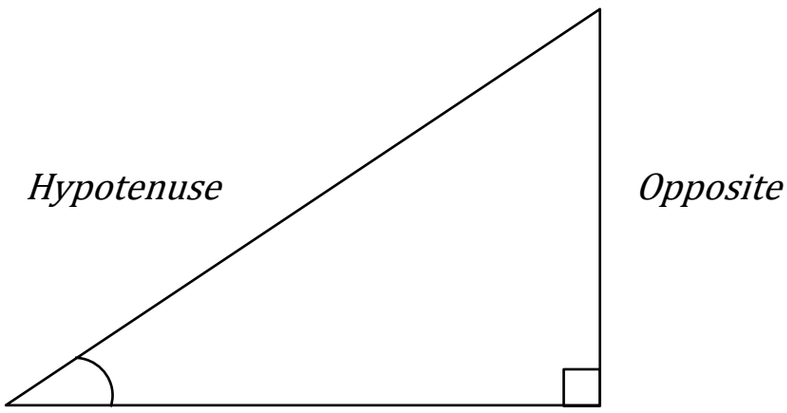
TRIGONOMETRIC FORMULAS

- ***RIGHT TRIANGLE***

Assume that:

$$0 < \theta < \frac{\pi}{2} \; or \; 0° < \theta < 90°$$

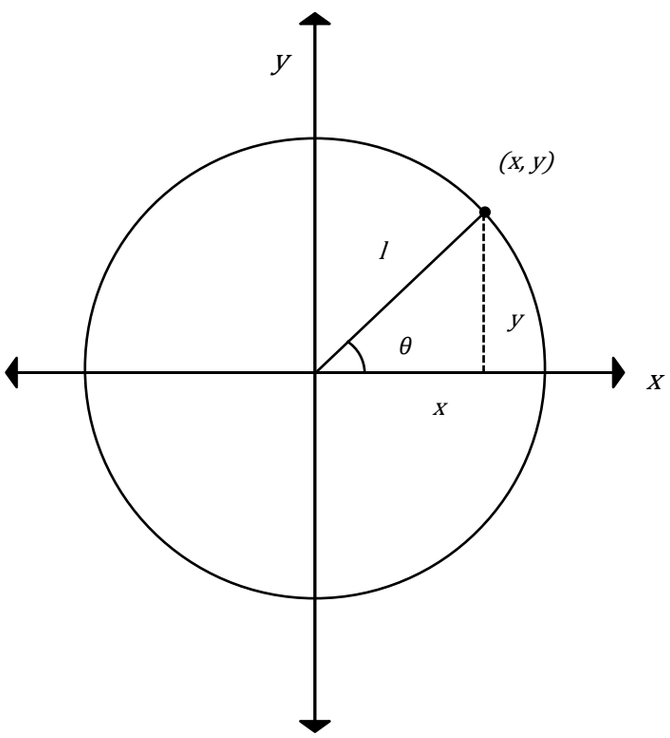


$$\sin\theta = \frac{opp}{hyp} \qquad \csc\theta = \frac{hyp}{opp}$$

$$\cos\theta = \frac{adj}{hyp} \qquad \sec\theta = \frac{hyp}{adj}$$

$$\tan\theta = \frac{opp}{adj} \qquad \cot\theta = \frac{adj}{opp}$$

- ***UNIT CIRCLE***

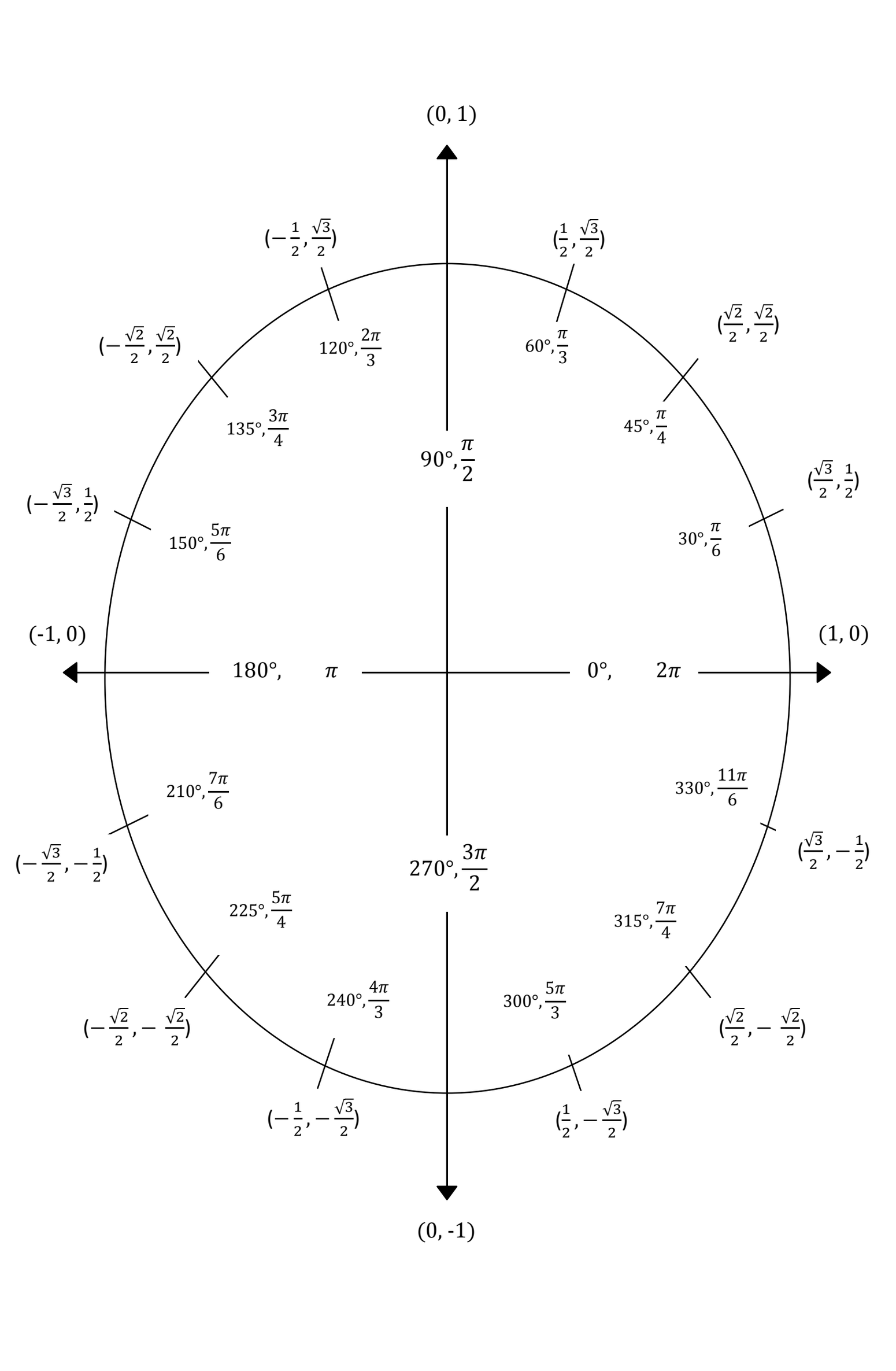


$$\sin\theta = \frac{y}{1} \qquad \csc\theta = \frac{1}{y}$$

$$\cos\theta = \frac{x}{1} \qquad \sec\theta = \frac{1}{x}$$

$$\tan\theta = \frac{y}{x} \qquad \cot\theta = \frac{x}{y}$$

Assume that θ can be any angle.


(0, 1)
$(-\frac{1}{2}, \frac{\sqrt{3}}{2})$
$(\frac{1}{2}, \frac{\sqrt{3}}{2})$
$(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$
$(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$
$120°, \frac{2\pi}{3}$
$60°, \frac{\pi}{3}$
$135°, \frac{3\pi}{4}$
$45°, \frac{\pi}{4}$
$90°, \frac{\pi}{2}$
$(-\frac{\sqrt{3}}{2}, \frac{1}{2})$
$(\frac{\sqrt{3}}{2}, \frac{1}{2})$
$150°, \frac{5\pi}{6}$
