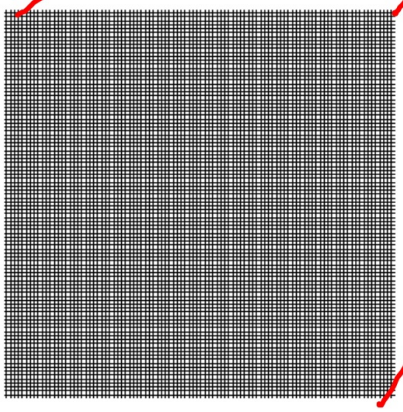
ITT - Day 3

Converting Square Units and Cubic Units

Ex 1) Convert 1 sq m into sq cm



100cm 1m

1m

100 cm

$1\ m^2 \cdot \left(\frac{10^2\ cm}{1\ m}\right)^2 = \_\_\_\_\ cm^2$

1m x 1m = 1 m^2

100cm x 100cm = 10000 cm^2

1,0

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Ex 2 Convert 1 m^3 into cm^3

$1\ m^3 \cdot \left(\frac{10^2\ cm}{1\ m}\right)^3 = \_\_\_\_\ cm^3$

$1\ m^3 \cdot \left(\frac{10^6\ cm}{1\ m^3}\right) = 1{,}000{,}000\ cm^3$

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What happens to the convesion factor as you square or cube the units?

Practice

P1) Convert 1,000,000 mm^2 into km^2

$$1 \times 10^6 \, mm^2 \cdot \left(\frac{10^{-6} \, km}{1 \, mm} \right)^2 = 1 \times 10^{-6} \, km^2$$

P2) Convert 520 Tm^3 into Mm^3

$$5.2 \times 10^2 \, Tm^3 \cdot \left(\frac{10^6}{1} \frac{Mm}{Tm} \right)^3 = 5.2 \times 10^{20} \, Mm^3$$

P3) Convert 10 sq mi into sq ft

$$10 \, mi^2 \cdot \left(\frac{5280 \, ft}{1 \, mi} \right)^2 = 278,784,000 \, ft^2$$

Liquid conversion 1 L = 1000 cm^3 = 1000cc

Convert 600 L into cubic meters

Practical problem -

Phil Erup has a rectangular water tank that is 10m x 10m x 8m, and his garden hose flows at a rate of 250 L/min. If Phil's tank is completely empty when he starts pumping water how long does Phil have before the tank starts to overflow. Round your answer to the nearest minute.

$$\frac{250L}{\min} \cdot \frac{1000cm^3}{1L} = \frac{250{,}000cm^3}{\min} = \frac{2.5\times10^5 cm^3}{\min}$$

$$\frac{2.5\times10^5 cm^3}{\min} \cdot \frac{10^{-6}m^3}{cm^3} = \frac{2.5\times10^{-1}m^3}{\min} = \frac{.25m^3}{\min}$$

$$\frac{800m^3}{.25m^3/\min} = 3200\min \quad or \quad 53hr\ 20\min$$

Conversion website

http://www.taylormade.com.au/billspages/conversion_table.html

First two weeks of Physics website

http://teachingphysics.wordpress.com/2008/07/25/the-first-two-weeks-of-physics-class/

$$7.34\times10^{15}\,pg \cdot \frac{10^{-12}\,g}{pg} = 10^{3}$$

$$\frac{10^{0}}{10^{-12}}$$

$$\frac{114\,mi}{hr} \cdot \frac{5280\,ft}{1\,mi} \cdot \frac{1\,hr}{3600\,sec} = 167.2\,\frac{ft}{sec}$$

50.95

$$\frac{114\ mi}{hr} \cdot \frac{1\ hr}{3600\ sec} \cdot \frac{5280\ ft}{1\ mi} \cdot \frac{m}{1\ ft}$$

$$\frac{50.95\ m}{sec} \cdot \frac{3600\ sec}{1\ hr} \cdot \frac{1\ km}{1000\ m}$$

$$183.42\ \frac{km}{hr}$$

$$1.08 \times 10^{24} \frac{pm}{hr}$$

$$3.0 \times 10^{8} \frac{m}{sec} \cdot \frac{10^{-9} Gm}{1 m} = 3.0 \times 10^{-1} \frac{Gm}{sec}$$

$$3.0 \times 10^{8} \frac{m}{sec} \cdot \frac{10^{12} pm}{m} \cdot \frac{3600 sec}{1 hr} =$$