DM- Permutations & Combinations

Ex. 1

Four candidates are running for the same office: Zeke, Jet, Jan and Val. To prevent subtle influence on voters' decision, it is important to print the ballots with names in every possible position/order. How many distinct ballots will there be?

4 3 2 1 or $4! = 24$

$\frac{n!}{(n-r)!r!} \quad \frac{4!}{(4-4)!4!}$

- Multiplication Principle

There will be 4 distinct ballots.

Ex. 2

How many permutations of the letters ABCDEFG contain the substring DEF?

$n = 7 \quad r = 3$

$\frac{n!}{(n-r)!r!} \rightarrow \frac{7!}{(7-3)!\,3!} = \frac{7!}{4!\,3!}$

$\frac{7 \cdot 6 \cdot 5 \cdot 4!}{4!\,3!} = \frac{7 \cdot 6 \cdot 5}{3 \cdot 2 \cdot 1} = \frac{210}{6} = 35$

There are 35 permutations of ABCDEFG that contain DEF.