

## Homework 4

Do the problems on webwork and turn the following problems in class on Feb. 22th.

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 go to a casino with \$31 and the following strategy:

In the first round you bet \$1, if you win, you receive double your bet, you leave. If you lose you double your bet to \$2. You continue this strategy that you receive double your bet and leave if you win, and doubling you bet in the previous round if you lose, until you run out of money.

Let  $X$  equal the total amount of money you win ("winning" a negative amount of money is the same as losing that amount).

If the probability of winning in each round is independent and equal to  $9/20$ :

- (a) What is the pmf,  $p_X(x)$ , of  $X$ ?
- (b) What is  $\mathbb{E}[X]$  and  $\text{Var}[X]$ ?

**Problem 2.** You are dealt one card from a full deck of 52 cards and your opponent is dealt two cards (without replacement). If you get a face card (jack, queen or king) your opponent pays you 5, if you get an ace your opponent pays you 2. If you don't have a face card or an ace, but you have a spade and your opponent doesn't have a spade they pay you 1. In all other cases you pay 1. What is the expectation of your winnings?