

HOMWORK ASSIGNMENT # 6

ASSIGNED: OCTOBER 29, 2009 DUE: NOVEMBER 5, 2009

I suggest that you make a wheel which represents the following bets to show your work.

- (1) In craps, the “Don’t Pass” bet is a bet that the shooter loses. The bet pays \$1 if the shooter rolls a 2 or 3 on the first roll of the die or if the shooter rolls a 7 before the point. The bettor loses \$1 if the shooter rolls a 7 or 11 on the first roll of the die or if the shooter rolls the point before a 7. In order to make this bet favor the house, if the shooter rolls a 12 on the first roll the payoff is \$0 (push). What is the expected value on the “Don’t Pass” bet? What is the house advantage on this bet? How does it compare to a \$1 bet on the Pass line?
- (2) In many casinos, if the first roll is not 2,3,7,11,12 then the bettor is able to place an extra bet called ‘pass odds’ or called ‘taking odds.’ You cannot take odds unless there is already a pass bet that belongs to you. The advantage of taking odds on a pass bet is that the money that is placed when you ‘take odds’ pays with true odds related to the point.

$$\text{on the odds bet part only} = \begin{cases} \text{first roll 4 or 10} & \text{pays } 2 : 1 \text{ on a 7 before the point} \\ \text{first roll 5 or 9} & \text{pays } 3 : 2 \text{ on a 7 before the point} \\ \text{first roll 6 or 8} & \text{pays } 6 : 5 \text{ on a 7 before the point} \end{cases}$$

Say that as a bettor you choose the strategy of playing a \$1 pass bet and then taking $5\times$ odds on this bet. That is, if the first roll is a 2,3,12 you lose \$1, if the first roll is 7 or 11 then you win \$1. If the point is 4 or 10 and the shooter rolls a 7 before the point, then you lose \$6 (because you place \$5 when the point is set), but if the shooter rolls the point before a 7 then you win \$11 ($= 2 \cdot \$5 + \1). If the point is 5 or 9 : you lose \$6 if the shooter rolls a 7 before the point and you win \$8.50 ($= \frac{3}{2} \cdot \$5 + \1) if the shooter rolls the point before the 7. Finally, if the point is a 6 or 8 : you lose \$6 if the shooter rolls a 7 before the point and you win \$7 ($= \frac{6}{5} \cdot \$5 + \1) if the shooter rolls the point before the 7. What is the expected value of the \$1 pass bet with $5\times$ odds? It is hard to say with the house advantage is, because you are wagering \$1 for part of this bet and \$6 for the second part.

- (3) Two women who each have 3 children make the following statements:

Woman #1: “My eldest child is a girl.”

Woman #2: “At least one of my children is a girl.”

What is the probability that Woman #1 has 3 girls? What is the probability that Woman #2 has 3 girls?