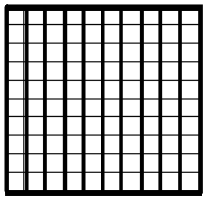
2. Powers of Ten and Base 10

Let's remember how exponents work for a minute.....



multiplying by 10 ↑

$10^3 = 10 \times 10 \times 10 = 1000$

$10^2 = 10 \times 10 = 100$

$10^1 = 10 = 10$

$10^0 = = 1$

$10^{-1} = = \frac{1}{10} = .1$

$10^{-2} = = \frac{1}{100} = .01$

$10^{-3} = = \frac{1}{1000} = .001$

↓ dividing by 10

Because our system is a base 10 system, there are a lot of neat things that happen when we are using exponents with tens. Let's see if we can find a pattern:

5×10^3	$= 5 \times 1000$	$= 5000$
5×10^2	$= 5 \times 100$	$= 500$
5×10^1	$= 5 \times 10$	$= 50$
5×10^0	$= 5 \times 1$	$= 5$
5×10^{-1}	$= 5 \times .1$	$= .5$
5×10^{-2}	$= 5 \times .01$	$= .05$
5×10^{-3}	$= 5 \times .001$	$= .005$

As we have a base 10 system, each power of ten corresponds to a place value.

This means multiplying by a power of ten will change the place value of the number.

25×10^2	= 25 hundreds =	2500
25×10^1	= 25 tens =	250
25×10^{-1}	= 25 tenths =	2.5
25×10^{-2}	= 25 hundredths =	.25

In these cases we are multiplying each part of the number (20 and 5) by the power of 10. Thus, we will change where they lie in regards to the decimal point (we have altered their place value).