# Tests, On Your Owns, and Practice Problems In chemistry Example 3.2, how do you do the math?

In the first part of this example, you have:

(405 nm/1) x ($10^{-9}$ m/1nm)

When you multiply 405 by $10^{-9}$, you get

405 x $10^{-9}$

This is not standard scientific notation, because there is no decimal place in 405. To get it into scientific notation, move the decimal to the left 2 places. This decreases 405 by a factor of 100. To keep the value of the entire number the same, then, you must INCREASE $10^{-9}$ by 100. Increasing $10^{-9}$ by 100 gives you $10^{-7}$. Thus, it is 4.05 x $10^{-7}$ m.

In the next step, you have

(3.0 x $10^8$ m/s) / (4.05 x $10^{-7}$ m)

You can divide the two numbers first:

3.0 / 4.05 = 0.74

You can then divide the two exponents. When multiplying numbers with exponents, you ADD the exponents. When dividing numbers with exponents, you SUBTRACT the exponents:

$10^8$ / $10^{-7}$ = $10^{(8 - -7)}$ = $10^{15}$

Thus, you have an answer of 0.74 x $10^{15}$. Once again, this is not standard scientific notation. To get it into standard scientific notation, multiply 0.74 by 10 to get 7.4. This means you must divide $10^{15}$ by 10 to get $10^{14}$. Thus, the answer is:

7.4 x $10^{14}$ 1/s

Now, having done all that, if you have a scientific calculator, it allows you to input the numbers in scientific notation and it does all of this for you. If you have a scientific calculator, read the manual to find out how to do this or you might be able to find a YouTube video explaining how to do it.

Unique solution ID: #1106
Author: Jacey
Last update: 2019-01-29 21:08