

Math 221: Basic Statistics Exam #3A

Week #15

Name: _____**INSTRUCTIONS:**

You may use a calculator for this exam and a letter-sized study sheet with information written on a single side. You must show all of your work in order to receive full credit. Read each question carefully. Be certain that you have answered the question that was asked. Answers supplied as decimals must be accurate to *at least three decimal digits*.

Problem	Points	Score
1	14	
2	14	
3	14	
4	14	
5	14	
6	14	
7	14	
-	-	+2
EC	10	
Total	100+10	

(1) A doctor knows from experience that 15% of the patients to whom he gives a certain drug will have undesirable side effects. Find the probabilities that among the eight patients to whom he gives the drug,

(a) exactly one will have undesirable side effects.

(b) at most one will have undesirable side effects.

(c) at least one will have undesirable side effects.

(2) Find the probability that a piece of data picked at random from a normal population will have a standard score (z) that lies between the following pairs of z -values:

(a) $z = 0$ to $z = 2.43$

(b) $z = -1.42$ to $z = 1.24$

(3) According to the 1994 *World Almanac*, the average speed of winds in Honolulu, Hawaii, equals 11.8 miles per hour. Assume that wind speeds are approximately normally distributed with a standard deviation of 3.2 miles per hour.

(a) Find the probability that the wind speed of any one reading will exceed 14 miles per hour.

(b) Find the probability that the mean of a random sample of 10 readings exceeds 14 miles per hour.

- (4) The weights of full boxes of a certain kind of cereal are normally distributed with a standard deviation of 0.31 oz. A sample of 20 randomly selected boxes produced a mean weight of 9.91 oz. Find the 90% confidence interval for the true mean weight of a box of this cereal.

- (5) An automobile manufacturer wants to estimate the mean gasoline mileage that its customers will obtain with its new compact model. How many sample runs must be performed in order that the estimate be accurate to within 0.4 mpg at 99% confidence? (Assume that $\sigma = 1.5$)

- (6) It has been suggested that abnormal male children tend to occur more in children born to older-than-average parents. Case histories of 6 abnormal males were obtained, and the ages of the 6 mothers were

31	21	29	28	34	45
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The mean age at which the mothers in the general population give birth is 28.0 years.

- (a) Calculate the sample mean and standard deviation.

- (b) Does the sample give sufficient evidence to support the claim that abnormal male children have older-than-average mothers? Use $\alpha = 0.05$. Assume ages have a normal distribution.

- (7) The marketing research department of an instant-coffee company conducted a survey of married men to determine the proportion of married men who preferred their brand. Forty of the 150 men in the random sample preferred the company's brand. Use a 95% confidence interval to estimate the proportion of all married men who prefer this company's brand of instant coffee.

(EC) Salt-free diets are often prescribed to people with high blood pressure. The following data were obtained from an experiment designed to estimate the reduction in diastolic blood pressure as a result of following a salt-free diet for two weeks. Assume diastolic readings to be normally distributed

Before	93	106	87	92	102	95	88	110
After	92	102	89	92	101	96	88	105

Find the 99% confidence interval for the mean reduction in blood pressure.