

Counting Strategy

1) List all elements and count them.

2) Counting Formula

$$c(A \cup B) = c(A) + c(B) - c(A \cap B)$$

3) Venn diagram

**** OR = ADD (but account for overlap)**

4) Multiplication principle

- 1 box per choice.
- Fill box w/# ways to make choice.
- Multiply

**** AND = MULTIPLY**

5) Permutations/Combinations

Order matters: $P(n,r) = {}_n P_r = \frac{n!}{(n-r)!}$

Order doesn't matter: $\binom{n}{r} = C(n,r) = {}_n C_r = \frac{n!}{(n-r)!r!}$

6) Distinguishable Permutations

$$\frac{n!}{n_1!n_2!n_3! \dots}$$

Best Used For...

1) Small sets; tree or other structure to list all.

2) 2 options; Abstract count info given.

3) 3+ options; large word problems.

4) choice AND choice AND choice

(all pairings of choices must be allowed)

5) Choosing out of a single set

Items in set must be unique

Must 'use up' items as they are chosen

6) Finding #ways to line up every element in a set with repeats