Homework Set 5

DUE: MAR 9, 2020 (AT THE BEGINNING OF CLASS)

To be handed in:

Please write your solution to Problems 1 and 2 on a single sheet of paper!

1. You are shown 5 coins, of which 4 are normal and 1 is a trick coin with heads on both sides. After the coins are scrambled together, one is picked at random and flipped 4 times, and you observe 4 heads. What is the probability that the coin that was tossed is the trick coin?

2. Suppose each round costs $1.00 at a slot machine on which you can win $2.00 with probability $p = 40\%$. You start playing with $10.00 and decide that you will keep playing until you either double your wealth (that is, earn another $10.00) or run out of money. What is the probability that you run out of money?
   (Remember: You do not need to simplify your answer.)

Bonus: If you want a challenging extra question, that will not count towards your grade, but might be fun to think about, then try answering this follow up to Problem 2:

> In the same situation as in Problem 2, what would have to be the smallest value of p so that you have at least 90% chance of doubling your wealth?

Spoiler: $p \cong 55.47\%$