

Quiz 2 2016.04.06

1. (20%) Suppose

$$p_X(x) = \begin{cases} \frac{1}{9}, & \text{if } x \text{ is an integer in } [-3, 5] \\ 0, & \text{otherwise} \end{cases}$$

Find the PMF of Y , where

$$Y = X^2$$

2. (30%) What are the PMF, mean and variance of the sum of 2 rolls of a fair 6-sided die?
3. (20%) A student takes a test until he passes the test, each time with a probability 0.3 of passing, independent of the previous attempts, up to a maximum number of 3 times. What is the conditional PMF of the number of attempts K , given that the student passes the test?
4. (30%) Consider a transmitter that is sending messages over a computer network. Let Y be the length of a message, and X be the travel time of the message. Suppose the PMF of Y is

$$p_Y(10^2) = 2/3, \quad p_Y(10^4) = 1/3$$

Furthermore

$$X = 10^{-1}Y, \text{ with probability } 1/2$$

$$X = 10^{-2}Y, \text{ with probability } 1/3$$

$$X = 10^{-3}Y, \text{ with probability } 1/6$$

Find the joint PMF of X and Y , and the PMF of X .