

Pledge:

2/22/2008  
Dr. Lunsford

MATH 171  
Test 1

Name: \_\_\_\_\_  
100 Points Possible

**Please show all work on this test (including calculator commands with input) to receive full credit.**

**I. Short Answer and Multiple Choice.** All problems count 2 points unless otherwise indicated. (45 points total)

1. The median waiting time for patients to see a doctor at a local emergency room is much smaller than the mean waiting time. Which of the following is most consistent with this information (circle one):

- a. A histogram of the waiting times would be symmetric.
- b. A histogram of the waiting times would be left-skewed.
- c. A histogram of the waiting times would be right-skewed.

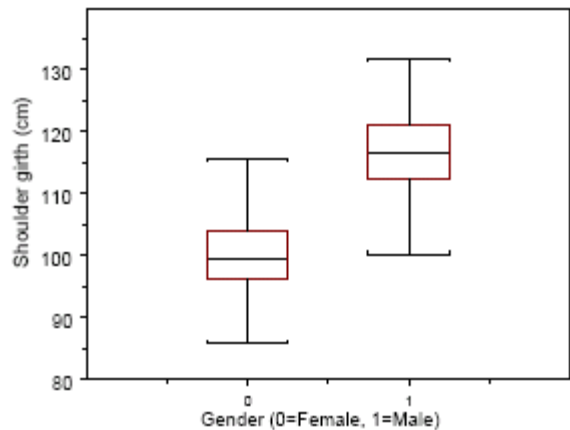
2. What type of data, *categorical* or *quantitative* (circle one), is produced by the answer choices for this question:

How many times have you accessed the internet this week?
(a) none
(b) once or twice
(c) three or four times
(d) more than four times

**Use the following side-by-side boxplots of female and male shoulder girth to answer Questions 3 through 6 below:**

3. Which of the following statements is most correct?

- a. Females have a typically smaller shoulder girth than males.
- b. Females have a typically larger shoulder girth than males.
- c. Females and males have about the same shoulder girths.
- d. None of the above are correct.



4. Estimate the interquartile range for female shoulder girth: \_\_\_\_\_

5. Estimate the median female shoulder girth: \_\_\_\_\_

6. Do you think the mean male shoulder girth is larger, smaller, or about the same as the median male shoulder girth? Why? (3 points)



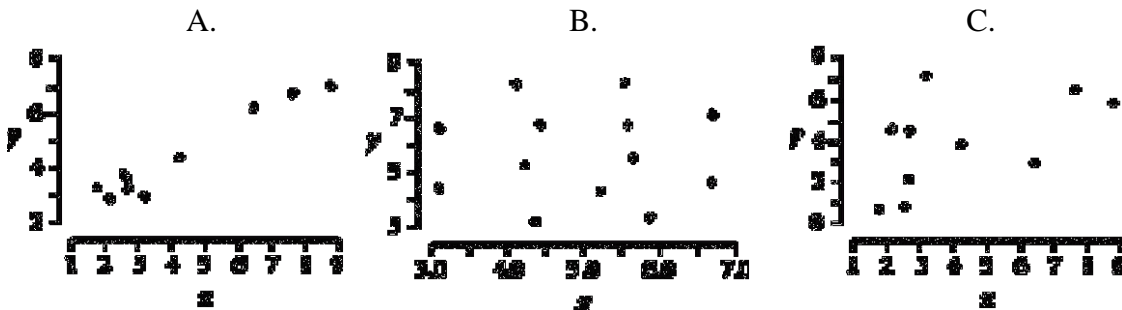
**I. Short Answer and Multiple Choice, continued.**

13. Indicate whether each of the following statements is true or false by writing “true” or “false” in the blank provided next to each statement. (2 points each, 8 total)

