Basic Statistical Concepts: Word Problems

Mean and Median

1. The mean for a set of 28 scores is 80. Suppose two more students take the test and score 60 and 50. What is the new mean?

2. Suppose in Selina's class there were four students who scored 98 and eleven who scored 60. What is the mean of the scores in the class?

3. Maria filled her car's gas tank. The mileage odometer read 42,800 mi. When the odometer read 43,030 Maria filled the tank with 12 gallons. At the end of the trip, she filled the tank with 18 gallons and the odometer read 43,390 miles. How many miles per gallon did she get for the entire trip?

4. To receive an A in a class, Willie needs at least a mean of 90 on five exams. Willie's grades on the first four exams were 84, 95, 86, and 94. What minimum score does he need on the fifth exam to receive an A in the class?

5. The mean of 20, 35, 50, 60, and 85 is 50.
   a. Add four numbers to the list so that the mean of the nine numbers is still 50.
   b. Explain how you could choose the four numbers to add to the list so that the mean does not change.

6. The following table gives the annual salaries of the 50 faculty and staff at Mountain Unified School District.

Salary ($)	Faculty/Staff
18,000	2
22,000	6
32,000	24
48,000	15
80,000	2
150,000	1

   a. Find the mean annual salary for the employees.
   b. Find the median annual salary.
   c. Which data should be reported to best describe the data?

7. If each number in a set of data is multiplied by a constant, how is the new mean related to the original mean?

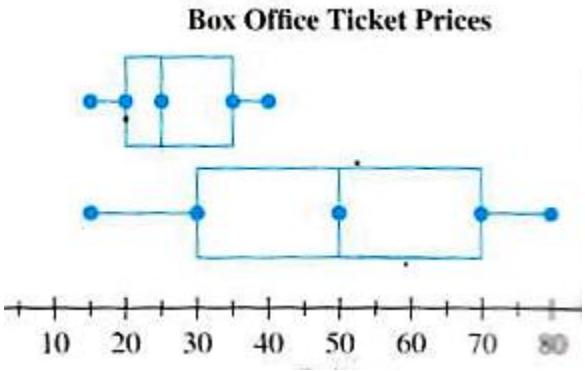
Standard Deviation

8. Find the standard deviation of this data set: 23, 76, 34, 26, 18, 54, 45, 67, 18, and 36.

9. If Mrs. Jones' class has grades of 0, 0, 0, 100, 100, 100 and Mrs. Pryor's class had grades of 65, 50, 20, 50, 90, 50 determine which class has the greater standard deviation.

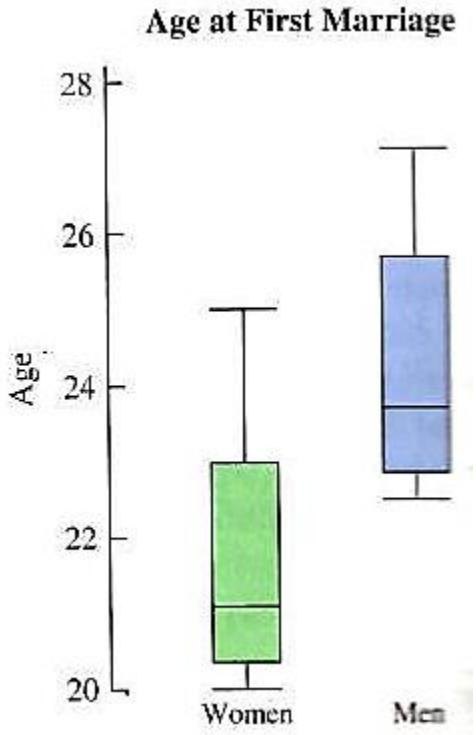
Box Plots

10. Following are box plots comparing the ticket prices of two performing arts theaters:



a. What is the median ticket price for each theater?
b. Which theater has the greatest range of prices?
c. What is the highest ticket price at either theater?
d. Make some statements comparing the ticket prices at the two theaters.

11. Following are box plots comparing ages at first marriage for a sample of U.S. citizens.



a. What is the median age of first marriage for men?
b. What is the median age of first marriage for women?
c. Which group has the greater range?
d. Compare the first marriage age for men and women.

12. The following table shows the heights in feet of the tallest 10 buildings in Los Angeles and in Minneapolis:

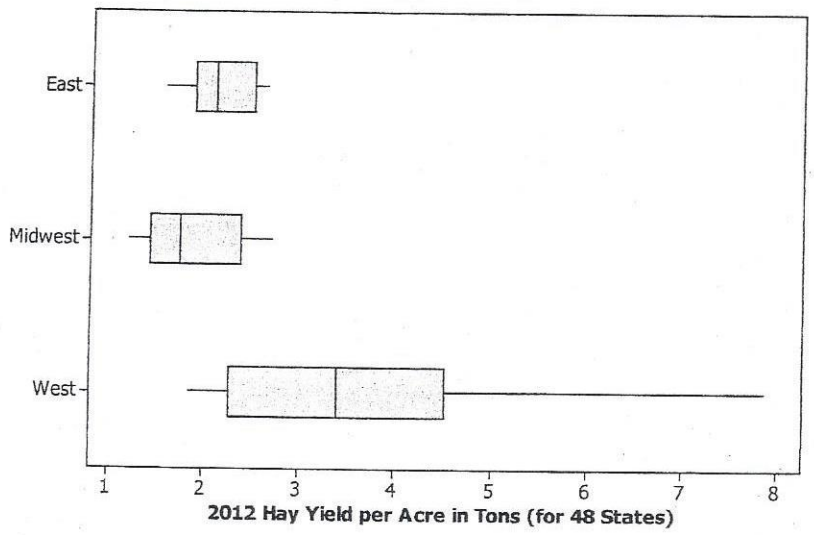
Los Angeles	Minneapolis
858	950
750	775
735	668
699	579
625	561
620	447
578	440
571	416
534	403
516	366

a. Draw horizontal box plots to compare the data.
b. Are there any outliers in this data? If so, which values are they?
c. Based on your box plots from (a), make some comparisons of the heights of the buildings in the two cities.

14.

According to the *United States Department of Agriculture National Agricultural Statistics Service Crop Production 2012 Summary*, in the contiguous 48 United States, there was a great deal of variability among states in terms of hay yield per acre. Do some regions of the United States generally have a higher hay yield per acre than other regions? The following box plots show the distribution of hay yield per acre (in tons) for 22 eastern states, 14 mid-western states, and 12 western states in 2012.

(From the *United States Department of Agriculture National Agricultural Statistics Service Crop Production 2012 Summary*, ISSN: 1057-7823, p. 75, accessed May 5, 2013 available at http://usda01.library.cornell.edu/usda/current/CropProdSu/CropProdSu-01-11-2013.pdf.)



a. Which of the three regions' data has the least variability? Which has the greatest? State a sentence or two that supports your choices by comparing relevant summary measures.

b. Is it true that the Western state with the smallest hay yield per acre has a higher hay yield than at least half of the Midwestern states? Explain how you know.

c. Which region has states with the largest hay yield per acre? Give two or three sentences comparing relevant summary measures or graphical attributes that supports your answer.

15. For a large group of dogs, the shortest dog was 6 inches and the tallest was 32 inches. One half of the dogs were taller than 18 inches. One-fourth of the dogs were shorter than 15 inches. The upper quartile of the dog heights was 23 inches. Draw a box plot and find the IQR.