Conversions

Since both degrees and radian measures will be dealt with in trigonometry, it will sometimes be necessary to convert degrees to radians, or radians to degrees.

The following formulas are used for such conversions.

Degrees to Radians	***Radians to Degrees***
$\text{Degrees} \times \frac{\pi}{180^\circ}$	$\text{Radians} \times \frac{180^\circ}{\pi}$

Example

Convert 80° to radians.

$$80^\circ \cdot \frac{\pi}{180^\circ}$$
$$\frac{80\pi}{180}$$
$$\frac{4\pi}{9}$$

Once the final product is reduced, it is evident that 80° is equal to $\frac{4\pi}{9}$ ***radians.***

Convert $-\frac{3\pi}{4}$ ***radians to degrees.***

$$-\frac{3\pi}{4} \cdot \frac{180^\circ}{\pi}$$
$$-\frac{540^\circ}{4}$$
$$-135^\circ$$

Notice the negative sign is kept in the problem. Once the final product is reduced, it can be concluded that $-\frac{3\pi}{4}$ ***radians is equal to -135°***

Convert 3 radians to degrees.

$$3 \cdot \frac{180^\circ}{\pi} = \frac{540^\circ}{\pi} \approx 171.887^\circ$$

In this example, there is no degree symbol next to the 3. This means we are looking at 3 radians. Once 3 is multiplied by 180°, divide the result by π ***. This will result in a decimal estimate of the measure of the angle.***

Why are these conversion formulas necessary?

There are certain formulas used in trigonometry such as the, arc-length formula, where the angle used in the calculations must be in radians. These conversion formulas will allow this to be done. Also, it is sometimes difficult to tell in which quadrant the terminal side of an angle lies when it is written in radians. Converting from radians to degrees will make this process easier.