Sample Exam 2 for Introductory Statistics

Prof. Bernardo Ábrego Math 140, Fall 2006

Name._____10/29/06

Directions.

- You have 1 hour and 50 minutes to complete the test.
- You can use a 3"×5" card with notes, your calculator, and the z-tables provided. No other materials are allowed.
- No scratch paper is permitted. For this purpose or in case you need more space you can use the back of the pages of the test.

1. The distribution of grades on a college statistics exam taken by more than 1500 students are given in the table.

Grade	Percent Receiving Grade
1	26.5
2	35.4
3	23.3
4	14.8

   (a) Compute the mean and standard deviation of this distribution.

   mean $\mu =$ _____

   standard deviation $\sigma =$ _____

   (b) Describe the shape, mean, and standard deviation (standard error) of the sampling distribution of the average grade on this exam of a random sample of size 12.

   shape = _____

   (center) mean = _____

   (spread) standard deviation = _____

   (c) What is the probability that the sum of the grades of 12 students who took this exam, selected at random, is 30 or more?

   Probability = _____

   (d) If we select 12 students at random who took this exam, what are the reasonably likely numbers which are the averages of their grades?

   Between _____ and _____.

2. About 68% of the people in Russia live in rural areas. Suppose a random sample of 250 Russian people is selected.

(a) Describe the shape, mean, and standard deviation (standard error) of the sampling distribution $\widehat{p}$, the proportion of people in the sample who live in rural areas.

shape = _____

(center) mean = _____

(spread) standard deviation = _____

(b) What is the probability that 61% or less live in rural areas?

Probability = _____

(c) What values of $\widehat{p}$ would be reasonably likely?

Between _____ and _____.

(d) What numbers of people in the sample who live in rural areas would be rare events?

Less than _____ or more than _____.

(e) What is the probability that 175 people or more in the sample live in rural areas?

Probability = _____

3. Suppose you roll two fair dice

(a) Determine each of these probabilities

i. getting doubles _____

ii. getting an even sum of at most 6 _____

iii. getting doubles and an even sum of at most 6 _____

iv. getting doubles or an even sum of at most 6 _____

(b) What of the following events are **disjoint** (circle all that apply)

i. getting doubles, getting an even sum of at most 6

ii. getting doubles, getting a sum of 7

iii. getting doubles, getting a sum of 6

iv. getting 2 on the first die, getting 2 on the second die

(c) Determine which of these pairs of events are **independent** (circle all that apply)

i. getting doubles, getting an even sum of at most 6

ii. getting doubles, getting a sum of 7

iii. getting doubles, getting a sum of 6

iv. getting 2 on the first die, getting 2 on the second die

4. Suppose that among all U.S. students, 80% have attended an amusement park and 45% have gone to a beach. Only 15% have done neither. Use this information to fill in the following table.

Have attended an amusement park?

		Yes	**No**	**Total**
Have gone to a beach?	**Yes**			
	No			
	Total			

(a) If you select a student at random, what is the probability that the student has gone to the beach but not attended an amusement park?

Probability = _____

(b) What is the probability that a randomly selected student has not attended an amusement park or has not gone to a beach?

Probability = _____

5. Suppose that 4% of a clinic's patients are known to have Lyme disease. A test is developed that is positive in 98% of patients with Lyme disease, but it is also positive in 3% of patients who do not have the disease. A patient is chosen at random from the clinic. Use this information to fill in the following table. Do not to round your answers (use all available digits).

Have Lyme disease?

	Yes	**No**	**Total**
Test is positive			
Test is negative			
Total			

(a) What is the probability that the patient's test comes out positive for Lyme disease?

Probability = _____

(b) What is the probability that a person actually has Lyme disease given that the test comes out positive?

Probability = _____

6. A recent study of 100 people in Miami found 27 were obese. Find the 99% confidence interval of the population proportion of individuals living in Miami who are obese.

7. A university dean of students wishes to estimate with 95% confidence the average number of hours students spend doing homework per week. It has been estimated that the population standard deviation is about 6.2 hours. How large a sample must be selected if he wants to be accurate within 1.5 hours?