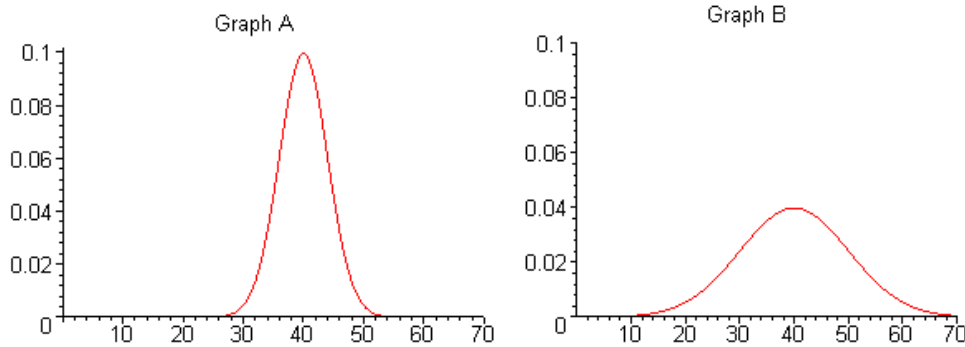
- \_\_\_\_\_ A) If the association between two variables is strong, then the explanatory variable *causes* the response variable.
- \_\_\_\_\_ B) The standard normal distribution has a standard deviation equal to 0.
- \_\_\_\_\_ C) If people with larger feet tend to be less intelligent, then we would expect the correlation between foot size and intelligence to be negative.
- \_\_\_\_\_ D) If we use a regression line to make predictions we are sure that the predictions are highly accurate.

14. Rank the scatterplots given below from smallest correlation coefficient to largest correlation coefficient. (3 points)

Smallest \_\_\_\_\_ Largest



15. Below you are given the graphs of two normal density curves, both with  $\mu = 40$ . Use these density curves to answer the following questions: (2 points each - 8 points total)



- (a) True or False (circle one): The area under each of these curves is equal to 1. (2 points)
- (b) Which curve has the larger standard deviation? (2 points) \_\_\_\_\_
- (c) Which distribution has a smaller percent of its data between 35 and 40 units? (2 points) \_\_\_\_\_
- (d) Give a rough estimate of the standard deviation of the density curve in Graph B (2 points) \_\_\_\_\_

**Problem II.** Company A gives a special aptitude test to job applicants. The data below represent the scores of 30 applicants to Company A. Use this data to answer the questions below. Note that the data is given in ascending order. DO NOT waste time entering this data into a list in your calculator! (19 points total)

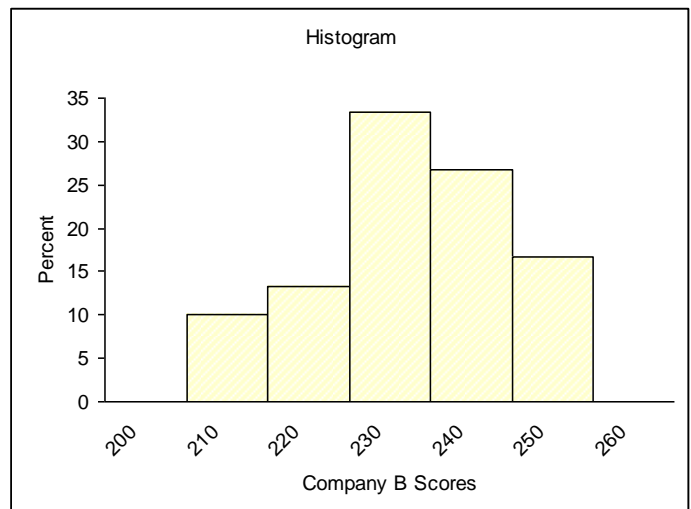
200, 204, 205, 209, 211, 212, 213, 215, 216, 219, 222, 223, 224, 229, 230  
 231, 233, 237, 238, 239, 240, 242, 242, 243, 243, 243, 243, 249, 251, 256

