Homework 3, ISyE 2027

1. Let X be a discrete random variable with $P\{X = i\} = ci$ for positive, odd integers $i \leq 11$; otherwise, the probability is zero. Compute the value of c.

2. What is more likely (a) one 6 in 6 rolls of one die or (b) two 6's in 12 rolls.

3. When Al and Bob play tennis, Al wins a set with probability 0.7 while Bob wins with probability 0.3. What is the probability Al will be the first to win (a)two sets (b)three sets.

4. Let X be a random variable with distribution function given in (1).

$$F(x) = \begin{cases} 0 & \text{for } x < 0 \\ \frac{1}{2} & \text{for } 0 \leq x < 1 \\ \frac{3}{5} & \text{for } 1 \leq x < 2 \\ \frac{4}{5} & \text{for } 2 \leq x < 3 \\ \frac{9}{10} & \text{for } 3 \leq x < 3.5 \\ 1 & \text{for } x \geq 3.5 \end{cases} \tag{1}$$

Find the probability mass function of X.