Units Conversion Using SMath Solver

Unit of a Physical Quantity

Any physical quantity can be measured and represented in terms of number and unit.

Unit (Definition) :

The standard used for measurement of a physical quantity is called unit of that quantity.

SMath Studio

Tiny, powerful, free mathematical program with WYSIWYG editor and complete units of measurements support. It provides numerous computing features and rich user interface translated into about 40 different languages. Application also contains integrated mathematical reference book.

Among its capabilities are:

• Solving differential equations;
• Graphing functions in two or three dimensions;
• Symbolic calculations, including solving systems of equations;
• Matrix operations, including determinants;
• Finding roots of polynomials and functions;
• Symbolic and numeric differentiation of functions;
• Numeric integration;
• Simple multiline looped programs;
• User-defined functions;
• Units of measurement.

Fundamental Quantities (Definition) :

The physical quantities which do not depend on any other physical quantities for their measurements are called fundamental quantities or base quantities.

Fundamental Units (Definition) :

The units used to measure fundamental quantities are called fundamental units. i.e. the unit of fundamental quantity is called fundamental unit.It does not depend on any other unit.

There are seven fundamental (basic) physical quantities: **Length, mass, time, temperature,electric current, luminous intensity and amount of a substance and their units arefundamental units.**

Examples of unit converion in SMath Studio

Length

$Length = 100\ m = 10000\ cm$

$Length = 100\ m = 1 \cdot 10^{5}\ mm$

$Length = 100\ m = 0.1\ km$

$Length = 100\ m = 328.084\ ft$

$Length = 100\ m = 3937.0079\ in$

Mass

$Mass = 100\ kg = 1 \cdot 10^{5}\ g$

$Mass = 100\ kg = 1 \cdot 10^{5}\ g$

$Mass = 100\ kg = 3527.3962\ oz$

$Mass = 100\ kg = 220.4623\ pound$

$Mass = 100\ kg = 0.1102\ ton$

Time

$Time = 60\ s = 1\ min$

$Time = 60\ s = 0.0167\ hr$

$Time = 60\ s = 2.2816 \cdot 10^{-5}\ month$

$Time = 60\ s = 0.0007\ day$

Temperature

$Temperature = 273.15\ K = 32\ °F$

$Temperature = 273.15\ K = 0\ °C$

$Temperature = 273.15\ K = 491.67\ °Ra$

Electric Current

$Electric\_Current = 1000\ A = 1256.6371\ Gi$

$Electric\_Current = 1000\ A = 1\ kA$

$Electric\_Current = 1000\ A = 1 \cdot 10^{6}\ mA$

$Electric\_Current = 1000\ A = 1 \cdot 10^{9}\ µA$

Luminous Intensity

$Luminous\_Intensity = 200\ cd = 200\ cd$

Amount of Substance

$Amount\_of\_Substance = 100\ mol = 0.1\ kmol$

$Amount\_of\_Substance = 100\ mol = 1 \cdot 10^{8}\ \mu mol$

$Amount\_of\_Substance = 100\ mol = 1 \cdot 10^{5}\ mmol$

$Amount\_of\_Substance = 100\ mol = 6.0221 \cdot 10^{25}\ atom$

There are two supplementary quantities (units) to fundamental quantities.

Plane Angle

$Plane\_Angle = 100\ rad = 6000\ s\ radpm$

Solid angle

$Solid\_Angle = 100\ sr = 100\ sr$

Derived Quantities (Definition) :

Physical quantities which depend on one or more fundamental quantities for their measurements are called derived quantities.

Derived Units (Definition) :

The units used to measure derived quantities are called derived units.
Thus units of derived quantities are derived units.

Examples of Derived Quantitres in SMath Solver

$Area = Length \cdot Length = 10000\ m^{2}$

$Volume = Length \cdot Length \cdot Length = 1 \cdot 10^{6}\ m^{3}$

$Velocity = \frac{Length}{Time} = 1.6667\ \frac{m}{s}$

$Acceleration = \frac{Velocity}{Time} = 0.0278\ \frac{m}{s^{2}}$

$Force = Mass \cdot Acceleration = 2.7778\ N$

$Pressure = \frac{Force}{Area} = 0.0003\ Pa$

$Density = \frac{Mass}{Volume} = 0.0001\ \frac{kg}{m^{3}}$

$Work = Force \cdot Length = 277.7778\ J$