STA107: Winter 2022
Midterm Test: Sample Solutions

Question 1: Consider a random variable X with support $R_X = \{0, 1, 2, 3, 4\}$ and probability function:

x	0	1	2	3	4
f(x)	0.25	2k	0.1	k/2	0.05

(a) Find k.

(b) Find the cumulative distribution function of X.

Solution:

(a) If this is a valid probability function, then it must sum to one over the support, so we have:

$$\sum_{x \in R_X} f(x) = 1 \Rightarrow 0.25 + 2k + 0.1 + k/2 + 0.05 = 1 \Rightarrow 2.5k = 1 - 0.40 \Rightarrow k = \mathbf{0.24}.$$

(b) We must add probabilities (masses at the jumps) to find the CDF:

(i) First, for $x < 0$, $F(x) = 0$.

(ii) For $0 \leq x < 1$, $F(x) = 0.25$