

Functions For Temperature Conversions

Mathcad provides for Kelvin and Rankine units only. Fahrenheit and Celsius for example cannot be created as user-defined units. Instead we must devise a function to perform the conversion and define the units as 1. This gives the appearance of the conversion.

Define constants: degF := 1 degC := 1

Type the defined unit constant degC or degF in the placeholder next to the result in your worksheet.

Celsius to Fahrenheit: $f(c) := \frac{9}{5} \cdot c + 32$ $f(0 \cdot \text{degC}) = 32 \text{ degF}$

Fahrenheit to Celsius: $c(f) := \frac{5}{9} \cdot (f - 32)$ $c(212 \cdot \text{degF}) = 100 \text{ degC}$

Kelvin to Celsius: $c(T) := \left(\frac{T}{K} - 273.15 \right)$ $c(373.15 \cdot K) = 100 \text{ degC}$

Celsius to Kelvin: $k(t) := (t + 273.15) \cdot K$ $k(100 \cdot \text{degC}) = 373.15 K$

Rankine to Fahrenheit: $f(t) := \frac{t}{R} - 459.67$ $f(491.67 \cdot R) = 32 \text{ degF}$

Fahrenheit to Rankine: $r(t) := (t + 459.67) \cdot R$ $r(32 \cdot \text{degF}) = 491.67 R$