Math 143
Radian Angle Measure

I. Converting Between Degree and Radian Measure

Recall that $360° = 2\pi$ radians, so $180° = \pi$ radians.

Therefore, to convert from degrees to radians, we multiply by the conversion factor: $\dfrac{\pi \text{rad}}{180°}$.

Similarly, to convert from radians to degrees, we multiply by the conversion factor: $\dfrac{180°}{\pi \text{rad}}$.

Examples:

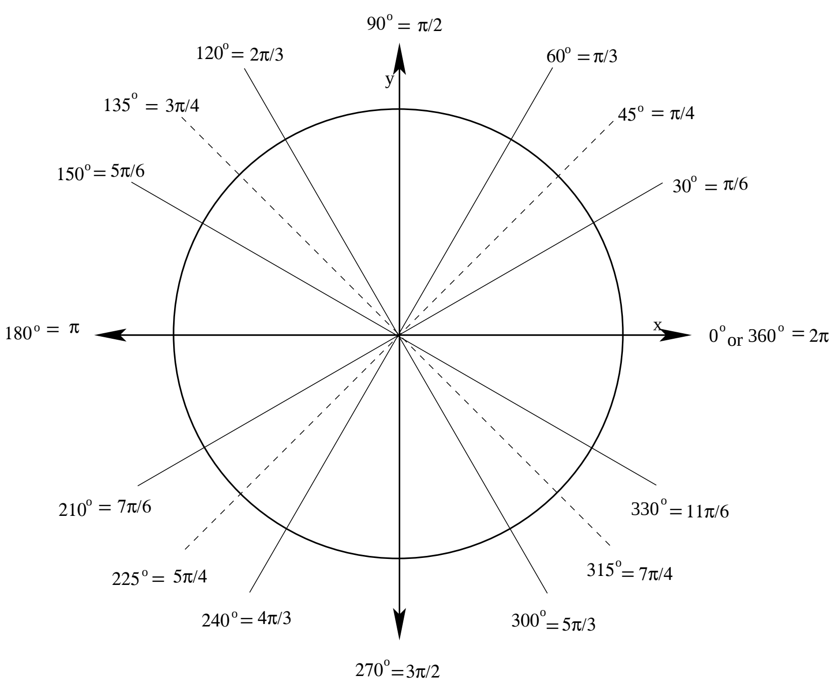
Suppose $\theta = 50°$. Then $\theta = 50° \cdot \dfrac{\pi \text{rad}}{180°} = \dfrac{50\pi}{180} = \frac{5\pi}{18}$ radians.

Suppose $\theta = \dfrac{7\pi}{4}$ radians. Then $\theta = \dfrac{7\pi}{4} \cdot \frac{180°}{\pi \text{rad}} = \dfrac{7 \cdot 180}{4} = 7 \cdot 45 = 315°$

Note: Two other useful formulas involving radian measure relate the central angle θ, the radius of a sector of a circle r, the length of the arc bounding the sector s, and the area of the sector A.

They are: $s = r \cdot \theta$ and $A = \frac{1}{2}r^2\theta$. *Be careful though!* These formulas only work properly when θ is measured in radians.

II. Key Angles in Degree and Radian Measure



III. Special Values of Trigonometric Functions

θ (radians)	θ (degrees)	$\sin\theta$	$\cos\theta$	$\tan\theta$	$\cot\theta$	$\sec\theta$	$\csc\theta$
$\frac{\pi}{6}$	$30°$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	$\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	2
$\frac{\pi}{4}$	$45°$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	1	$\sqrt{2}$	$\sqrt{2}$
$\frac{\pi}{3}$	$60°$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{\sqrt{3}}{3}$	2	$\frac{2\sqrt{3}}{3}$