STAT/MA 41600
In-Class Problem Set #43: December 3, 2018

1. If X is a Geometric random variable with probability mass function $p_X(x) = (3/5)(2/5)^{x-1}$ for integers $x \geq 1$, and $p_X(x) = 0$ otherwise, find the moment generating function of X.

2. If X is an Exponential random variable with probability density function $f_X(x) = 7e^{-7x}$ for all $x > 0$, and $f_X(x) = 0$ otherwise, find the moment generating function of X.

3a. Use the forms of the moment generating function in question **1** to verify the expected value of X.

3b. Use the forms of the moment generating function in question **2** to verify the expected value of X.

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. How many bears do we expect to be happy?

(Please note, for instance, if the three blue bears are all sitting in a consecutive row, then the middle blue bear is happy but the other two blue bears are not happy.)