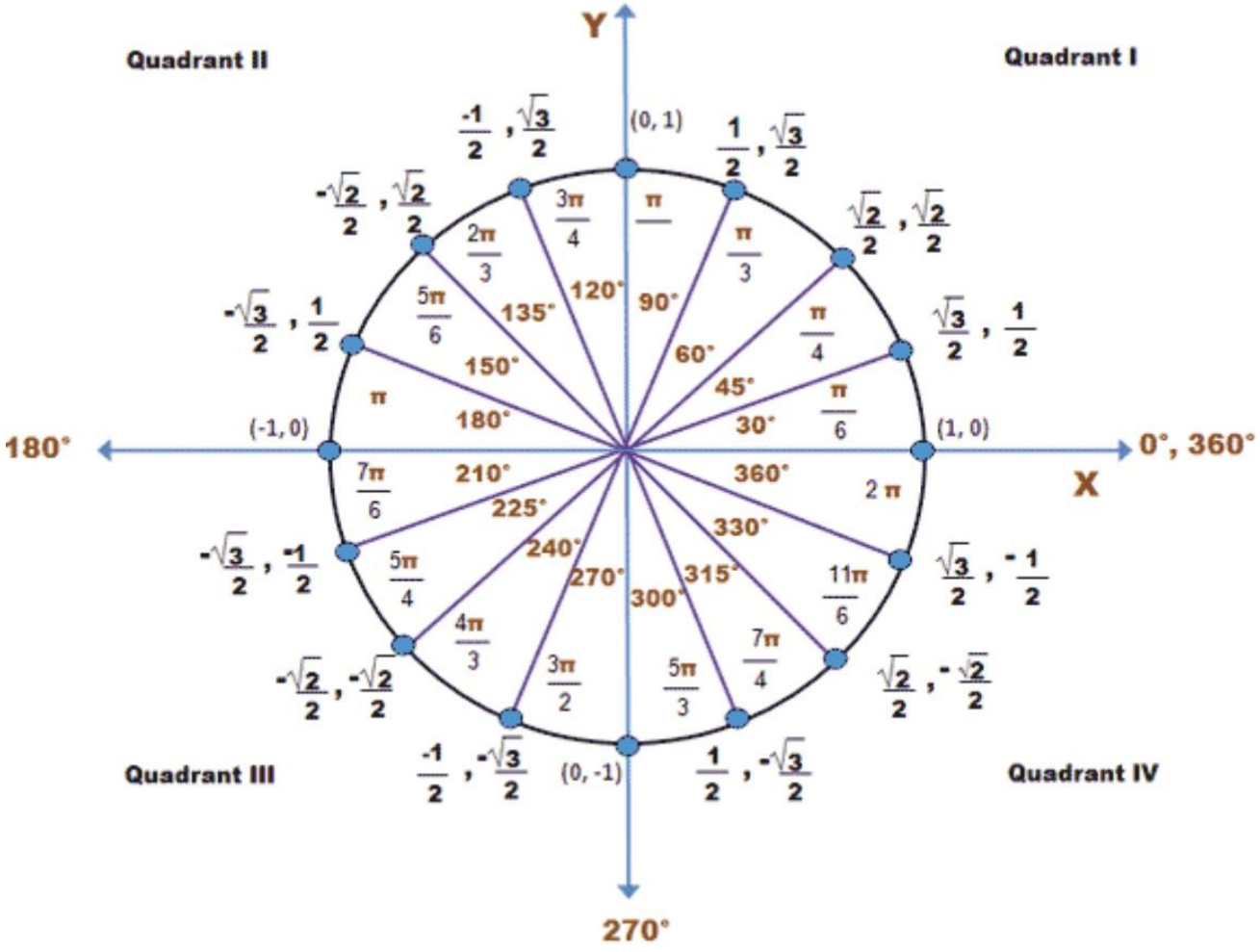
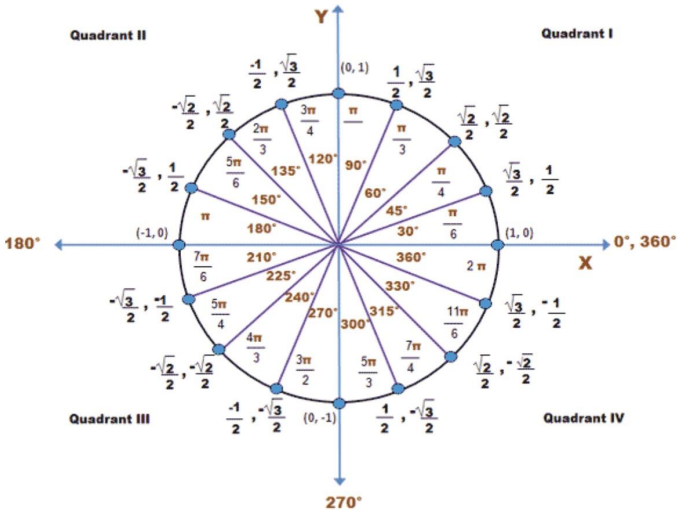
Unit Circle, reference angles, 45 + 45 + 90 triangle & 30 + 60 + 90 triangle



