1.1 Angle Measures & Radians

Degrees 360°/circles

Minutes $60'$

Seconds $60''$

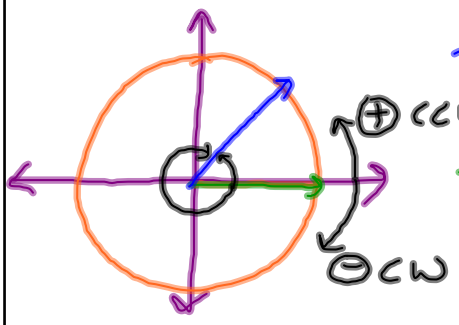
3600 seconds/°

$157^\circ\ 23'\ 38''$ DMS

to decimal

$\div 60$ decimal + to degree

$\div 3600$ decimal + degree + min



terminal Ray

⊕ ccw

Initial Ray

⊖ cw

Each pair of rays make ∞ angles

⊕ positive

⊖ negative

coterminal angles

Michael Jackson

$0 \to 720^\circ$

Tony Hawk

$0 \to 900^\circ$

Shawn White

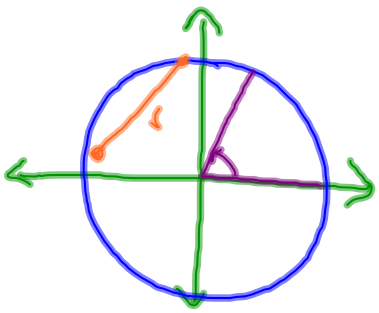
$\to 1080^\circ$

Complimentary Angles : add to 90° ← right Angles

Supplementary Angles : add to 180° ← half circle

Coterminal angles: Share initial & Terminal rays
Differ by multiples of 360°

Radians ← Mathematical angle measure based on circles



- 1 radian is the measure of a central angle that intercepts an arc length (s) equal in length to the radius (r) of the circle.

There are 2π radians in a circle.

Circumpherence = $2\pi r$

Degrees	Radians
360°	2π
180°	π
90°	$\frac{\pi}{2}$
60°	$\frac{\pi}{3}$
45°	$\frac{\pi}{4}$
30°	$\frac{\pi}{6}$

Common Angles
30° & 45° and their multiples

240° $\div 180^\circ$ Stick π on it

$\frac{240}{180} = \frac{4\pi}{3}$

$270^\circ = 3 \cdot 90^\circ = 3 \cdot \frac{\pi}{2} = \frac{3\pi}{2}$

$135^\circ = 3 \cdot 45^\circ = \frac{3\pi}{4}$

$330^\circ = 11 \cdot 30^\circ = \frac{11\pi}{6}$

50°

$\frac{50}{180} = \frac{5\pi}{18}$

$= 0.2\overline{7}\pi$

≈ 0.873

Radians → Degrees

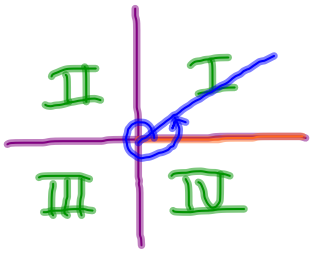
$\frac{7\pi}{4}$ $\div \pi \times 180^\circ$ $\frac{7 \cdot 180^\circ}{4} = 7 \cdot 45^\circ = 315^\circ$

$\frac{8\pi}{4} = 2\pi$

$\frac{7\pi}{6} = 7 \cdot 30^\circ = 210^\circ$

$\frac{2\pi}{3} = 120^\circ$

$\frac{\pi}{9} = \frac{180^\circ}{9} = 20^\circ$



Standard Position

Initial Ray on positive x-axis

390°

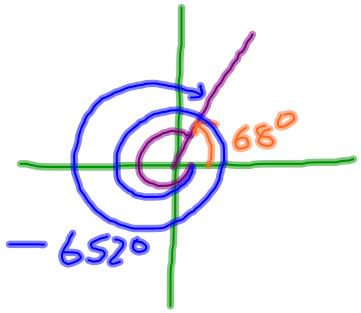
-74° IV

$\frac{13\pi}{6}$ I

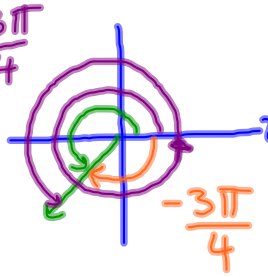
Find Coterminal Angles

Find 2 $\frac{1\oplus}{1\ominus}$

-292°



$\frac{13\pi}{4}$



$2\pi = \frac{8\pi}{4}$ $\frac{5\pi}{4}$

$-\frac{3\pi}{4}$