Sample Means Date _____

Example: The height of young women follows a normal distribution with a mean of 64.5 inches and a standard deviation of 2.5 inches.

a) Find the probability that a randomly selected young women is taller than 66.5 inches.

b) Find the probability that the mean height of an SRS of 10 young women exceeds 66.5 inches.

Problems:

1. A bottling company uses a filling machine to fill plastic bottles with cola. The bottles are supposed to contain 300 milliliters (ml). In fact, the contents vary according to a normal distribution with mean μ = 298 ml and standard deviation σ = 3 ml.

a. What is the probability that an individual bottle contains less than 295 ml?

b. What is the probability that the mean contents of the bottles in a six-pack is less than 295 ml?

2. At the P. Nutty Peanut Company, dry-roasted, shelled peanuts are placed in jars by a machine. The distribution of weights in the jars is approximately Normal, with a mean of 16.1 ounces and a standard deviation of 0.15 ounces.

(a) Without doing any calculations, explain which outcome is more likely: randomly selecting a single jar and finding that the contents weigh less than 16 ounces or randomly selecting 10 jars and finding that the average contents weigh less than 16 ounces.

(b) Find the probability that a randomly selected jar contains less than 16 ounces of peanuts.

(c) Find the probability that 10 randomly selected jars contain less than 16 ounces of peanuts, on average.

3. The weights of newborn children in the United States vary according to the Normal distribution with mean 7.5 pounds and standard deviation 1.25 pounds. The government classifies a newborn as having low birth weight if the weight is less than 5.5 pounds.

a) What is the probability that a baby chosen at random weighs less than 5.5 pounds at birth?

b) You choose three babies at random and compute their mean weight. What is the probability that their average birth weight is less than 5.5 pounds?