STAT/MA 41600
In-Class Problem Set #44: December 10, 2014

1. Suppose that X is a continuous random variable that is Uniformly distributed on $[0, 3]$.
1a. Find $\mathbb{E}(X^2)$.
1b. Find $\text{Var}\,(X^2)$.

2. Define $Y = X^2$, where X is Uniformly distributed on the interval $[0, 3]$.
2a. What are the possible values that Y can be?
2b. Find the CDF $F_Y(y)$ of Y.
2c. Find the density $f_Y(y)$ of Y.
2d. Use your answer to part **2c** to find $\mathbb{E}(Y)$. Check that your solution matches **1a**.
2e. Use your answer to part **2c** to find $\text{Var}\,(Y)$. Check that your solution matches **1b**.

3. Suppose that X is an Exponential random variable with $\mathbb{E}(X) = 1/4$.
3a. Find $\mathbb{E}(3X + 2)$.
3b. Find $\text{Var}\,(3X + 2)$.

4. Define $Y = 3X + 2$, where X is an Exponential random variable with $\mathbb{E}(X) = 1/4$.
4a. What are the possible values that Y can be?
4b. Find the CDF $F_Y(y)$ of Y.
4c. Find the density $f_Y(y)$ of Y.
4d. Use your answer to part **4c** to find $\mathbb{E}(Y)$. Check that your solution matches **3a**.
4e. Use your answer to part **4c** to find $\text{Var}\,(Y)$. Check that your solution matches **3b**.