Conversion factors in metric

In the metric system, conversion factors between units may always be made from the metric prefixes!

For example, "kilo-" means 10^3

$$k = 10^3$$

so

$$kg = 10^3 g$$

$$km = 10^3 m$$

$$ks = 10^3 s$$

$$kL = 10^3 L$$

Just apply the prefix to the base unit!

How do we actually USE a conversion factor?

Convert 15.75 m to cm

$cm = 10^{-2} m$

$$15.75\ \cancel{m} \times \frac{cm}{10^{-2}\ \cancel{m}} = 1575\ cm$$

* Similar to...

If X = 2, then

$$\frac{X}{2} = 1$$

15.75 / EE −2 .. on TI-83

* This fraction equals one, so multiplying by it does not change the VALUE of the number, only its UNITS!

Convert 0.0183 kg to g

$kg = 10^{3} g$

$$0.0183\ \cancel{kg} \times \frac{10^{3} g}{\cancel{kg}} = 18.3\ g$$

DRAG AND DROP

- Drag the part of the factor that contains the unit you want to get rid of (cancel out) to the BOTTOM.

- Then, drag the other half of the factor to the TOP

Convert 14500 mg to kg

$mg = 10^{-3} g$ $\quad Kg = 10^{3} g$

$$14500\ mg \times \frac{10^{-3} g}{mg} \times \frac{Kg}{10^{3} g} = \boxed{0.0145\ Kg}$$

When writing a factor from a prefix, remember that you can't "apply" a base that already has an exponent!

Convert 0.147 cm^2 to m^2

$cm = 10^{-2} m$

$$0.147\ cm^2 \times \frac{10^{-2} m}{cm} \times \frac{10^{-2} m}{cm} = 1.47 \times 10^{-5}\ m^2$$

$(0.0000147\ m^2)$

When converting squared and cubed units, use each conversion factor two (squared) or three (cubed) times.

$cm^2 = cm \times cm$ $\quad cm^3 = cm \times cm \times cm$

8.45 kg to μg

$Kg = 10^3 g$ $\quad \mu g = 10^{-6} g$

$$8.45\ \cancel{kg} \times \frac{10^3\ \cancel{g}}{\cancel{Kg}} \times \frac{\mu g}{10^{-6}\ \cancel{g}} = \boxed{8450000000\ \mu g}$$

$$(8.45 \times 10^9\ \mu g)$$

88100 kHz to MHz

$KHz = 10^3 Hz$

$MHz = 10^6 Hz$

$\boxed{Hz = s^{-1}\ (\text{Frequency})}$

$$88100\ \cancel{KHz} \times \frac{10^3\ \cancel{Hz}}{\cancel{KHz}} \times \frac{MHz}{10^6\ \cancel{Hz}} = \boxed{88.1\ MHz}$$