STAT/MA 41600
In-Class Problem Set #44: December 5, 2018

1. Suppose that X is a continuous Uniform random variable on the interval $(0, 1)$. Define $Y = -(1/7)\ln(X)$.
1a. What values can Y take on?
1b. What is the CDF of Y?
1c. What kind of random variable is Y? What is/are its parameter(s)?

2. Suppose that X is an Exponential random variable with $\lambda = 5$, i.e., $\mathbb{E}(X) = 1/5$. Define $Y = e^{-5X}$.
2a. What values can Y take on?
2b. What is the CDF of Y?
2c. What kind of random variable is Y? What is/are its parameter(s)?

3a. Suppose that X is an Exponential random variable with parameter λ, i.e., with $\mathbb{E}(X) = 1/\lambda$. Suppose that $c > 0$ is a positive constant, and define $Y = cX$. Is Y necessarily an Exponential random variable too? Why or why not? What is/are the parameter(s) of Y?

3b. Suppose that X is a Normal random variable with mean μ and variance σ^2. Suppose that $c > 0$ is a positive constant, and define $Y = cX$. Is Y necessarily a Normal random variable too? Why or why not? What is/are the parameter(s) of Y?

3c. Suppose that X is a continuous Uniform random variable on $(0, b)$ for some fixed positive value b. Suppose that $c > 0$ is a positive constant, and define $Y = cX$. Is Y necessarily a continuous Uniform random variable too? Why or why not? If Y is Uniform, then what interval is Y uniform on?

4. (Review question) Consider 18 bears sitting around a circle: 3 red, 3 orange, 3 yellow, 3 green, 3 blue, 3 purple, with all arrangements equally likely. A bear is happy if her/his buddies of the same color are sitting on her/his left *and* right sides.

What is the variance of the number of happy bears?

I really enjoyed working with each and every one of you this semester! It is always OK to stop by and see me, if I can help with your exam review, or with anything about life in general! Dr Ward is here for you!