$30°, \frac{\pi}{6}$
(-1, 0)
(1, 0)
180°, π
0°, 2π
$210°, \frac{7\pi}{6}$
$330°, \frac{11\pi}{6}$
$(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$
$(\frac{\sqrt{3}}{2}, -\frac{1}{2})$
$270°, \frac{3\pi}{2}$
$225°, \frac{5\pi}{4}$
$315°, \frac{7\pi}{4}$
$240°, \frac{4\pi}{3}$
$300°, \frac{5\pi}{3}$
$(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$
$(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$
$(-\frac{1}{2}, -\frac{\sqrt{3}}{2})$
$(\frac{1}{2}, -\frac{\sqrt{3}}{2})$
(0, -1)

- ***IDENTITIES AND FORMULAS***

1. *Tangent and Cotangent Identities*

$$tan\,\theta = \frac{sin\,\theta}{cos\,\theta} \qquad cot\,\theta = \frac{cos\,\theta}{sin\,\theta}$$

2. *Reciprocal Identities*

$$\sin\theta = \frac{1}{\csc\theta} \qquad \csc\theta = \frac{1}{\sin\theta}$$

$$\cos\theta = \frac{1}{\sec\theta} \qquad \sec\theta = \frac{1}{\cos\theta}$$

$$\tan\theta = \frac{1}{\cot\theta} \qquad \cot\theta = \frac{1}{\tan\theta}$$

3. *Pythagorean Identities*

$$\sin^2\theta + \cos^2\theta = 1$$

$$\tan^2\theta + 1 = \sec^2\theta$$

$$1 + \cot^2\theta = \csc^2\theta$$