Homework 7, ISyE 2027
Due October 17, Friday

1. Consider the random variable X with

$$F(x) = \begin{cases} 0 & \text{for } x < 0 \\ \frac{x^2}{16} & \text{for } 0 \le x \le 4 \\ 1 & \text{for } x > 4 \end{cases} \tag{1}$$

Compute $E[X]$

2. A rod of length L is bent until it snaps in two. The point of breakage X, as measured from one end of the rod, has a probability density function

$$f_X(x) = Ax(L - x) \qquad \text{for } 0 \le x \le L.$$

(a) Compute A.

(a) What is the expected difference in the lengths of the two pieces of rod?

3. Let X be a random variable with cumulative distribution function given below

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

Compute $E[X]$.