**Problems 1 and 2 – Exploring the Normal Curve**

**1.** Describe the normal curve in your own words.

**2.** Why is the normal curve so useful?

**3.** How does changing the mean and standard deviation of a normal curve affect its shape?

**Problem 3 – Probability as Area**

Draw a picture to represent each area. Then find each area.

**4.** area within 1 standard deviation of the mean

**5.** area within 2 standard deviations of the mean

**6.** area within 3 standard deviations of the mean

**7.** entire area under the curve

**8.** area to the left of the mean

**9.** area to the right of the mean

**10**. area from 1 standard deviation to the left of the mean to the mean

**11.** area from the mean to 2 standard deviations to the right of the mean

**12.** area to the right of a line 3 standard deviations to the right of the mean

**13.** area to the left of a line 2 standard deviations to the left of the mean

**14.** area to the right of a line 1 standard deviation to the left of the mean

**Problem 4 – Application of the Normal Distribution**

A farmer harvests a crop of oranges. The oranges' weights are normally distributed with a mean of 310 grams and a standard deviation of 15 grams.

**15.** Sketch the graph of the normal distribution for this data. Be sure to label the axes and scale.

**16.** The farmer sells all the oranges weighing 280 grams or less to a juicer. What percent of the oranges will be sold to the juicer? (***Hint:*** Use your results from Problem 3.)

**17.** The farmer sells all the oranges weighing 300 grams or more to a commercial buyer. What percent of his oranges will be sold to the commercial buyer?

**18.** What does it mean if a test score is at the $75^{th}$ percentile?

**19.** What is the percentile rank of an orange weighing 320 grams?

**20.** What is the weight of an orange at the $84^{th}$ percentile?