**Permuta tions**

WENZ has 4 letters

$$n=4 r=4$$

$$\frac{4!}{\left(4-4\right)!}=\frac{4!}{0!}=\frac{24}{1}=24$$

**Permutations without Repetition**

**How many ways can I arrange the letters in the name WENZ**

When repetition cannot occur, we must reduce the number of outcomes for each trial.

Here n is the number of choices and r is the number of trials.

$$\frac{n!}{\left(n-r\right)!}$$

nr

n = 10 r = 3

103 = 1,000

**Permutations with Repetition**

**How many ways are there to pick a 3 digit number?**

Here we have 10 choices for the first digit, 10 for the second and 10 for the third.

The form nr helps us, where n is the number of choices and r is the number of trials.

**Operations with Factorials**

When dividing factorials, you can simplify the numbers by cancelling like factors of each number.

$\frac{6!}{3!}=\frac{6\*5\*4\*3\*2\*1}{3\*2\*1}=\frac{6\*5\*4\*3\*2\*1}{3\*2\*1}=6\*5\*4=120$  **-or-**$ \frac{6!}{3!}=\frac{720}{6}=120$

!

**Factorials**

Factorials are a way of representing decreasing numbers that are multiplied by one another.

A factorial is represented by an exclamation point (!)

5! = 5\*4\*3\*2\*1 = 120

10! = 3,628,800

**0! = 1**

Access the factorial symbol (!) using the probability button on your calculator.

Permutations are the number of outcomes in a given situation where the order of events do not matter.