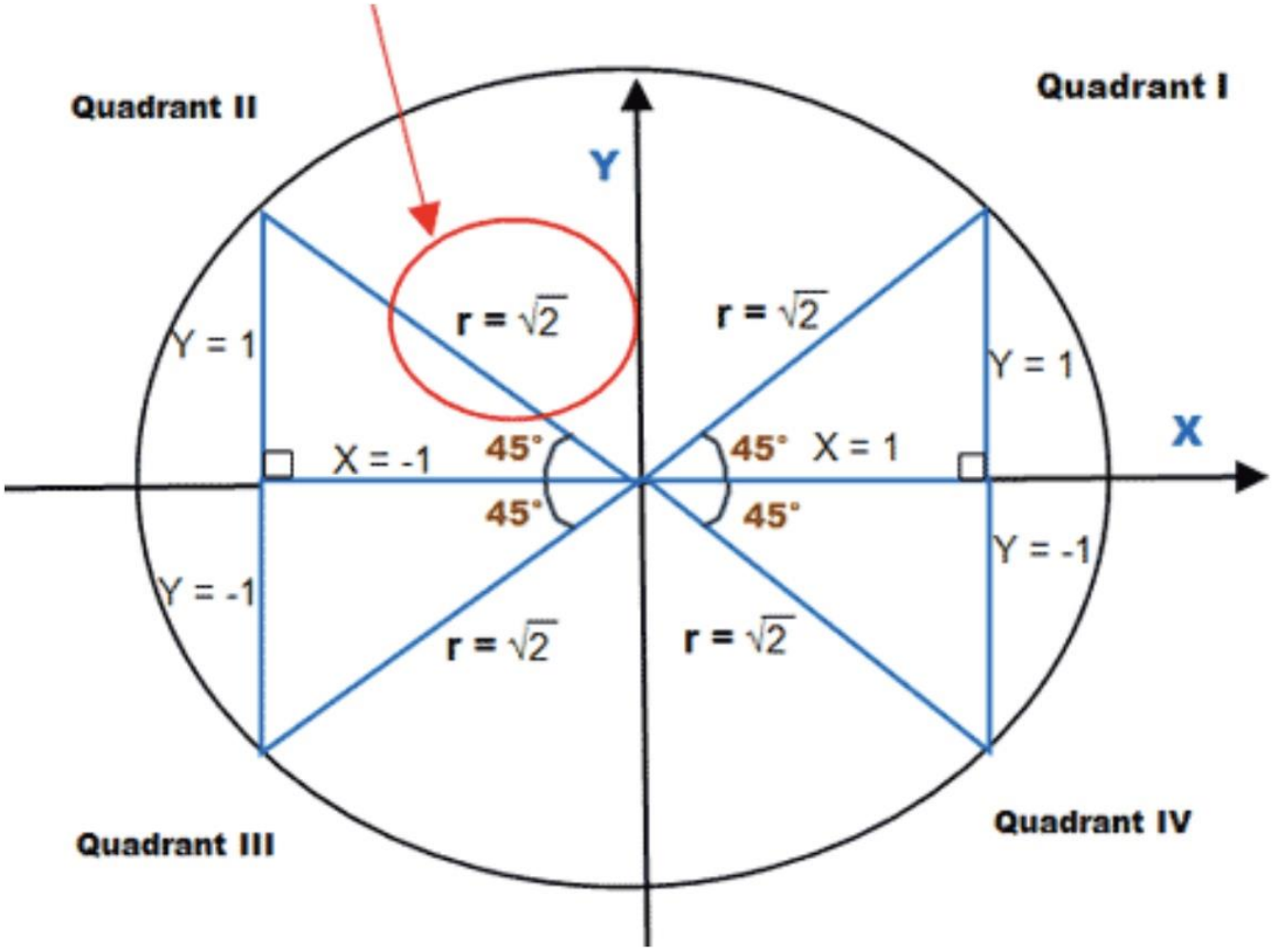


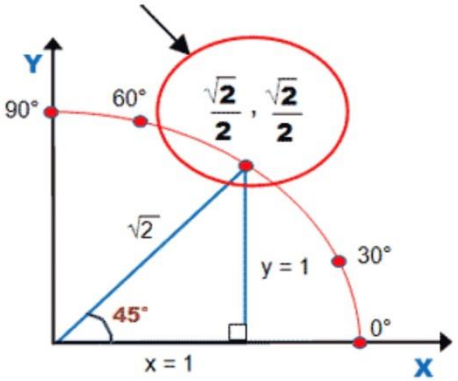
commonly encountered angles

θ	Radians	Sin θ	Cos θ	Tan θ
0°	0	0	1	0
30°	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
45°	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60°	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
