UNIT CONVERSIONS

After completing this topic's notes you will move on to the Units of Measurement Worksheet. On Part 2 of the worksheet you will be given some measurements that need to be converted into different units.

Below are several examples that are similar to the questions on the worksheet. The methods used in these examples can be applied to the worksheet questions.

EXAMPLE (A):   75,290 mm   - convert to units of m.

To solve this problem you need to multiply the given measurement by a conversion factor.

The conversion factor needs to have three things:

1. **The units you want -   put on TOP of the conversion factor,**
2. **The units you start with - put on the BOTTOM of conversion factor,**
3. **The conversion number - it makes the two units equal**
   (e.g. 1,000 mm = 1 m)

75,290 mm   X $\left(\dfrac{\text{1 m}}{\text{1,000 mm}} \right)$ **=   The Answer in metres.**

Conversion factor

Notice that the mm will cancel each other out. The mm in the given number gets divided by the mm in the conversion factor. Thus you will be left with an answer that is in metres.
Here the conversion number is on the bottom of the conversion factor.   Therefore take the 75,290 and DIVIDE by 1,000.

ANSWER = 75.29 m

EXAMPLE (B):   Working with SQUARED units.
                 Convert 11.8 km^2 to units of m^2.

Set up your conversion factor, just like you did in the previous question. Put the units you want on top, the starting units on the bottom and include a conversion number   (1,000 m = 1 km)

11.8 km^2 X $\left(\dfrac{(\text{ 1,000 m})^2}{(\text{ 1 km})^2} \right)$ **=   Answer in m^2**

1.

HOWEVER, this conversion factor is different to that of the last question. Here we have squared units. Therefore we have to square our conversion factor. EVERYTHING inside the conversion factor must be squared - units and numbers.

km^2 = km X km
m^2 =   m X m
$1,000^2$ = 1,000 X 1,000 = 1,000,000

NEXT, RESTATE THE CONVERSION FACTOR WITH SQUARED UNITS AND SQUARED NUMBER:

11.8 km^2 X $\left(\dfrac{1,000,000 \ m^2}{1 \ km^2} \right)$ =   Answer in m^2

Here the conversion number is on the top of the conversion factor. Therefore MULTIPLY 11.8 by 1,000,000.

ANSWER = 11,800,000 m^2

EXAMPLE (C):   8,540,000 um^2 - convert to units of mm^2.

This question is a little more difficult. Here you have to convert from units of um^2 to units of mm^2.

So how do you get the conversion number for um → mm ?

ANSWER - Use THIS formula:

CONVERSION NUMBER = $\dfrac{\text{BIGGER PREFIX}}{\text{SMALLER PREFIX}}$

The prefix "milli" means 0.001. The prefix "micro" means 0.000 001. Therefore "milli" is the bigger prefix in this question, so put it on top.

CONVERSION NUMBER = $\dfrac{milli}{micro}$ = $\dfrac{0.001}{0.000 \ 001}$ = 1,000

Therefore: $\underset{\text{Many Small Units}}{1,000 \ um}$ = $\underset{\text{One Big Unit}}{1 \ mm}$

However we are working with squared units. Therefore we have to SQUARE this conversion number:
            1,000,000 um^2 = 1 mm^2

Now you are ready to set up the conversion factor. Again, remember to put the units you WANT on TOP.

$$8{,}540{,}000 \text{ um}^2 \text{ X } \left(\frac{1 \text{ mm}^2}{1{,}000{,}000 \text{ um}^2} \right) = \text{ Answer in mm}^2$$

ANSWER = 8.54 mm^2

EXAMPLE (D): $0.000\ 855 \text{ Mm}^2$ - convert to units of km^2.

This is similar to the last question.

CONVERSION NUMBER = $\dfrac{\textbf{Mega}}{\textbf{Kilo}}$ **=** $\dfrac{\textbf{1,000,000}}{\textbf{1,000}}$ **= 1,000**

Therefore: 1,000 km = 1 Mm

But we have Squared Units, so: 1,000,000 km^2 = 1 Mm^2
                                             Many small units   One big unit

Set up conversion factor:

$$0.000\ 855 \text{ Mm}^2 \text{ X } \left(\frac{1{,}000{,}000 \text{ km}^2}{1 \text{ Mm}^2} \right) = \text{ Answer in km}^2$$

ANSWER = 855 km^2