

Committees and Subsets $\Rightarrow$ Combinations

A group with 12 members has to form a 3-member committee. How many committees are possible?

choose a P, VI, T

$$\underline{12} \cdot \underline{11} \cdot \underline{10}$$

A	B	C
A	C	B
B	A	C
B	C	A
C	A	B
C	B	A

A B C

A F I

D G B

Arrangements of A, B, C
3!

$${}_nP_r \text{ too large. } \Rightarrow \frac{{}_nP_r}{?} = \frac{{}_{12}P_3}{3!} //$$

$$= \frac{1320}{3!}$$

$$= 220$$

$$\frac{12}{P} \cdot \frac{11}{VP} \cdot \frac{10}{T}$$

The number of combinations of r items chosen from among n items is:

$${}_nC_r = C(n, r) = \binom{n}{r} = \frac{{}_nP_r}{r!} = \frac{n!}{r!(n-r)!}$$

The number of combinations is the number of permutations divided by the number of possible reorderings of each permutation.

" n choose r "