

You can use the "Fundamental Counting Principle" to find the number of ways a group of objects can be arranged. Remember, the F.C.P. says you can find the total number of ways a series of events can occur by multiplying how many ways each event can occur. For example, the number of ways the letters A, B, C, & D can be arranged is

$$4 \cdot 3 \cdot 2 \cdot 1 = 24 \text{ ways}$$

SINCE

$\uparrow$        $\uparrow$        $\uparrow$        $\uparrow$   
 1<sup>st</sup> choice can occur 4 ways (A, B, C, or D)      2<sup>nd</sup> choice can occur 3 ways (since one letter has been used)      3<sup>rd</sup> choice = 2 ways      4<sup>th</sup> choice, only 1 letter left

The operation of taking a number, 4 in the above example, and multiplying itself by all the integers less than that number (all the way down to 1) occurs so often it has its own symbol, the "factorial" symbol!

Ex)  $4! = 4 \cdot 3 \cdot 2 \cdot 1 = 24$

$2! = 2 \cdot 1 = 2$

EVALUATE:

- ① 3!      ② 5!      ③ 6!      ④ 8!      ⑤ 10!






⑥ How many ways can nine baseball players be listed for batting order?

⑦ For a class of 15 students & 15 chairs, how many seating arrangements are possible?