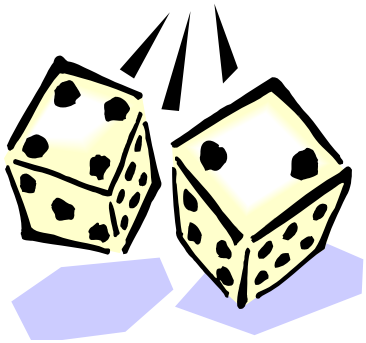
Game of Chuck-a-Luck



In the game of Chuck-a-Luck three fair dice are rolled. You as the "bettor" are allowed to bet $1 on the occurrence of one of the integers 1, 2, 3, 4, 5, or 6. Suppose you bet on the occurrence of a "5". Then if any 5's occur on the 3 dice, you get your $1 bet back. In addition, if one 5 occurs (on the 3 dice) you win $1, if two 5's occur you win $2, and if three 5's occur you win $3. If no 5's occur you lose your dollar.

1. In the long run, what amount of money would you expect to be paid (or lose) for one bet in the Chuck-a-Luck Game? What does this number mean in this problem?

2. If you played 100 games, how much money would you expect to win (or lose)? Explain your reasoning.

3. Is the Chuck-a-Luck Game fair? If so, how do you know it's fair? If not, how could you make it a fair game?