90°	$\frac{\pi}{2}$	1	0	—
180°	π	0	–1	0
270°	$\frac{3\pi}{2}$	–1	0	—

Finding Reference Angles in Degrees

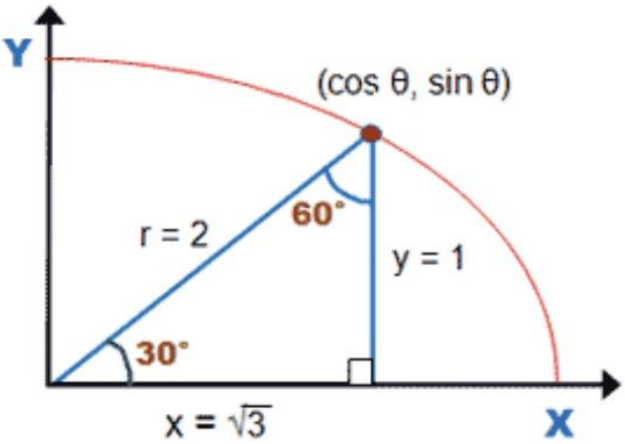
Quadrant	Measure of Angle Theta	Measure of Reference Angle
I	0° to 90°	theta
II	90° to 180°	180° – theta
III	180° to 270°	theta – 180°
IV	270° to 360°	360° – theta

