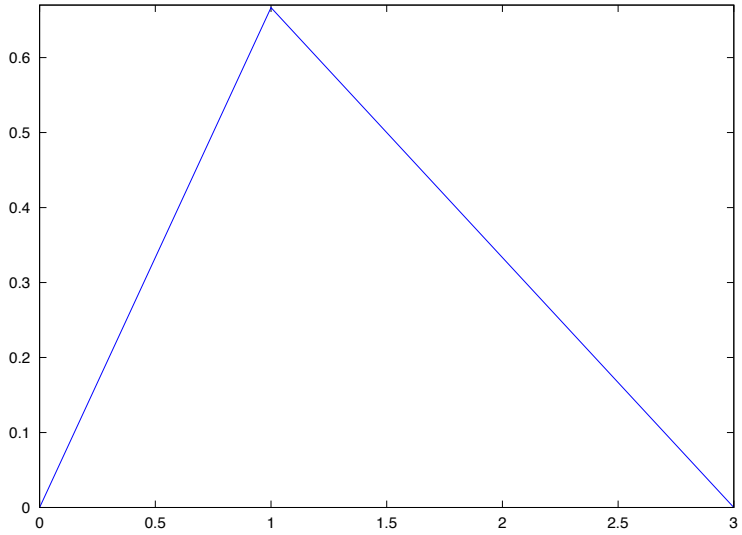
1. A random variable X results from an experiment in which a fair 1 6-sided die is rolled at the same time a fair coin is flipped. Specifically, X = {the number of dots showing on the die + Number of heads showing on the coin}.

a) Determine all possible values of X and the probability of occurrence for each of these values (i.e., the *pmf* of X). Show your work or justify your answer.

b) Plot the CDF $F(x)$ of X. Clearly label all values (on both axes).

c) Determine the mean of X. Show your work.

2. Let X be a continuous random variable with the following probability density function (*pdf*):



given mathematically by

$$f(x)=\begin{cases} \frac{2}{3}x, & 0\le x\le 1 \\ 1-\frac{x}{3}, & 1<x\le 3 \\ 0, & Otherwise \end{cases}.$$

a) Determine $P\{X < 1\}$.

b) Calculate the mean of X.

b) Calculate the variance of X.