COMBINATORICS

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ORDERED ELEMENTS

PERMUTATIONS:

A STRING OF n elements with k possibilities.

$$k^n$$

EG: HOW MANY POSSIBILITIES OF 10 LENGTH 0-1 STRINGS ARE THERE? 2^{10}

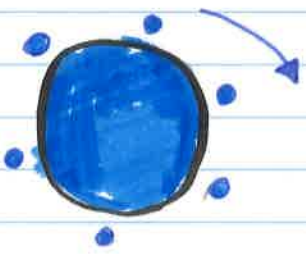
ORDER n distinct objects in a line.

$$n!$$

EG: PUT 5 PEOPLE IN A ROW. HOW MANY WAYS CAN YOU DO THIS? $5!$

ORDER n distinct objects in a circle. FIRST POINT IS ARBITRARY. BECOMES THE FRAME OF REFERENCE

$$(n-1)!$$



EG: 5 PEOPLE AROUND A TABLE. HOW MANY WAYS? $4!$

In a set of n elements, choose k

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

Eg: Of a club of 20 members how many possibilities for an eboard of 4 people? $\boxed{\binom{20}{4}}$

Anagrams! For a word of length n, with repeated letters appearing x, y, and z times

$$\frac{n!}{x!y!z!}$$

Eg: Mississippi has how many anagrams?

$$\boxed{\frac{11!}{4!\,4!\,2!}}$$

Distribute n nondistinct toys to k children

$$\binom{n+k-1}{k-1}$$

Eg: Give 100 distinct toys to 5 kids so each gets at least 1.

$100-5(1) = 95$

$$\boxed{\binom{95+5-1}{5-1}}$$