Stat509 Fall 2014 Homework 4
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Instruction: Please finish this homework before the class on 10/14. You will have a quiz based on this homework during the class.

1. Suppose Y is a normal random variable with a mean of 25 and a standard deviation of 1.5. Apply Empirical rule, calculate the following probability.

   (a) Approximately what proportion of the distribution lies between 23.5 and 26.5?

   (b) Approximately what proportion of the distribution lies between 23.5 and 28?

   (c) Approximately what proportion of the distribution is greater than 28?

2. The weight of a ream of paper follows a normal distribution with a mean of 2.8 pounds and a standard deviation of 0.8 pounds. Use R or standard normal table to answer the following questions

   (a) Approximately what proportion of the reams weigh less than 2.2 pounds?

   (b) Find out the value in pound such that 5% of the reams weigh more than this value.

   (c) What is the probability that a randomly chosen ream will weigh less than 0.9392 pounds?

   (d) What is the approximate probability that a randomly chosen ream will weigh between 1.5 and 3.5 pounds?

   (e) If the specification calls for the reams to weigh 2.8 ± 1.6 pounds, about what proportion of the reams are out-of-specification?

3. Assume that in the detection of a digital signal the background noise follows a normal distribution with a mean of 0 volt and standard deviation of 0.45 volt. The system assumes a digital 1 has been transmitted when the voltage exceeds 0.9.

   (a) What is the probability of detecting a digital 1 when none was sent?

   (b) Determine symmetric bounds about 0 that include 99% of all noise readings.

4. (Redo questions in notes) The army reports that the distribution of head circumferences among male soldiers is approximately normal with a mean of 22.8 inches and standard deviation of 1.1 inch. The army plans to make helmets in advance to fit the middle 98% of head circumferences for male soldiers. What head circumferences are small enough or big enough to require custom fitting?

5. (Redo questions in notes) The distribution of head circumferences among female soldiers is approximately normal with mean 22.2 inches and standard deviation 1.4 inches. Female soldiers use the same type of helmet as male soldiers (from previous question). What percent of female soldiers can be fitted with a made-in-advance helmet?