k-permutation

The number of k-element sequences of distinct symbols from a universe of n symbols is:

$$P(n,k) = n \cdot (n-1) \cdots (n-k+1) = \frac{n!}{(n-k)!}$$

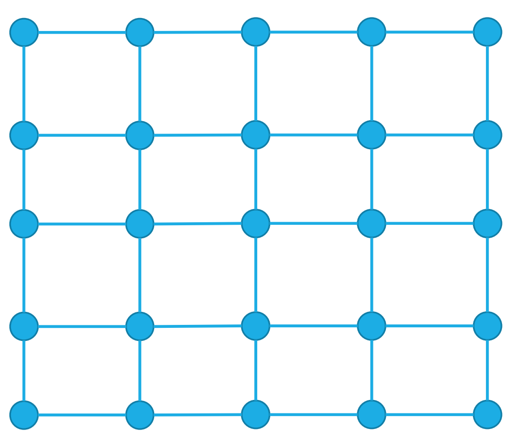
k-combination

The number of k-element subsets from a set of n symbols is:

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

41

Path Counting (options)



We're in the lower-left corner, and want to get to the upper-right corner.

We're only going to go right and up.

How many different paths are there?

A. 2^8
B. $P(8,4)$
C. $\binom{8}{4}$
D. Something else

19

Overcounting

How many anagrams are there of SEATTLE
(an anagram is a rearrangement of letters).

It's not $7!$ That counts SEATTLE and SEATTLE as different things!
I swapped the Es (or maybe the Ts)

23

Some Facts about combinations

Symmetry of combinations: $\binom{n}{k} = \binom{n}{n-k}$

Pascal's Rule: $\binom{n}{k} = \binom{n-1}{k-1} + \binom{n-1}{k}$

27