

STAT/MA 41600
In-Class Problem Set #36: November 9, 2016

- 1.** Consider 5 students who each have a container of water, for which the volume (in cups) is Normally distributed with mean 1.9 and standard deviation 0.3.
 - 1a.** If the students combined their containers, what is the probability that the students have at least 10 cups of water?
 - 1b.** Find a value c such that there is a 90% chance that the students have at least c cups of water altogether in their 5 containers.

- 2.** In City A, the average amount of rainfall during a year is 35 inches, and the standard deviation is 3 inches. In City B, the average annual rainfall is 31 inches, and the standard deviation is 2 inches. What is the probability that City A has greater rainfall in a year than City B? (You may assume that the rainfall is independent in these two cities.)

- 3.** A big rock has weight that is Normally distributed with mean 21 pounds and standard deviation 2 pounds. A small rock has weight that is Normally distributed with mean 10 pounds and standard deviation 1.5 pounds. It is assumed that the weights of all rocks are independent.
 - 3a.** What is the probability that the sum of the weights of 5 big rocks exceeds 100 pounds?
 - 3b.** Suppose we measure the weights of 1000 small rocks. What is the probability that the sum of the weights exceeds 10,020 pounds?

- 4a.** What is the probability that, if a big rock and two small rocks are chosen, the big rock is heavier than the sum of the weights of the two small rocks?
- 4b.** If X denotes the weight of a big rock and Y denotes the weight of a small rock, what is $P(2Y \leq X \leq 2Y + 1)$?