STAT/MA 41600
Practice Problems: October 29, 2014

1. Suppose that X has CDF

$$F_X(x) = \begin{cases} 0 & x < 2, \\ \frac{x-2}{4} & 2 \leq x \leq 6, \\ 1 & x > 6. \end{cases}$$

a. Find $P(X \leq 4.5)$.

b. Find $P(3.09 \leq X \leq 4.39)$.

c. Find $P(X \geq 3.7)$.

2. Assume that the amount of soda in a can is uniformly distributed between 11.93 ounces and 12.02 ounces.

a. What is the probability that it has more than the stated quantity that is printed on the can, which is 12 ounces?

b. What is the standard deviation of the amount (in ounces) of soda in the can? (Remember that the standard deviation is the square root of the variance.)

3. Suppose that, when you buy gas at the gas station, the price is uniformly distributed between \$4.30 and \$4.50 per gallon. You plan to buy 12 gallons of gasoline, plus a candy bar for an extra \$1.00. (Assume that there is no tax on your purchase.)

a. Find the expected value of the cost of your purchase.

b. Find the variance of the cost of your purchase.

4. Let X, Y, Z be independent and uniformly distributed on the interval $[0, 10]$. Find the probability that Y is the middle value, i.e., find $P(X < Y < Z \text{ or } Z < Y < X)$.

5. Suppose X, Y have constant joint density on the triangle with vertices at $(0, 0)$, $(3, 0)$, and $(0, 3)$.

Find $\mathbb{E}(\min(X, Y))$.