

Homework 4

Do the problems on **Webwork** and turn the following problems in class on Feb. 21st.

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. Let X be a discrete random variable with pmf:

$$p_X(k) = C - k/10 \text{ for } k = 1, 2, 3 \text{ and } p_X(k) = 0 \text{ otherwise.}$$

1. What is C ?
2. What is $\mathbb{E}[X]$?
3. What is $\text{Var}[X]$?
4. What is $\mathbb{E}[(1 + 3X)^{-1}]$?

Problem 2. A machine uses 10 devices to operate, each device fails with probability .1, independently.

1. What is the expectation of the number of devices that will fail?
2. The machine will work correctly as long as there are 8 devices that don't fail. What is the probability the machine works?
3. If you inspect 4 devices and see that they didn't fail, what is the probability the machine works? (Once again as long as there are a total of 8 devices that don't fail, the machine works.)