per day?

ii) Did you have any form of cancer in your life up to this point?

The student found out that there is an association between the variables implied by those two questions.

3. (4 points) What are the variables?

4. (5 points) Is this an observational study or a controlled experiment? Explain briefly.

5. (5 points) Actually, the student also asked some other questions to determine if the subject follows a healthy life style (score=1) or not (score=0). Shortly called "lifestyle", this is a confounding variable. Explain briefly.

Part II. (20 points) The following are scores from an experiment:

3, -2, 0, -1, -4, -4, 2, 2, 5, -2, 1, -2, 0, 0, 4, 2, -4, -3, 5, -2

1. (7 points) Fill in the blanks in the following distribution table.

Score	-4 to -3	-2 to -1	0 to 1	2 to 3	4 to 5
Percentage					

2. (7 points) Is inter-quartile range a measure of center or spread? Find it for the above data set.

3. (6 points) Here is a table of scores for another data set. Write below the Excel formula to find the average (=mean) for those scores:

	A	B	C	D	E
1		Score	Percentage (Relative Frequency)		
2		-5	2%		
3		-4	3%		
4		-3	5%		
5		-2	14%		
6		-1	8%		
7		0	10%		
8		1	11%		
9		2	15%		
10		3	19%		
11		4	12%		
12		5	1%		
13		Total	100%		
14					
15					
16					

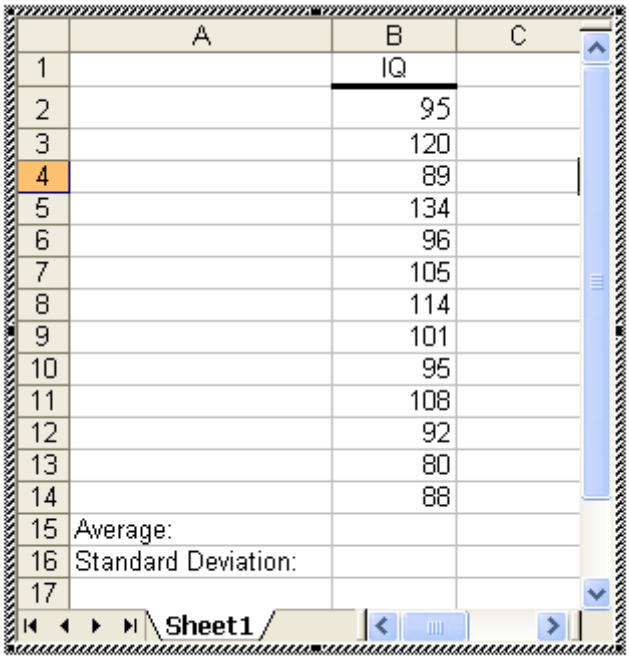
Sheet1

Part III. (20 points) It is assumed that IQ scores follow a normal distribution with mean 100 and standard deviation 15.4

1. (6 points) IQ scores between 90 and 110 are designated "ordinary". What percentage of the people is "ordinary"?

2. (7 points) Find the 90th percentile of IQ scores.

3. A sample of IQ values are



	A	B	C
1		IQ	
2		95	
3		120	
4		89	
5		134	
6		96	
7		105	
8		114	
9		101	
10		95	
11		108	
12		92	
13		80	
14		88	
15	Average:		
16	Standard Deviation:		
17			

Sheet1

a) (4 points) Write down a formula to find the average and the standard deviation, any way you like, as long as your procedure gives the answer (either an Excel formula or just hand written operations). DO NOT calculate the final answer.

b) (3 points) What is the percentage of ordinary people in this sample?

Part IV. (20 points) A researcher is studying the amygdala (a part of the brain involved in emotion). The subjects are measured for the increase in activation of their amygdala while they are viewing pictures of violent scenes. The distribution of activation increases obtained from a sample is as follows:

Activation Increase	Percentage
0-5	10
5-15	30
15-25	33
25-30	8
30-50	12
50-60	4
60-90	3

1. (10 points) Draw a histogram using the density scale.

2. (5 points) Is the mean (=average) of activation increase smaller or larger than its median? Explain.

3. (5 points) In which interval is the median of activation increase, 15-25, 25-30 or 30-50? Why?

Part V. (20 points) A survey of young people, namely 18-22 year olds, was published by Sabah last week. Assume that the survey has been conducted by random sampling. One of the questions in the survey is "Do you support death sentence (idam cezası)?". Before taking the survey, the percentage of 18-22 year olds in Turkey who support death sentence was believed to be 28%.

1. (3 points) What is the expected value of the percentage in the sample that support death sentence?

2. (6 points) What should the sample size be so that the standard error of the sample percentage is 2%?

3. (7 points) If 500 young people are surveyed, estimate the chance that the percentage of those who support death sentence is larger than 30%.

4. (4 points) Among 500 subjects interviewed, 155 of them responded "YES" to the question.
   a) What is the observed value for the percentage in the sample that support death sentence?

   b) What is this value called, a statistic or a parameter?

(Remark: This is indeed the observed percentage by Sabah!)