M10 - 1.1 - SI/Imperial Conversion Factors vs Equal Fractions Notes

How many centimeters around a 400m track?

1

$\times 400$

Given $\rightarrow \frac{?}{400m} = \frac{100cm}{1m}$ ← Conversion Factor

$\times 400$

$100cm \times 400 = 40000cm$

There are 40000 cm around a 400 m track.

OR

How many centimeters around a 400m track?

2

$400\cancel{m} \times \frac{100cm}{1\cancel{m}} = 40000cm$

Given ↑ Conversion Factor ↑

$\frac{m}{m} = 1$ Cross it off.

Notice: choose a conversion factor that allows you to cross off the units you're given to get the units you want.

How many inches in 1m?

$1\cancel{m} \times \frac{100cm}{1\cancel{m}} = 100cm$

$100\cancel{cm} \times \frac{1in}{2.54\cancel{cm}} = 39.37in$

OR

$1\cancel{m} \times \frac{100\cancel{cm}}{1\cancel{m}} \times \frac{1in}{2.54\cancel{cm}} = \frac{100in}{2.54} = 39.37in$

Notice: sometimes we need to use two conversion factors to get from what we are given to get the units we want or all in one step.

How many meters squared (m^2) in 2 kilometers squared (km^2)?

$2\cancel{km^2} \times \frac{1000m}{1\cancel{km}} \times \frac{1000m}{1\cancel{km}} = 2000000m^2$

OR

$2km^2 \times \left(\frac{1000m}{1km}\right)^2 = 2000000m^2$

$km^2 = \cancel{km} \times \cancel{km} \times \frac{m}{\cancel{km}} \times \frac{m}{\cancel{km}} = m^2$

Notice: in order to cross off km^2 we must multiply by the conversion factor 2 times.

How many centimeters cubed (cm^3) in 1 meter cubed (m^3)

$1\cancel{m^3} \times \frac{100cm}{1\cancel{m}} \times \frac{100cm}{1\cancel{m}} \times \frac{100cm}{1\cancel{m}} = 10000cm^3$

OR

Notice: in order to cross off m^3 we must multiply by the conversion factor 3 times.

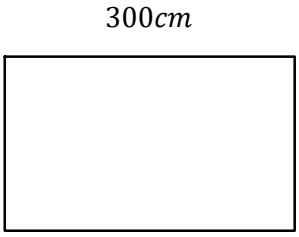
$1m^3 \times \left(\frac{100cm}{1m}\right)^3 = 10000cm^3$

M10 - 1.2 - Conversion 1st vs 2nd Notes

Find the Area in cm^2

$3m \times \frac{100cm}{1m} = 300cm$

$2m \times \frac{100cm}{1m} = 200cm$



OR

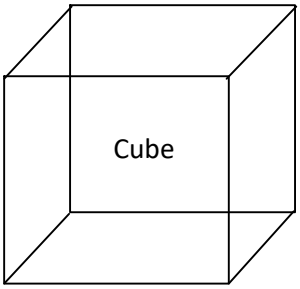
$A = l \times w$
$A = 3 \times 2$
$A = 6m^2$

$6m^2 \times \frac{100cm}{1m} \times \frac{100cm}{1m} = 60000cm^2$

$A = l \times w$
$A = 300 \times 200$

$A = 60000cm^2$

How many litres of water can fit in this cube?



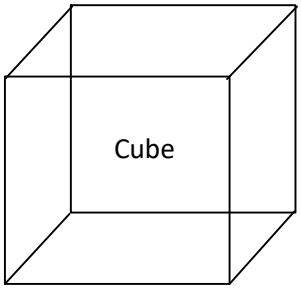
$V = l \times w \times h$
$V = 10m \times 10m \times 10m$
$V = 1000m^3$

$1000m^3 \times \frac{100cm}{1m} \times \frac{100cm}{1m} \times \frac{100cm}{1m} = 1000000000cm^3$

$1000000000cm^3 \times \frac{1mL}{cm^3} = 1000000000mL$

$1000000000mL \times \frac{1L}{1000mL} = 1000000L$

OR



$10m \times \frac{100cm}{m} = 1000cm$

$V = l \times w \times h$
$V = 1000cm \times 1000cm \times 1000cm$
$V = 1000000000cm^3$

M10 - 1.3 - Scientific Notation Conversion Factors Notes

Conversion Factors

Prefixes

How many Litres are in 50 Millilitres?

$$50\ mL \times \frac{1\ L}{1000\ mL} = 0.05\ L = 5 \times 10^{-2}\ L$$

OR

$$50\ mL \times \frac{10^{-3}\ L}{1\ mL} = 0.05\ L = 5 \times 10^{-2}\ L$$

Attach Prefix Exponent to the Base Unit!

How many Micrometers in 4 Meters?

$$4\ m \times \frac{1000000\ \mu m}{1\ m} = 4000000\ \mu m$$

$$4000000\ \mu m = 4 \times 10^{6}\ \mu m$$

OR

$$4\ m \times \frac{1\ \mu m}{10^{-6}\ m} = 4000000\ \mu m$$

$$4000000\ \mu m = 4 \times 10^{6}\ \mu m$$

How many millimeters in 24 kilometers?

Base Unit 1st

$$24km \times \frac{1000m}{1km} \times 24000m$$

$$24000m \times \frac{100cm}{1m} = 2400000cm$$

$$2400000cm \times \frac{10mm}{1cm} = 24000000mm$$

OR

$$24km \times \frac{10^{3}m}{1km} = 24000m$$

$$24000m \times \frac{1mm}{10^{-3}m} = 24000000mm$$

OR

$$24km \times \frac{1000m}{1km} \times \frac{100cm}{1m} \times \frac{10mm}{1m} = 24000000mm$$

OR

$$24km \times \frac{10^{3}m}{1km} \times \frac{1mm}{10^{-3}m} = 24000000mm$$

$$24000000mm = 2.4 \times 10^{7}mm$$