

One more thing: multiplying anything by the number one leads to no change, so, eg,

$$1 \times 10^5 \text{ is the same as } 10^5, \text{ or } 1 \times 10^{-8} \text{ is the same as } 10^{-8}.$$

Probably the first experience you have with scientific notation will be the speed of light, which is $3 \times 10^8 \text{ ms}^{-1}$. You will need to know how to use your calculator to answer questions involving the speed of light, and know how to convert what you see on the calculator into an answer. This is difficult to cover since calculators work in different ways depending on the manufacturer (it is not that the answer is different, it is the way of displaying the answer which can be different).

Example: How far will light travel in 5 seconds?

$$\begin{aligned} d &= v \times t \\ &= 3 \times 10^8 \times 5 \end{aligned}$$

enter the following into the calculator:

3, followed by pressing the button with EXP on it, followed by 8, followed by the X button, followed by 5, followed by the = button.

You should get an answer of $1.5 \times 10^9 \text{ m}$. **NOTE** that the answer is **NOT** 1.5^9 m !

DO NOT DO THIS: 3 X 1 0 EXP 8 X 5. If you do you will get an answer which is ten times too big!

Another example: Calculate the period of a wave which has a frequency of 4 MHz.

$$\begin{aligned} T &= \frac{1}{f} \\ &= \frac{1}{4\text{MHz}} \\ &= \frac{1}{4 \times 10^6} \end{aligned}$$

enter the following into the calculator:

$$1 \div 4 \text{ EXP } 6 =$$

You should get $2.5 \times 10^{-7} \text{ s}$

Yet another example: Calculate how long it takes for light to travel 3 km.

$$t = \frac{d}{v}$$
$$= \frac{3 \times 10^3}{3 \times 10^8} \quad (3 \text{ km} = 3\,000 \text{ m} = 3 \times 10^3 \text{ m})$$

Do this:

$$3 \text{ EXP } 3 \div 3 \text{ EXP } 8 =$$

You should get 1×10^{-5} s