Notes 7

discrete probability $P(E) = {}^{N(E)}\!/_{N(S)}$

S—sample space; *E*—event. Both are defined as a set of possible *outcomes*.

outcome—all *outcomes* are equally likely to occur

multiplication rule

each step has a fixed number of ways to perform regardless of how the preceding steps were performed

addition rule—key word: disjoint

difference rule—key word: subset

inclusive/exclusive rule—think graphically

permutation—ordered selection

$$P(n,r) = \frac{n!}{(n-r)!}$$

combination—unordered selection

$$\binom{n}{r} = \frac{n!}{r! \cdot (n-r)!}$$

probability formulas directly from the addition, difference, and inclusive/exclusive rules

expected value—"weighted" (by probability) average. Suppose P (x=a_k) = p_k, then the expected value of x is

$$\sum_{k=1}^{n} (a_k p_k).$$

conditional probability of B given A

$$P(B|A) = \frac{P(A \cap B)}{P(A)}$$

independent events A and B

$$P(A \cap B) = P(A) \cdot P(B)$$

Pascal's Triangle and the Binomial Theorem—understand the three formulas

$$\binom{n}{r} = \binom{n}{n-r} \qquad \binom{n+1}{r} = \binom{n}{r-1} + \binom{n}{r} \qquad \sum_{k=0}^{n} \binom{n}{k} = 2^n$$

pigeonhole principle and generalized pigeonhole principle