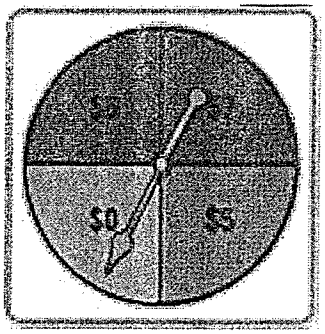
Statistics Semester Review - Gaming Theory & Expected Value

1. You buy one $2 raffle ticket. There is one 1st prize of $2000, one 2nd prize of $1000, two 3rd prizes of $500 each, and five 4th prizes of $100 each. All the other tickets lose. What is the expected value of your gain?

2. There are two marbles in a bag. If you choose the red marble, you will win $10. If you choose the blue marble, you will win $200. What is the expected value of your winnings from the game?

3. You must pay $0.50 to draw a card randomly from a standard deck of 52 cards. If you drawn an Ace, you win $30. If you draw any other card, you lose $1. What is your expected value?

4. At a fund-raising carnival for a service organization, Laurie is trying to get Ali to play a game she has invented. Laurie would spin the spinner shown below and get a gift certificate worth the amount indicated. It costs $5 to play this game. Is this the fair price to play this game? If not, what would be the fair price?



5. A game at an amusement park has a 0.1 probability of scoring 10 points, a 0.2 probability of scoring 20 points, and a 0.7 probability of scoring 30 points. How many points can you expect to receive by playing the game?

6. Linda played a game in which she could win 10 points with a probability of 0.2. There is a 0.8 probability that she will not win any points. How many points can Linda expect to win?

7. Ali is playing a game in which there is a 0.1 probability of winning $100, a 0.2 probability of winning $200, and a 0.7 probability of winning $300. What is the expected value of Ali's winnings?

8. The following table shows a prize and the probability of winning the prize.

Prize	Probability
$1	1/10
$10	1/500
$100	1/10,000
$1000	1/60,000

a) What is the probability of winning one of the four prizes?

b) What is the probability of winning nothing?

c) What is the expected value/fair price?

9. Chris estimates the number of questions he answered correctly on a test. He answered 10 correctly with probability of 0.6, 20 correctly with probability of 0.3, and 50 correctly with probability 0.1. What is the expected value of the number of questions he answered correctly?

10. You roll a die and you win the amount of money shown on the die.

a) Find the expected amount to RECEIVE (expected value) [note: this will not take into account how much you pay per ticket].

b) Suppose you get $1 for an even number, $3 for a 1, $9 for a 3, and $15 for a 5. It costs you $6.50 to play. Is this game fair?

c) If it is not fair, determine the amount you would charge to make it fair.