7.1: Probability Distributions

Discussion: If you moved your player on a board game according to the roll you make with a dice, how far do you think you would have moved after 5 throws? Try this out.

Probability Distributions can only be done with **Continuous Variable (def'n):**
Continuous Variable:

Discrete Variable:

Fair Game:

Expected Value, E(X): predicted average of all possible outcomes.
Method 1: Probability: $P(x_i)$ Random Variable: x_i

$$E(X)=x_1P(x_1)+x_2P(x_2)+...+x_nP(x_n)$$

1. Consider a simple game in which you roll a single die. If you roll an even number, you gain that number of points, and, if you roll an odd number, you lose that number of points.
   a) What is the expected number of points per roll?
   b) Is this game fair? Why?

Method 2: $\frac{Revenue - Cost}{Number\ of\ tickets}$

2. Super 7 had the following winners on Friday, April 17, 2007. The tickets cost $2.00. Total number of tickets sold: 1,319,173.

Prize	Amount	Winners
1	$10,000,000.00	0
2	$93,112.20	2
3	$1,808.00	103
4	$106.70	5,933
5	$10.00	126,997
6	$10.00	116,153

c) Show the expected value of each ticket.

d) What does this tell you about the profit for the Super 7 company?