

# MATH 241 Chapter 4 part 2 Live Exercises

1. Let the random variable  $X$  denote the GP a certain student will earn in this class. Suppose its pmf is

$$p(0) = 0.05, \quad p(1) = 0.05, \quad p(2) = 0.3, \quad p(3) = 0.4$$

Calculate their GP variance  $Var[X]$ .

2. Find  $Var(X)$  if

$$P(X = a) = p = 1 - P(X = b)$$

3. If  $E[X] = 1$  and  $Var(X) = 5$ , find

(a)  $E[(2 + X)^2]$

(b)  $Var(4 + 3X)$

4. Let  $X$  be the number of 6 obtained when roll four fair 6-sided dice simultaneously. Its pmf is.

$x$	0	1	2	3	4
$p(x)$	0.4823	0.3858	0.1157	0.0154	0.0008

Find its cdf  $F(x)$ .

5. I drink a cup of coffee everyday. About 80% of the time I buy coffee from CraftedKup, about 20% of the time from the Starbucks. Compute the probability I drink 4 cups of Starbucks coffee in 10 days.
6. Random variable  $X \sim \text{Binom}(n, p)$ , and the value of  $n$  is fixed. For any fixed  $n$ , find  $p$  such that the distribution of  $X$  has the largest spread.