STAT/MA 41600
In-Class Problem Set #35: November 6, 2017

1a. Consider a standard Normal random variable Z. Find a constant c with the property that $P(-c < Z < c) = 0.8324$.

1b. Now consider a Normal random variable Y with $\mathbb{E}(Y) = 4.2$ and $\text{Var}(Y) = 2.3$. Find a constant c with the property that $P(4.2 - c < Y < 4.2 + c) = 0.8324$.

2. When choosing a random gas station in the State of Indiana, assume that the price of "unleaded 87 octane gas" is modelled by a Normal random variable with mean \$2.60 and standard deviation \$0.10. What is the probably that, if we choose a gas station randomly, the price of gas is in the range \$2.50 to \$2.75?

3. Pregnancy length (according to `https://www.ncbi.nlm.nih.gov/pubmed/8590208`) is, on average, 283.6 days. Suppose that the standard deviation of the length of a pregnancy is 1.5 days. Find the probability that a pregnancy lasts in the range 282 to 286 days.

4. Suppose that the books published by a certain book publisher have weights that (roughly) have a Normal distribution with mean 14.2 ounces and standard deviation 1.7 ounces.

4a. What is the probability that such a book weighs less than 1 pound (i.e., less than 16 ounces)?

4b. What is the probability that such a book weighs in the range 13 to 15 ounces?

4c. Suppose that we select ten books from this publisher, and that their weights are independent. A book is considered "heavy" if it weighs 16 ounces or more. What is the probability that exactly three of the ten selected books are considered "heavy"?