(a) Complete the frequency table below for this data. Use the frequency table to construct a histogram showing the distribution of test scores on the axes given below. Be sure to label your axes! (12 points)

$X$ : Test Score	Number of Scores	Percent of Scores
$200 \leq X < 210$		
$210 \leq X < 220$		
$220 \leq X < 230$		
$230 \leq X < 240$		
$240 \leq X < 250$		
$250 \leq X < 260$		

(b) What percent of Company A's applicants had an aptitude test score of at least 240? Represent this percent graphically on the histogram you drew in part (a). (4 points)

(c) Company B gives its applicants the same special aptitude test as Company A. To your right is a relative frequency histogram for Company B's test scores. Based on this histogram and the one you generated above, which company do you think has the smallest standard deviation for their test score data? Why? (3 points)



**Problem III.** Assume that the systolic blood pressure of adult Americans is normally distributed with a mean of 120 millimeters of mercury (mm Hg) and a standard deviation of 5.6 mm Hg. Use this information to answer the following questions. (18 points total)

(a) Draw a nice graph of the distribution of systolic blood pressure. On the graph you should show values  $\pm 1$ ,  $\pm 2$ , and  $\pm 3$  standard deviations from the mean. Clearly label your axis. (5 points)

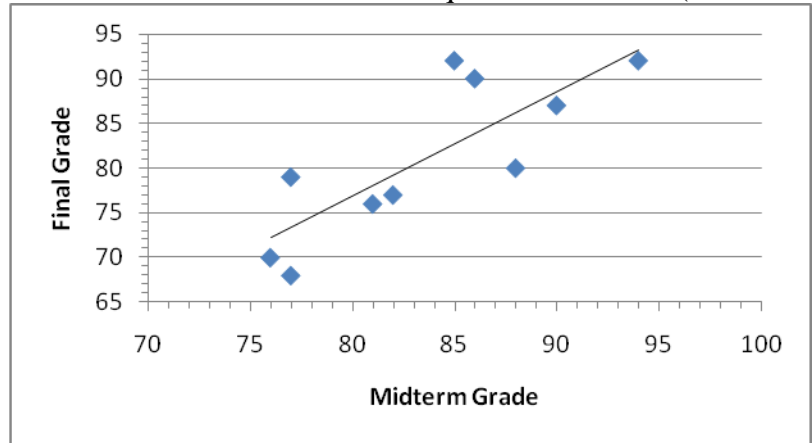
(b) What percent of adult Americans have systolic blood pressure between 110 and 115 mm Hg. Please represent this probability on your graph above. You should clearly indicate any calculator functions (including inputs) you use to make this computation. (4 points)

(c) A  $z$ -score of  $-1.45$  would correspond to what systolic blood pressure? (4 points)

(d) We will say a person has high systolic blood pressure if their blood pressure falls within the top 5% of this distribution. What is the cutoff point (i.e. the lowest blood pressure a person can have) to be considered among those with high blood pressure? (5 points)

**Problem IV.** Below are the data from 10 randomly selected students from Dr. L.'s Fall 2004 MATH171 Classes. For each student we are given the student's midterm grade and their final class grade. You are also given a scatterplot of the data including the least squares regression line. Please use this information to answer the questions below. (18 points total)

Midterm Grade (x)	Final Grade (y)
82	77
81	76
88	80
85	92
90	87
86	90
94	92
77	79
76	70
77	68



- Find the centroid of the data and plot it on the scatter plot. Clearly indicate the answer below and clearly show the centroid on your graph. (3 points)
- Compute the correlation coefficient of the data. Clearly indicate your answer. (3 points)
- Find the equation of the least squares regression line. Clearly indicate your answer. (4 points)
- Use the regression model to estimate the final grade for students who have a midterm grade of 80. Show this estimation graphically (using up-and-over lines) on the scatterplot above. (4 points)
- According to this model, an increase of *10 points* in midterm grade corresponds to what change in final grade? (4 points)