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.

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