

# Sample Midterm Questions

## Stat111 – Summer 2008

*NOTE: This sample midterm is shorter than the actual midterm will be.*

### **Question 1**

Do IQ scores of Self-concept affect GPA? Based on 102 eighth-grade students in a rural Midwestern school with their IQ score, Self-concept scores and GPA we have the following information.

$r = 0.542$  for the regression of GPA on Self-concept

$r = 0.632$  for the regression of GPA on IQ

	N	Mean	STD Dev
GPA	102	8.3	3.5
SELF-CONCEPT	102	52.3	13.4

- (a) Suppose that we are interested in predicting GPA by Self-concept scores. Calculate the best-fit line for  $Y = \text{GPA}$  and  $X = \text{Self-concept scores}$ .

- (b) Julia's Self-concept score is 31. Predict her GPA using the best-fit line.

(c) If an eighth-grade student decreases his Self-concept score by 12, what change do you expect in his GPA?

(d) Which variable, Self-concept or IQ has a stronger association with GPA and how do you know this?

## **Question 2**

A population of students contains 32% freshmen, 50% sophomores and 18% juniors. Three students are independently selected at random from the population to take a particular Psychology class.

(a) Find the probability that at least one sophomore is selected.

(b) Find the probability that at least one sophomore is selected given that you are told no juniors are selected.

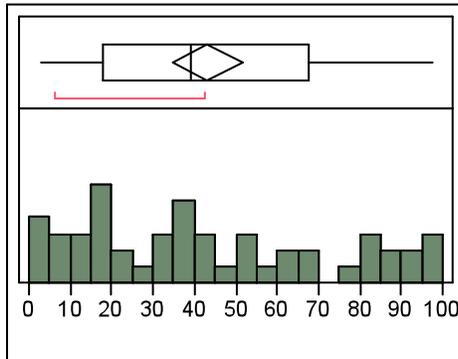
(c) Let  $X$  = number of freshmen selected. Write down the probability distribution of  $X$ .

(d) What is the mean and standard deviation of  $X$ ?



### Question 4

Shown below are the scores for the final exam for 50 students in Physics 101.



Mean	43.18
Std Dev	29.8
N	50

(a) Approximately how many students received a score of 70 or greater?

(b) The professor decided to grade on a curve. He multiplied all of the scores by 1.1 and then subtracted 5 points. What is the mean and what is the standard deviation for the rescaled exams?

- (c) The test scores were clearly not normally distributed, as you can see from the histogram. If the test scores (the original test scores, NOT the rescaled) were normally distributed and the mean and the standard deviation were the same, how many students would you anticipate scoring 20 or below?

### **Question 5**

A group of Anthropology students want to know if graduate students are more likely to be alcoholics than other people. The anthropology students created a survey that helped them diagnose alcoholism. They then went to the Irish Pub on Monday night during Quizzo to find graduate students to survey. They performed a simple random sample of the graduate students in the Irish Pub.

The Anthropology students found that 64% of the people surveyed showed signs of alcoholism. The population rate of alcoholism is 23%.

- (a) What can you conclude from their study?

- (b) Why are anthropologists always messing up statistics? Seriously.