

Name: _____

Economics 300-01
Fall Semester 2009-10
October 14, 2009

Test #1

Each problem is weighted equally. Write your answers on the test; use an appropriate number of significant digits for each answer; continue answers on the back if additional space is needed. In order to get full credit, you must show the reasoning and calculations used to arrive at your answers.

- (1) Suppose you were interested in finding out the percentage of U.S. college students who want U.S. troops to stay in Afghanistan. Describe two different ways you could go about estimating this percentage, and list two drawbacks for each of your ways.

(2) You have a sample of ten fish, with the weights (in ounces) of:

23, 74, 60, 64, 42, 77, 94, 82, 60, 84

a. What is the mode of this sample?

b. What is the median of this sample?

c. What is the mean of this sample?

d. What is the standard deviation of this sample?

- (3) Max is taking quizzes in both his calculus class and his Italian class on the same day. He assesses his probability of passing the calculus quiz at 75% and his probability of passing the Italian quiz at 85%. Assuming that his chance of passing one is independent of his chance of passing the other, what is the chance that he will pass at least one of them?

(4) A test consists of eight multiple-choice questions, each with a choice of five answers. Let X be the number of correct answers for a student who resorts to pure guessing.

a. Calculate μ_X and σ_X .

b. If the instructor calculates a rescaled mark $Y = 10X + 20$, what are μ_Y and σ_Y ?

c. If the passing mark is $Y = 50$, what is the chance that a student who resorts to pure guessing will pass?

(5) A few years back, Snapple ran a promotion where each bottle of Diet Snapple had the chance to win a free bottle. The odds for winning were listed as one to seven. Colin complained to his statistics professor, Dr. Pepper, that he was very unlucky because he had bought 25 bottles and lost every time. Dr. Pepper went to the store and bought two bottles and won both times.

a. If you buy 25 bottles, what is the probability of losing 25 times?

b. If you buy 2 bottles, what is the probability of winning twice?

c. If you buy 25 bottles, what is the probability of winning at least twice?

(6) Two evenly-matched baseball teams are playing a best-of-seven pennant series. What is the probability that the pennant winner will win the series by winning the first four games?

(7) Suppose that 4% of interviewees for a position with the National Security Agency lie during a lie detector test. Suppose that 3% of the time the lie detector labels as a truth teller someone who has actually lied, and that 5% of the time the lie detector labels as a liar someone who has actually told the truth.

a. For a randomly picked interviewee, what is the probability that the lie detector will indicate that she is telling the truth?

b. If the lie detector labels someone a liar, what is the probability that he actually is a liar?

(8) Archer Ali takes 12 shots at a target. Her lifetime average for hitting the bullseye is 60%. What is the probability that she will:

a. Hit the bullseye eight times?

b. Miss it every time?

c. Hit the bullseye at least two times?

(9) A seller of izune, a new kind of music player, notes that the time from sale until an izune stops working is normally distributed with a mean of thirty months and a standard deviation of ten months.

a. What percentage of izunes will have stopped working by two years after their sale?

b. At what point in time after sale will three percent of izunes still be working?

(10) At Salattes, the only two items for sale are salads and lattes. The counter help notes the following distribution of salad and latte sizes (both in ounces):

latte size	salad size	
	10	20
(tall) 12 l	.25	.15
(grande) 16 l	.25	.35

a. Calculate the mean and standard deviation for salad size.

b. Show that latte size and salad size are dependent.

c. Explain how you know to modify your prediction of salad size if you know what latte size the customer is ordering. Then calculate the expected salad sizes conditional on latte size.