Name: _____ **MAT 221**
Fall 2014 **Problem Set 2**

Problem 1: Fill in the blank:

(a) The five number summary includes the following five measurements:

_____, _____, _____, _____, and _____.

(b) The _____ and _____ are robust measures of center

while _____ and _____ are not.

(c) The standard deviation, σ, measures the spread about the _____.

(d) For a normal distribution, _____ of observations fall within one standard deviation

of the mean, _____ within two standard deviations from the mean,

and _____ within three standard deviations from the mean.

(e) Linear transformations do not change the _____ of a normal distribution but can

change the _____ and _____ of a distribution.

(f) If a class had a median exam grade of 61 and a mean exam grade of 66, the teacher may curve the class grade. Suppose the teacher adds 15 points to everyones grade. Then the new median grade is _____ and the new mean exam grade is _____.

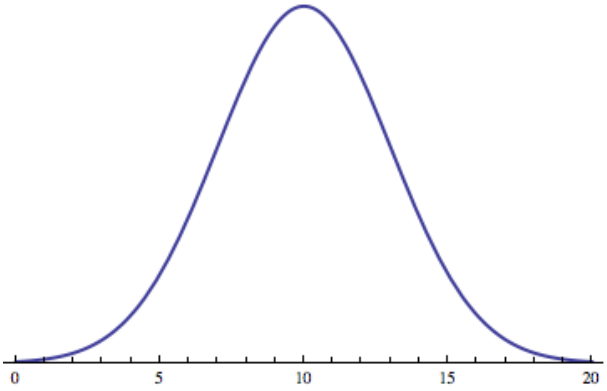
(g) Generalizing (f), if one applies the linear transformation $ax + b$ to a data set with median m and mean $\overline{x}$, the new median is _____ and the new mean is _____.

Problem 2: Is the mean or standard deviation more sensitive to outliers? Give an example to explain.

Problem 3: Draw the stemplot (stem-and-leaf plot) for the following data set:

15 16 18 20 21 23 23 23 31 37 51 56 57

Problem 4: Look at the following normal distribution:



Using the graph, answer the following questions about the distribution:

(a) What is the median What is the mean?

(b) What is the standard deviation?

(c) What percentage of data values fall between 7 and 10?

(d) What percentage fall between 10 and 16?

(e) What is the area under the curve between 7 and 10, and what is the area under the curve between 10 and 16?

Problem 5: Sketch a normal curve with mean 15 and standard deviation 3. Mark the scores that are within $\pm 3\,\sigma$ from the mean.

Problem 6: Recall the z-score:

$$z = \frac{x - \mu}{\sigma}$$

Explain verbally what z is measuring. Why does this measure how 'unusual' a value is from a distribution?

Problem 7: There are two major tests of readiness for college: the ACT and the SAT. ACT scores are reported on a scale from 1 to 36. This year, the ACT had mean 21.5 and standard deviation 5.4. The SAT scores are reported on a scale from 600 to 2400. This year, the SAT had mean 1498 and standard deviation 316. Suppose Jessica and Ashley took the SAT and ACT. Jessica took the SAT and scored 1825 while Ashley took the ACT and scored 28. Based on these scores, who do you think is better prepared for college? Explain your answer.