

You are allowed to operate a calculator and refer to one page (front and back of standard 8.5 by 11 inch sheet) of notes while taking this examination. Your solutions should be clear, complete, and sufficiently detailed in order to demonstrate your understanding and communicate your reasoning and method of solving the problem. Each problem will be evaluated on a 5-point standard rubric.

\_\_\_\_\_  
Student's Name

### Problem 1

The number of commercials ( $X$ ) shown during a single hour of children's television programming is approximated by the following probability distribution.

$X$	$p_x$
13	10.4%
14	19.7%
15	31.5%
16	25.3%
17	13.1%

For a random sample of 24 one hour blocks of children's television programming, find the narrowest interval that would accurately predict the mean number of commercials shown during a single hour of children's television programming 90% of the time.

**Problem 2**

The results of a nationwide Gallup poll concerning a person's race and their opinion on the death penalty are summarized in the table below.

		Person's Race		
		White	Black	Hispanic
Person's Opinion on the Death Penalty	In Favor	925	277	394
	Opposed	362	415	317

- (a) What percentage of the people polled were opposed to the death penalty?
- (b) What percentage of the people polled were either in favor of the death penalty or white?
- (c) What percentage of the people polled were Hispanic and opposed to the death penalty?

**Problem 3**

Refer to the results of the Gallup poll presented in Problem 2 to respond to the following questions.

(a) What proportion of the people polled was in favor of the death penalty given that they were black?

(b) Based on these results, is a person's opinion on the death penalty independent of their race?

**Problem 4**

According to a recent Gallup poll, about 15.5% of adults worry about their weight all of the time.

- (a) For a randomly selected class containing 32 college students, what is the likelihood that exactly five of these students worry about their weight all of the time?
- (b) How many students in a randomly selected class containing 32 college students are expected to worry about their weight all of the time?

**Problem 5**

According to a recent Gallup poll, about 15.5% of adults worry about their weight all of the time. What is the probability that the number of students who worry about their weight all of the time in a randomly selected class containing 32 college students falls within two standard deviations of the mean?

**Problem 6**

After an 8 hour fast, a person's blood glucose level (in milligrams of glucose per deciliter of blood) is normally distributed with a mean of 85 mg/dl and a standard deviation of 8.5 mg/dl.

- (a) Hypoglycemia (or low blood sugar) is defined as a blood glucose level below 70 mg/dl after an 8 hour fast. According to this definition, what proportion of people in the population has hypoglycemia?
- (b) Would it be unusual for a person to have a blood glucose level between 90 and 100 mg/dl after an 8 hour fast?