A Nice Integral if you have studied integration ...

$$I_n = \int_0^\infty x^n e^{-x} dx$$

Use integration by parts to show that:

$$I_n = n I_{n-1}$$

So:

$$I_8 = 8 \times I_7 = 8 \times 7 \times I_6 = 8 \times 7 \times 6 \times I_5 = ... = 8!$$

In general:

$$I_n = n!$$

Now:

$$n! = 1 \times 2 \times 3 \ldots \times n$$

This only makes sense if n is a positive integer.

$$I_n = \int_0^\infty x^n e^{-x} dx$$

This makes sense for any value of n

So, for example:

$$(-1)! = \int_0^\infty x^{-1} e^{-x} dx$$

I might not be able to work this out but it certainly has a value.