

1. Let X be a random variable with the following PMF:

$$f(x) = \begin{cases} \frac{x^2}{10} & \text{for } x = -2, -1, 0, 1, 2 \\ 0 & \text{otherwise.} \end{cases}$$

- (a) Show that this is a valid PMF.
- (b) Find the CDF of X . Plot it.
- (c) What is $f(-1)$? What is $F(-1)$?
- (d) Let $Y = X^2$. What is the PMF of Y ?

-
2. Consider an experiment in which we roll two six-sided dice. Let X be the sum of the two dice. Let Y be the absolute difference between the two dice.
- (a) Find $f_x(10)$. (eg, there are 36 possible outcomes to an experiment that rolls two dice. How many sum to 10?)
- (b) Find $f_y(2)$. (eg, there are 36 possible outcomes to an experiment that rolls two dice. How many have a difference of 2?)
- (c) Find $f_{x,y}(x = 10, y = 2)$. (How many outcomes both sum to 10 and have a difference of 2?)
- (d) Are X and Y independent? Why or why not?