Factorials (MathATube.com)

The **factorial** of a number is **the product of all the whole numbers, except zero, that are less than or equal to that number.** For example, to find the factorial of 7 you would multiply together all the whole numbers, except zero, that are less than or equal to 7. Like this:

7 x 6 x 5 x 4 x 3 x 2 x 1 = 5,040

The factorial of a number is shown by putting an exclamation point after that number. So, 7! is a way of writing "the factorial of 7" (or "7 factorial").

Here are some factorials:

1! = 1 = 1

2! = 2 x 1 = 2

3! = 3 x 2 x 1 = 6

4! = 4 x 3 x 2 x 1 = 24

5! = 5 x 4 x 3 x 2 x 1 = 120

6! = 6 x 5 x 4 x 3 x 2 x 1 = 720

7! = 7 x 6 x 5 x 4 x 3 x 2 x 1 = 5,040

8! = 8 x 7 x 6 x 5 x 4 x 3 x 2 x 1 = 40,320

9! = 9 x 8 x 7 x 6 x 5 x 4 x 3 x 2 x 1 = 362,880

10! = 10 x 9 x 8 x 7 x 6 x 5 x 4 x 3 x 2 x 1 = 3,628,800

11! = 11 x 10 x 9 x 8 x 7 x 6 x 5 x 4 x 3 x 2 x 1 = 39,916,800

12! = 12 x 11 x 10 x 9 x 8 x 7 x 6 x 5 x 4 x 3 x 2 x 1 = 479,001,600

Factorials are useful. They can **show how many different ways there are to order or arrange a set** of things. For example, if you have 5 books on a shelf, and want to know how many different ways there are to order or arrange them, simply find the factorial of 5:

5! = 5 x 4 x 3 x 2 x 1 = 120 This shows that you can arrange 5 books 120 different ways.