

ITT - Day 2

I) Conversions

Conversion factor - an equivalence relation that can be used to convert from one unit to another

Examples of some conversion factors -

- 1 mi = 5280 ft
- 1 m = 100 cm
- 1 km = 1000 m

How do we use conversion factors?

Ex 1) Convert 3 miles into feet.

$$3 \text{ mi} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} = 15,840 \text{ ft}$$

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Ex 2) Convert 30,000 ft into mi. (round your answer to the nearest hundredth)

$$30,000 \text{ ft} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}} = 5.68 \text{ mi}$$

Ex 3) Convert 600 km into m

$$600 \text{ km} \cdot \frac{1000 \text{ m}}{1 \text{ km}} = \begin{aligned} &600,000 \text{ m} \\ &6.0 \times 10^5 \text{ m} \\ &6.0 \text{ E}^5 \text{ m} \end{aligned}$$

Ex 4) Convert 10,000,000 cm into km

$$10,000,000 \text{ cm} \cdot \frac{1 \text{ m}}{100 \text{ cm}} \cdot \frac{1 \text{ km}}{1000 \text{ m}} = 100 \text{ km}$$

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II) Scientific Notation and Metric Conversions

To successfully convert metric units using scientific notation follow these steps.

Step 1 - write your original quantity in scientific notation

Step 2 - establish a conversion factor by subtracting the exponent of the smaller unit from the exponent of the larger unit

Step 3 - larger units to smaller the exponent stays positive
smaller units to larger the exponent becomes negative

Ex 3b) Convert 600 km into m.

$$6 \times 10^2 \text{ km} \cdot \frac{10^3 \text{ m}}{\text{km}} = 6 \times 10^5 \text{ m}$$

Ex 4b) Convert 10,000,000 cm into km.

$$1 \times 10^7 \text{ cm} \cdot \frac{10^{-5} \text{ km}}{\text{cm}} = 1 \times 10^2 \text{ km}$$

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Ex 4b) Convert 10,000,000 cm into km.

Practice

P1) Convert 150 Tm into km

$$1.5 \times 10^2 \text{ Tm} \cdot \frac{10^9 \text{ km}}{\text{Tm}} = 1.5 \times 10^{11} \text{ km}$$

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P2) Convert 300,000 nm into m

$$3 \times 10^5 \text{ nm} \cdot \frac{10^{-9} \text{ m}}{1 \text{ nm}} = 3 \times 10^{-4} \text{ m}$$

P3) Convert .00046 Gigabytes into kilobytes

$$4.6 \times 10^{-4} \text{ Gbyte} \cdot \frac{10^6 \text{ kbyte}}{1 \text{ Gbyte}} = 4.6 \times 10^2 \text{ kbyte}$$

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III) Conversions involving time

Ex 1) Convert 65 mi/hr into ft/sec

$$\frac{65 \text{ mi}}{\text{hr}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot \frac{1 \text{ hr}}{3600 \text{ sec}} = \frac{\text{ft}}{\text{sec}}$$

Ex 2) 50,000 m/sec into km/hr

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Conversion factors website

<http://www.infoplease.com/ipa/A0001729.html>