MATH 30350
Introduction to Probability

Name: _____

March 4th

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. What is the mean of the distribution $\mathcal{H}yper\mathcal{G}eom(w, b, n)$?

$$\text{expectation} = \frac{nw}{w+b}$$

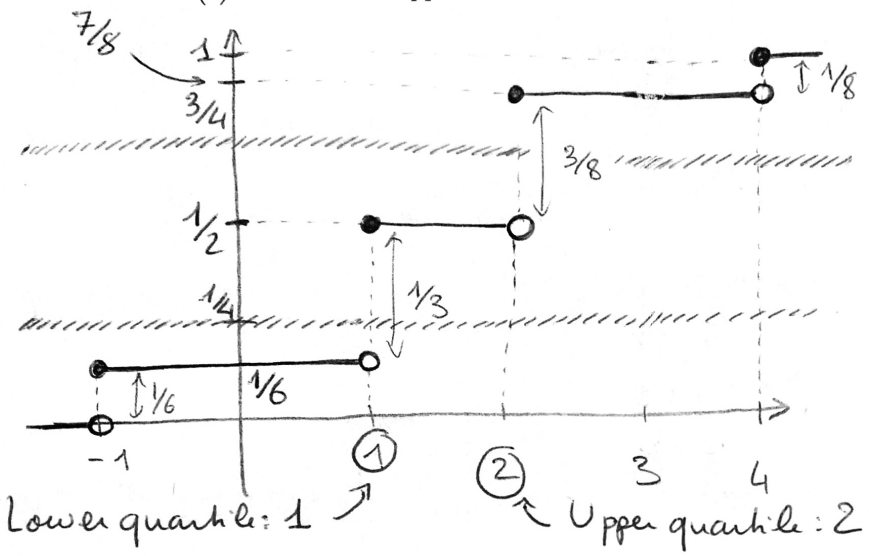
2. In March, about 4 meteors are bright enough to be visible every hour of the night. Write N for the number of meteors visible during the 11 hours of the night. Which distribution would be a good model for N? What would its parameter(s) be?

$$N \sim Poi(44)$$

3. A random variable N can only take the values -1, 1, 2 and 5, with probabilities

$$\mathbb{P}(N=-1)=\frac{1}{6},\quad \mathbb{P}(N=1)=\frac{1}{3},\quad \mathbb{P}(N=2)=\frac{3}{8},\quad \mathbb{P}(N=4)=\frac{1}{8}.$$

(a) What are the upper and lower quartiles of N?



(b) What is the mean of N? Give your answer as a fraction, possibly unreduced.

$$\mathbb{E}[N] = -1\cdot\mathbb{P}(N=-1)+1\cdot\mathbb{P}(N=1)+2\cdot\mathbb{P}(N=2)+4\cdot\mathbb{P}(N=4)$$
$$= -\frac{1}{6}+1\cdot\frac{1}{3}+2\cdot\frac{3}{8}+4\cdot\frac{1}{8}$$
$$= -\frac{1}{6}+\frac{1}{3}+\frac{3}{4}+\frac{1}{2}$$
$$= \frac{-4+8+18+12}{24} = \frac{34}{24} = \frac{17}{12}.$$