**Scientific notation**

The mass of the Earth is 5970000000000000000000000 kg

The mass of a hydrogen atom is 0.00000000000000000000000166 g

Scientists have to deal with very big numbers and very small numbers. It is no fun writing these numbers out completely and doing sums with them. To avoid this scientists use scientific notation.

Scientific notation. Putting the decimal point after the first number and then indicating how many places the decimal point has to be moved.

**Mass Earth** = 5970000000000000000000000 kg = 5.97 x 1024 kg *much easier to write!*

 24 places

 Decimal point here and moved 24 places to the right.

**Mass of a hydrogen atom** is 0.00000000000000000000000166 g = 1.66 x 10-24 g

 *Negative 24 as decimal point moved to left*

1. Express each of the following in scientific notation;

 245000 \_\_\_\_\_\_\_\_\_\_\_\_\_ 67000000\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 213456 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 45000000 \_\_\_\_\_\_\_\_\_\_\_\_\_ 0.000567 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ 0.000444 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 5555 \_\_\_\_\_\_\_\_\_\_\_\_\_ 0.000555 \_\_\_\_\_\_\_\_\_\_\_\_\_ 0.00055 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Google 5 very large science values i.e. distance from earth to moon; express in scientific notation

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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3. Write as a normal number

 4.56 ×105 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1.44 ×103 \_\_\_\_\_\_\_\_\_\_\_ 4.51 ×10-2 \_\_\_\_\_\_\_\_\_\_

 9.66 ×103 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 8.553 ×10-3 \_\_\_\_\_\_\_\_\_\_\_ 6.1 ×108 \_\_\_\_\_\_\_\_\_\_

To do sums on your calculator you will need to use the EXP key or equivalent. Remember your indices rules you can add indices if multiplying or subtract if dividing.

4. Calculate

 6 × 4.2 × 10-3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3.2 × 10-3 × 4.23 × 10-3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 5.67 × 10-3 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 8.5 × 10-2