Discussion - Week 4

Example 1 (Counting Rules)

Five cards are randomly drawn from a standard deck.

(a) What is the probability that exactly two of the five cards are spades?

(b) What is the probability that at most two of the five cards are spades?

Example 2 (Event Relations; Conditional Probability)

One hundred randomly chosen San Francisco residents were asked "Do you smoke tobacco?" The results are shown below.

	Smoker	Non-smoker
Male	19	41
Female	12	28

An individual is selected at random from the 100 that were surveyed. Find the following probabilites.

(a) The individual is female.

(b) The individual is a female smoker.

(c) The individual is a smoker given that she is female.

(d) The individual is a smoker given that he is male.

Example 3 (Conditional Probability)

Suppose a tennis match is to be decided in one tiebreaker point. The judge will toss a biased coin, which comes up heads 40% of the time. You get to serve if the coin comes up heads, and your opponent serves if the coin comes up tails. When you serve, you win 80% of the time, and when your opponent serves, you win 30% of the time. Before the judge tosses the coin, what is your probability of winning?

Example 4 (Discrete Random Variable)
A fair coin is tossed 3 times. For every time it comes up heads I pay you a dollar, and for every time it comes up tails you pay me a dollar. Let X denote your winnings (if at the end you owe \$1, it's expressed as -\$1 winnings).

(a) What is the distribution of X?

(b) Find $E[X]$, $Var[X]$, and $SD[X]$.

(c) Find $P(X \leq 1)$

Example 5 (Binomial Distribution)
It is known that in some city 3% of the population has the flu. Ten people from that city are randomly chosen. Let X be the number of people in that group that have the flu.

(a) Find $E[X]$, $Var[X]$, and $SD[X]$

(b) Find $P[X = 3]$

(c) Find $P[X < 3]$

(d) Find $P[X > 3]$