Quiz 2 2017.05.16

1. (20%) Draw the CDFs of the following random variables
   - discrete uniform random variable taking an integer in $\{1, \ldots, 5\}$
   - exponential random variable with parameter $\lambda = \frac{1}{2}$
2. (20%) Strong swims a lap for 3 times, and the fastest one will be recorded as his test time. Assume that the time in each lap is a continuous uniform random variable ranging from 50 to 70 seconds. What is the PDF of the recorded test time?
3. (20%) Romeo and Juliet have a date. Each will be late for an exponential random time with a mean of 30 minutes. Romeo can wait 10 minutes for Juliet, while Juliet waits for nobody. What is the probability that they meet?
4. (20%) Archer Lin shoots at a target. We assume that he always hits the target, and that all points of impact are equally likely. The target is ruled by 3 concentric circles with incremental radii of 20 cm between adjacent circles. A shot scores 10 at the center, and 8 at the outermost circle. What is the mean of the score of a shot?
5. (20%) From home, Julia first takes the subway to school and then walks to classroom. The time X for subway and Y for the walk are independent, distributed approximately with
$$X \sim \mathcal{N}(20, 16), \quad Y \sim \mathcal{N}(10, 9)$$
What is the probability that it takes Julia more than 35 minutes to go from home to classroom?