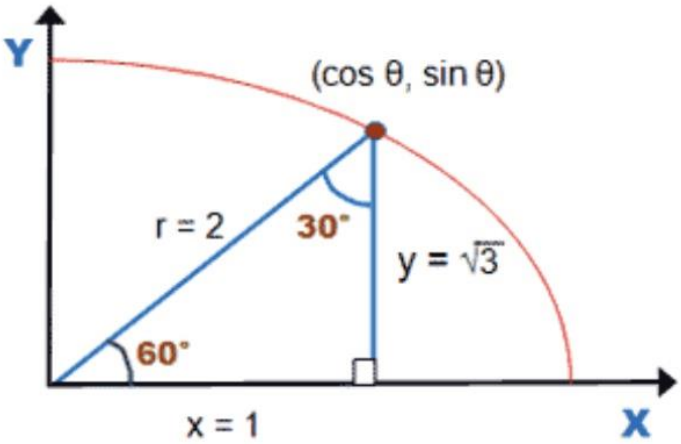




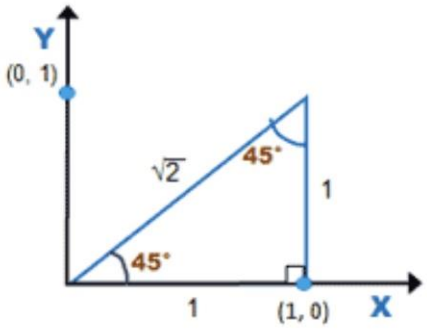
$$X^2 + Y^2 = r^2$$
$$1^2 + 1^2 = r^2$$
$$2 = r^2$$
$$\sqrt{2} = \sqrt{r^2}$$
$$\sqrt{2} = r$$

Rationalize the Denominator
You cannot have a radical in the denominator.

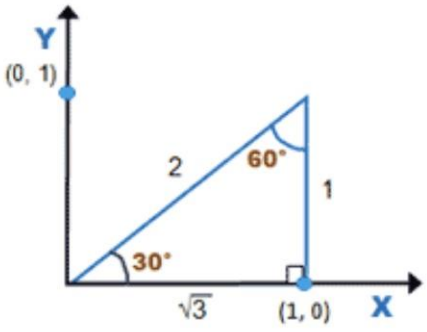


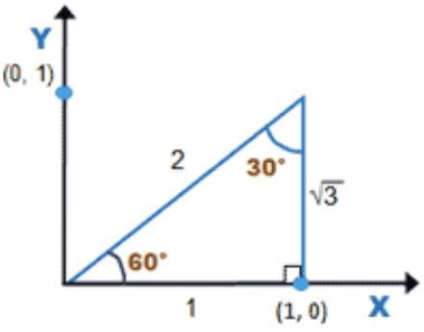


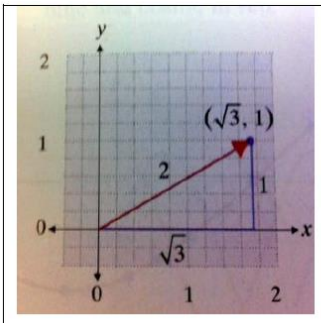
45 – 45 – 90 Triangle



30 – 60 – 90 Triangle







x	$\sin(x)$	$\cos(x)$
0	0	1
$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$
$\frac{\pi}{4}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$
$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$
$\frac{\pi}{2}$	1	0
$\frac{2\pi}{3}$	$\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$
$\frac{3\pi}{4}$	$\frac{1}{\sqrt{2}}$	$-\frac{1}{\sqrt{2}}$
$\frac{5\pi}{6}$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$

x	$\sin(x)$	$\cos(x)$
π	0	-1
$\frac{7\pi}{6}$	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$
$\frac{5\pi}{4}$	$-\frac{1}{\sqrt{2}}$	$-\frac{1}{\sqrt{2}}$
$\frac{4\pi}{3}$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{2}$
$\frac{3\pi}{2}$	-1	0
$\frac{5\pi}{3}$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{2}$
$\frac{7\pi}{4}$	$-\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$
$\frac{11\pi}{6}$	$-\frac{1}{2}$	$\frac{\sqrt{3}}{2}$

Figure 1: Selected Values of Sine and Cosine

Practice

(01)

If tan = ¾ and sec < 0, in which quadrant does angle lie?

What are the values of the remaining angles?

(02)

The value of cos (- π / 3) is

A	B	C	D
½	- ½	$\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{2}$

(03)

Assume cos =3/5, and 3π/2 < Degree < 2π. Find the remaining trig values.

(04)

Find the exact value of the five remaining trig functions if tan = - 4/3 and cos < 0

(05)

If tan = and sec < 0, in which quadrant does angle lie?

What are the values of the remaining angles?

(06)

If $\sin\theta = \frac{1}{3}$ and θ is in quadrant II, find all other trigonometric functions of θ.

(07)

Find the exact values of each of the remaining trigonometric functions of θ when $\tan\theta = -\frac{1}{8}$ and $\sec\theta < 0$.

(08)

Name the quadrant in which the angle θ lies when $\cos\theta < 0$ and $\tan\theta < 0$.

(09)

(10)