DISCRETE MATHEMATICS (DM)

Formulas, Rules, & Principles: Overview (limited to Course reqs.)

SETS	$A = \{x \mid x \text{ is a positive, even integer}\}$ A equals the set of all x such that x is a positive, even integer Sets can contain any elements; the types don't have to match. $x \in A$ $y \notin A$ ↑ x is in the set A ↑ y is NOT in the set A
MULT. PRINCIPLE	Multiplication Principle: If an activity/action can be done in ~~t ways~~ successive steps and step 1 can be done in n_1 ways, step 2 in n_2 ways..., and step t can be done in n_t ways, then the number of different possibilities of the activity/actions is $n_1 \cdot n_2 \cdots \cdot n_t$
ADD. PRINCIPLE	Addition Principle: Suppose that $X_1 \ldots, X_t$ are sets and that the ith set X_i has n_i elements. ✳ If $\{X_1 \ldots, X_t\}$ is a pairwise disjoint family (i.e. if $i \neq j$, $X_i \cap X_j = \emptyset$), the number of possible elements that can be selected from X_1 or... X_t is $n_1 + \ldots + n_t$ ✳ If i does not equal j, then the intersection of X_i and X_j is empty.
PERMS & COMS	Permutation: A permutation of n distinct elements $x_1 \ldots x_n$ is an ordering of the n elements $x_1 \ldots x_n$ • alt. def. A way in which a set can be arranged. Combination:

Permutation Formula

$$nPR \rightarrow \frac{n!}{(n-R)!}$$

The "!" denotes factorial. This symbol indicates a number multiplied by all of its predecessors up until "1."

Combination Formula

$$nCR \rightarrow \frac{n!}{(n-R)! R!} \quad \text{or} \quad C(k+t-1, t-1) \rightarrow \frac{(k+t-1)!}{(\frac{}{} - \frac{}{})! (t-1)!}$$

- n = the total # of distinct objects
- R = the # selected