

Project #2

50 Points

MATH 102 Sections 02 and 03

Due Wednesday, December 3, 2008

1. In this first question you will analyze Hot Lotto, a lottery game that can be played in Minnesota. When you buy a hot lotto ticket you choose 5 different numbers between 1 and 39, and a hot number between 1 and 19. In order to win you must match numbers. The following table tells you how much you can win.

Numbers MATCHED	Prize
5 numbers + hot number	at least \$1,000,000
5 numbers	\$10,000
4 numbers + hot number	\$500
4 numbers	\$50
3 numbers + hot number	\$50
3 numbers	\$4
2 numbers + hot number	\$4
1 number + hot number	\$3
hot number	\$2

- (a) (10 pts) Compute the probability of winning each different prize. (You will compute 9 probabilities.)
 - (b) (10 pts) Use the information you determined in the previous question and assume the jackpot is \$1,000,000 to calculate the expected value of a Hot Lotto ticket. Is the game fair?
 - (c) (10 pts) Determine what the prize for the jackpot (5 numbers + hot number) would have to be to make the game fair. Is this a reasonable jackpot?
2. Consider the pirates dice game that we played. Use binomial probabilities to answer the following questions.
 - (a) (10 pts) You are playing a game with 3 other people. It is the 12th round. The person previous to you bids 5 fours. You roll a skull and a six. Determine the probability that there are at least 5 fours on the table. Based on your computation, do you increase the bid, or do you challenge? (Hint, determine the probability of exactly 5 fours, exactly 6 fours, exactly 7 fours, etc. and then add these up.)
 - (b) (10 pts) You are playing a game with 7 other people. It is the first round, and you go first. You roll 4 sixes and a skull. For fun you open the bidding with 20 sixes. What is the probability that there are exactly 20 sixes on the board? Should the next person challenge you?