Howard University Math Department

1. (10 points) Here are the points scored by the South Carolina women's basketball team (Gamecocks) in the NCAA tournament:

   $$103, 101, 94, 78, 62, 51.$$

   Find the median, mode, and average. You must show your work and explain steps.

   Solution:

   Since there are an even number of data points, we take the average of the middle two values, namely $(94 + 78)/2 = 86$.

   The mode is every value because they all occur just once.

   The average is the sum divided by 6 namely $489/6 = 81.5$ points.

2. (Extra credit 5 points) What percentile rank does 51 points have among all the scores? You must show your work and explain steps.

   Solution: First you arrange the values in ascending order.

   51 is 1st out of 6 so $1/6 = 0.1667$ or 16.67 percent of the values are at or below it, so it is in the 16th percentile.

3. (10 points) For the same six values (points scored by Gamecocks) find the standard deviation. You must show your work and explain steps.

   Solution:

   The differences from the average are $21.5, 19.5, 12.5, -3.5, -19.5, -30.5$.

   Their squares are $462.25, 380.25, 156.25, 12.25, 380.25, 930.25$.

   Average of their squares (variance) is 386.91. Its square root is the standard deviation, and equals 19.67.

4. (10 points) For the following problem use these facts about data in normal distribution:

   68.2 percent lie within one standard deviation of the average ; 95.4 percent within two standard deviations ; 99.7 percent within three standard deviations.

   In a group of 1000 people, suppose the number of pizzas they eat in a year follows the normal distribution, with an average of 42 and standard deviation of 5. How many people eat between 32 and 52 pizzas in a year?

   Solution: Between 32 and 62 means average plus or minus two standard deviations because $32 = 42 - (2 \times 5)$ and $52 = 42 + (2 \times 5)$. So that means 95.4 percent of 1000 which is $1000 \times 0.954 = 954$ people.