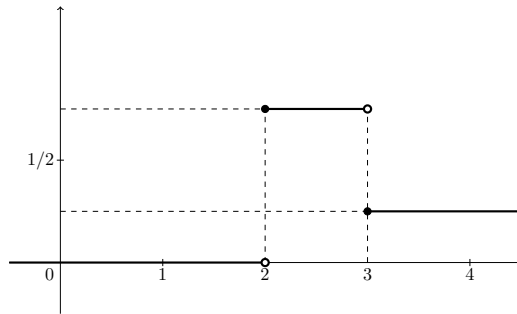


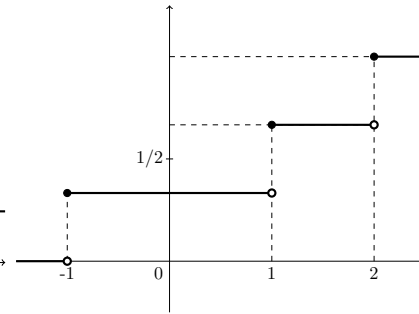
Quiz 2

The duration of this test is 15 minutes. Collaboration is prohibited, as are documents (textbook, personal notes) and calculators. Partial credit will be given for incomplete yet relevant attempts.

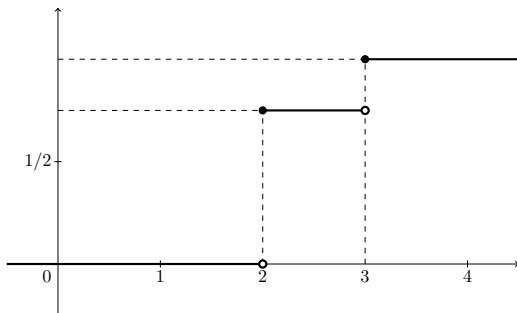
1. Among the following four figures are three graphs of cumulative distribution functions, and one decoy. Find the decoy, and match the remaining graphs with the discrete distributions $Unif(\{-1, 1, 2\})$, $NegBin(2, 2/3)$ and $\mathcal{H}Geom(3, 1/3)$.



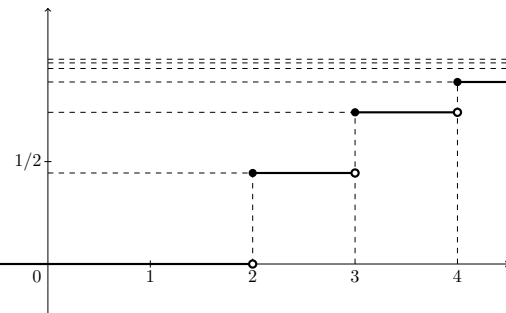
Graph 1: decoy



Graph 2: $Unif(\{-1, 1, 2\})$



Graph 3: $\mathcal{H}Geom(3, 1/3)$



Graph 4: $NegBin(2, 2/3)$

2. Give the median for one variable of your choosing, out of the previous three non-decoy graphs.
The median for the graphs 2, 3 and 4 are 1,2 and 3 respectively.

3. What is the expectation of N , for N a binomial random variable of parameter (n, p) ?

$$\mathbb{E}[N] = np.$$

4. Let X be a Bernoulli of parameter p . What is the expectation $\mathbb{E}[3X - 2]$?

$$\mathbb{E}[3X - 2] = 3\mathbb{E}[X] - 2 = 3p - 2.$$

Alternatively,

$$\mathbb{E}[3X - 2] = (3 \cdot 0 - 2) \cdot \mathbb{P}(X = 0) + (3 \cdot 1 - 2) \cdot \mathbb{P}(X = 1) = -2 \cdot (1 - p) + 1 \cdot p = 3p - 2.$$