

Symmetry of Combinations

Let's see the algebraic proof of the notion that selecting p -many elements out of a set of n is the same as omitting $n-p$ many elements.

For starters, recall the combination formula:

$$C(n, p) = \frac{n!}{(n-p)! p!}$$

If we plug in $n-p$ for p , we get the following:

$$C(n, n-p) = \frac{n!}{(n-(n-p))! (n-p)!} = \frac{n!}{(n-n+p)! (n-p)!} = \frac{n!}{p! (n-p)!} = \frac{n!}{(n-p)! p!} = C(n, p)$$

Therefore, we can conclude that $C(n, p) = C(n, n-p)$.