

Name: Section A01

1. (10 points) Assume you toss 3 coins: 2 fair coins and 1 double-headed coin. Let X be the number of heads. (Remark: X is not the random variable binomial($3, \frac{1}{2}$) since $P(X = 0) = 0$).

- (a) Compute $P(X \geq 4)$

0, since we can have at most 3 heads out of 3 coins.

- (b) Compute $P(X = X^2)$

$$\begin{aligned} &= P(X=0 \cup X=1) \\ &= P(X=0) + P(X=1) \\ &= 0 + \frac{1}{4} = \boxed{\frac{1}{4}} \end{aligned}$$

- (c) Plot F_x

$$f(x) = \begin{cases} 0 & \text{if } x < 1 \\ \frac{1}{4} & \text{if } 1 \leq x < 2 \\ \frac{3}{4} & \text{if } 2 \leq x < 3 \\ 1 & \text{if } 3 \leq x < 4 \end{cases}$$

