Week 3 HW

1. Larsen and Marx: 3.2.1,3.2.15,3.3.1,3.3.2,3.3.7,3.4.1,3.4.5,3.4.10, 3.4.11,3.4.18.

2. Suppose the probability of clearing UPSC exam in a single attempt is p and suppose it can be attempted any number of times. Suppose an aspirant attempts the exam repeatedly until they clear the exam for the first time. Assume the aspirant is really lazy and doesnt prepare at all before attempting. In other words, assume outcome of all attempts are independent events. Let N denote the total number of failed attempts.

   (a) Show that for a whole number k, the p.m.f is $f_N(k) := \Pr(N = k) = (1-p)^k p$.

   (b) Show that $\mathbb{E}(N) = \dfrac{1-p}{p}$.

   For UPSC, google shows $p = 0.002$, the average number of failed attempts (without preparation) is 499! Even the first round clearance rate is around $p = 0.011$. So the average number of failed attempts is around 89.

3. Let $X \sim$ Uniform(0,1), compute the p.d.f of X^3 and compute $\mathbb{E}(X^3)$.