

Calculations with different units of measure

MatDeck provides three different types of units of measure which are radians, degrees and gradians. The most familiar unit of measure is degrees, where an unit circle is divided into 360 equal degrees. The other common measurement for angles is radians, where the unit circle contains 2 radians (2π). Radians are used most often in trigonometry. Gradians on the other hand divide the unit circle into 400 equal gradians. It is easy to convert between degree measurement, radian measurement and gradian measurement. Entire circle have 2π radians, 360° degrees or 400 gradians if we change measurement type. Therefore the conversions look like the examples below.

$$1 \text{ degree} = \frac{\pi}{180} \text{ radians}$$

$$1 \text{ degree} = \frac{9}{10} \text{ gradians}$$

$$1 \text{ radian} = \frac{180}{\pi} \text{ degrees}$$

$$1 \text{ radian} = \frac{200}{\pi} \text{ gradians}$$

$$1 \text{ gradian} = \frac{10}{9} \text{ degrees}$$

$$1 \text{ gradian} = \frac{\pi}{200} \text{ radians}$$

In MatDeck documents you can set an angle unit measure from the Math tab, and this setting is global and remains the same throughout the whole document. To convert a specific value despite the global Angle unit setting, use the conversion functions: rad2deg, rad2grad, deg2rad, deg2grad, grad2rad and grad2deg. The relation between degrees measurements, radian measurements and gradian measurements of some of the standard angles are given bellow (we have set the global measure units to degrees in this document):

Degrees

Radians

Gradians

$$a1 := 0$$

$$\text{deg2rad}(a1) = 0$$

$$\text{deg2grad}(a1) = 0$$

$$a2 := 30$$

$$\text{deg2rad}(a2) = 0.524$$

$$\text{deg2grad}(a2) = 33.333$$

$$a3 := 45$$

$$\text{deg2rad}(a3) = 0.785$$

$$\text{deg2grad}(a3) = 50$$

$$a4 := 60$$

$$\text{deg2rad}(a4) = 1.047$$

$$\text{deg2grad}(a4) = 66.667$$

$$a5 := 90$$

$$\text{deg2rad}(a5) = 1.571$$

$$\text{deg2grad}(a5) = 100$$

$$a6 := 120$$

$$\text{deg2rad}(a6) = 2.094$$

$$\text{deg2grad}(a6) = 133.333$$

$$a7 := 135$$

$$\text{deg2rad}(a7) = 2.356$$

$$\text{deg2grad}(a7) = 150$$

$$a8 := 150$$

$$\text{deg2rad}(a8) = 2.618$$

$$\text{deg2grad}(a8) = 166.667$$

$$a9 := 180$$

$$\text{deg2rad}(a9) = \pi$$

$$\text{deg2grad}(a9) = 200$$

$$a10 := 270$$

$$\text{deg2rad}(a10) = 4.712$$

$$\text{deg2grad}(a10) = 300$$

$$a11 := 360$$

$$\text{deg2rad}(a11) = 6.283$$

$$\text{deg2grad}(a11) = 400$$