

## Homework 10

Do the problems on webwork and turn the following problems in class on Dec. 3rd.

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.** Consider the following 2-step experiment. In the first stage of the experiment we roll a fair six-sided die until we get a 1, and we remember how many times we had to roll it. Let  $X$  be the number of times the die was rolled. In the 2nd stage of the experiment we will toss a fair coin  $X$  times. Let  $Y$  be the number of heads in the second stage.

Compute  $E[Y]$  and  $\text{Var}(Y)$ .

[Hint: Use the formulas from 5.11, and don't try to compute the pmf of  $Y$ ]

**Problem 2.** Let  $X$  be a continuous uniformly distributed random variable on the interval  $[-2, 1]$  and  $Y = 4 - X^2$ . Compute the pdf of  $Y$ .

**Problem 3.** The amount of time it takes for a train to arrive is an exponential random variable with mean 1. Once the train arrives the amount of time to load the train is a random variable uniformly distributed on the interval  $[0, 3]$ . These two random variables are independent. Compute the pdf of the time for the train to arrive plus the time to load.