Scientific notation

- a way that scientists + mathematicians can represent really big numbers and really small numbers without having to deal with all the zeroes.

* based on powers of ten

Powers of ten

$10^0 = 1$

$10^1 = 10$

$10^2 = 10 \cdot 10 = 100$

$10^3 = 10 \cdot 10 \cdot 10 = 1000$

sci notation

$1 \times 10^6 = 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 = 1000000$

standard notation

$1 \times 10^{0} = 1$

$1 \times 10^{-1} = 1 \div 10 = .1$

$1 \times 10^{-2} = 1 \div 10 \div 10 = .01$

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

$$1 \times 10^{2} = 1 \times 100$$

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

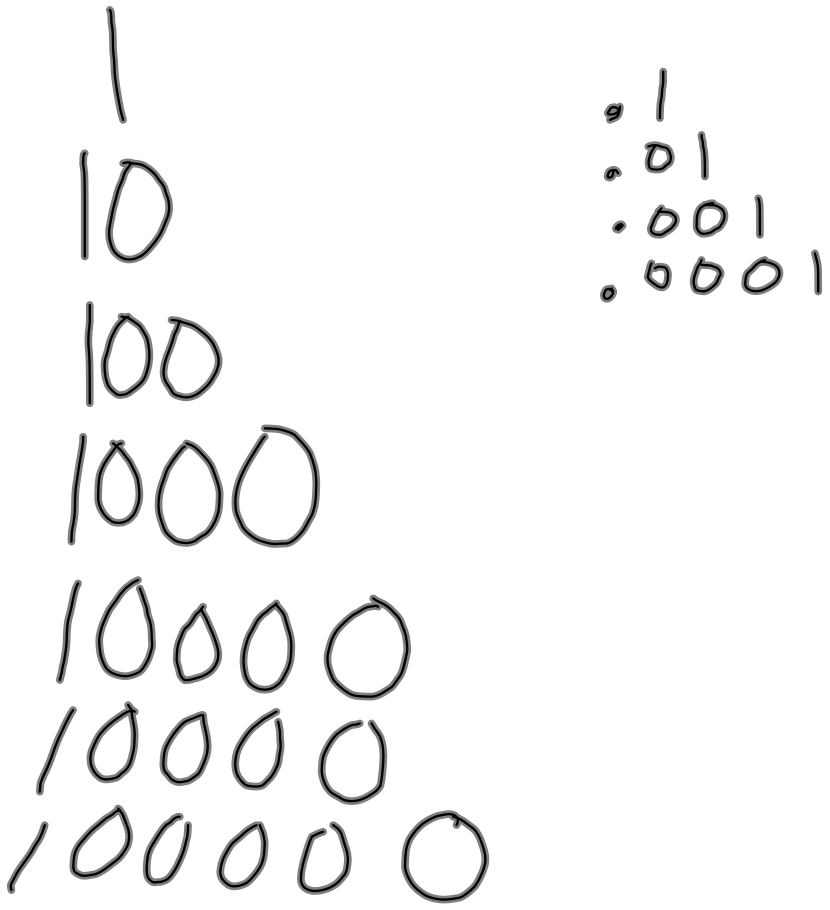
$$x^{-2} = \frac{1}{x^2}$$

$$10^{-3} = \frac{1}{10^3}$$

$1 \times 10^{-12} = .000000000001$

$d_{proton} = \sim 1.7 \times 10^{-15}\ m$

$m_{proton} = \sim 1 \times 10^{-24}\ g$


1
10
100
1000
10000
100000
.1
.01
.001
.0001

Standard Notation	Sci. Notation
3000	3×10^{3}
40	4×10^{1}
7000000	7×10^{6}
.06	6×10^{-2}
.00005	5×10^{-5}
33000	33×10^{3}
	3.3×10^{4}
	$.33 \times 10^{5}$

this number needs to be a single digit number

37620 3.762×10^{4}

37.60 $= 3.76 \times 10^{1}$

2.9×10^{4} 29000

8.2×10^{-7} .00000082

.00000082

$8.2 \times 10^{-3} > 9.1 \times 10^{-7}$

$$x^{-2}$$

10^2

$1 \times 10^2 = 100$

$$\frac{8^5}{8^2} = 8^{5-2} = 8^3$$

$$\frac{\cancel{8}\cancel{8}\cancel{8}\cancel{8}\cancel{8}}{\cancel{8}\cancel{8}} = 8^3$$

$$2^{2} \cdot 2^{3} = 2^{5}$$

$$(2^3)^2 = 2^6$$

$$\frac{4^4}{4^2} = 4^2$$

$$\frac{9^{27}}{9^{11}} = 9^{16}$$

$$\frac{9^2}{9^2} = 9^0$$

$$\frac{81}{81} = 1$$

$$\frac{2^3}{2^3} = 2^0$$

$$\frac{8}{8} = 1$$

$$\frac{x^2}{x^2} = x^0 = 1$$