

## Homework 4

Do the problems on webwork and turn the following problems in class on Oct. 1st.

Homework should be written neatly and clearly explained. If it requires more than one sheet, the sheets must be stapled. Include your name and id number in the top right corner of your homework.

**Problem 1.** You simultaneously roll a six-sided die (with sides labeled 1–6) and a ten-sided die (with sides labeled 1–10) until the sum of the dice is 3. Let  $X$  be the trial on which this happens.

- (a) What is the pmf of  $X$ ?
- (b) What is  $\mathbb{E}[X]$  and  $\text{Var}(X)$ ?
- (c) What is the probability that the six-sided die displays a 1 on the last roll?

**Problem 2.** Let  $Y$  be a random variable with pmf:

$$p_Y(k) = \begin{cases} Ck^2 & \text{if } k = -1, 0, 1, 2 \\ 0 & \text{otherwise} \end{cases}$$

- (a) What is  $C$ ?
- (b) What is  $\mathbb{E}[Y]$ ?
- (c) What is  $\mathbb{E}[Y^3 - 3Y + 4]$ ?

**Problem 3.** Generate of random sample of 1,000 binomial random variables with  $p = 1/10$  and  $n = 50$ .

- (a) Plot the histogram of your simulation.
- (b) What is the largest value you observed?
- (c) What is the mean of your sample?