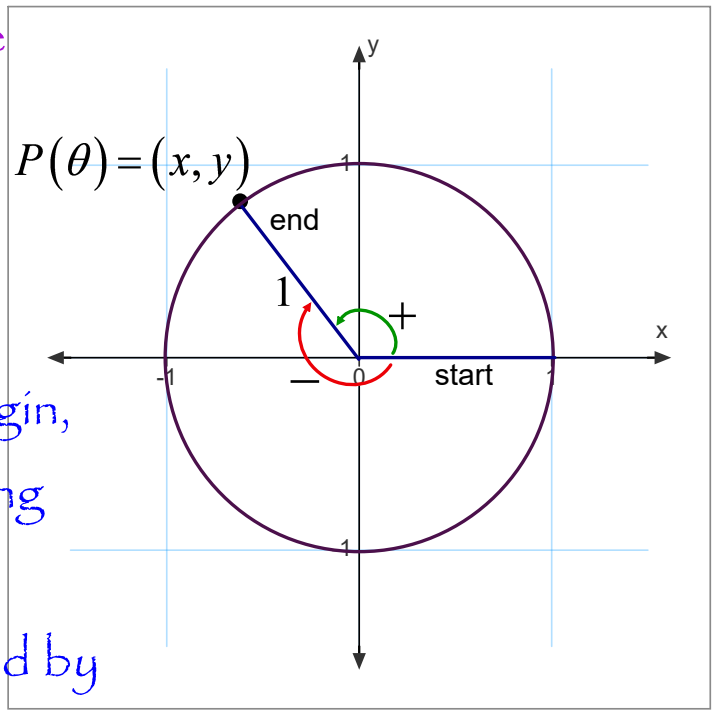
Trigonometric Circle

The trigonometric circle is a unit circle centred at the origin.

radius = 1

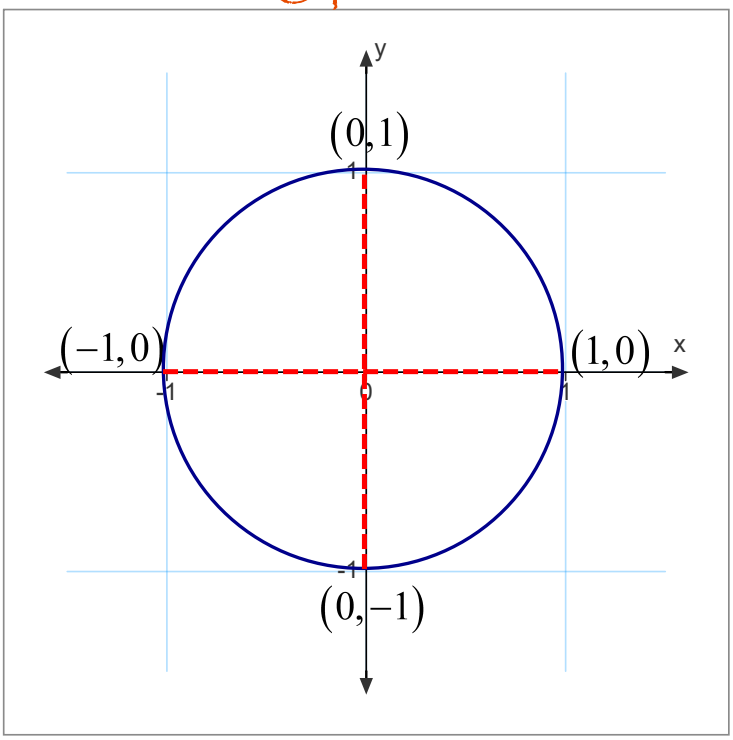
Any point on the circle is called a trigonometric point.



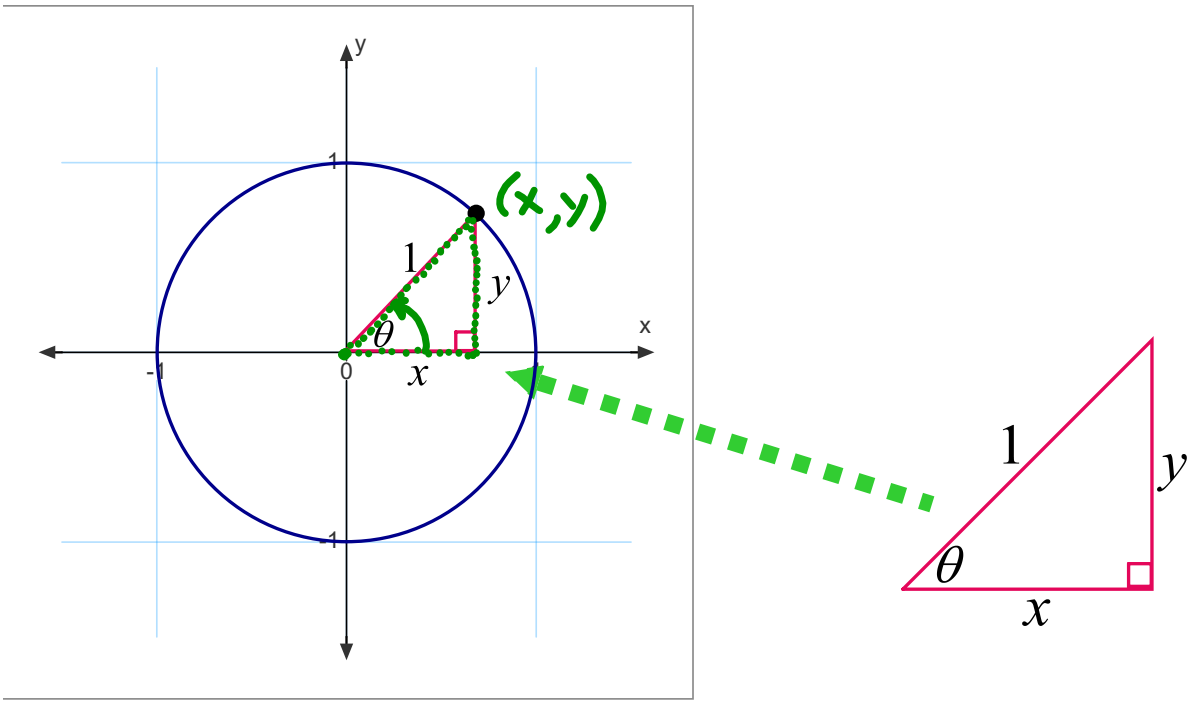
A trigonometric angle has its vertex at the origin, its fixed initial side along the positive x-axis, and its terminal side created by a rotation from the initial side.

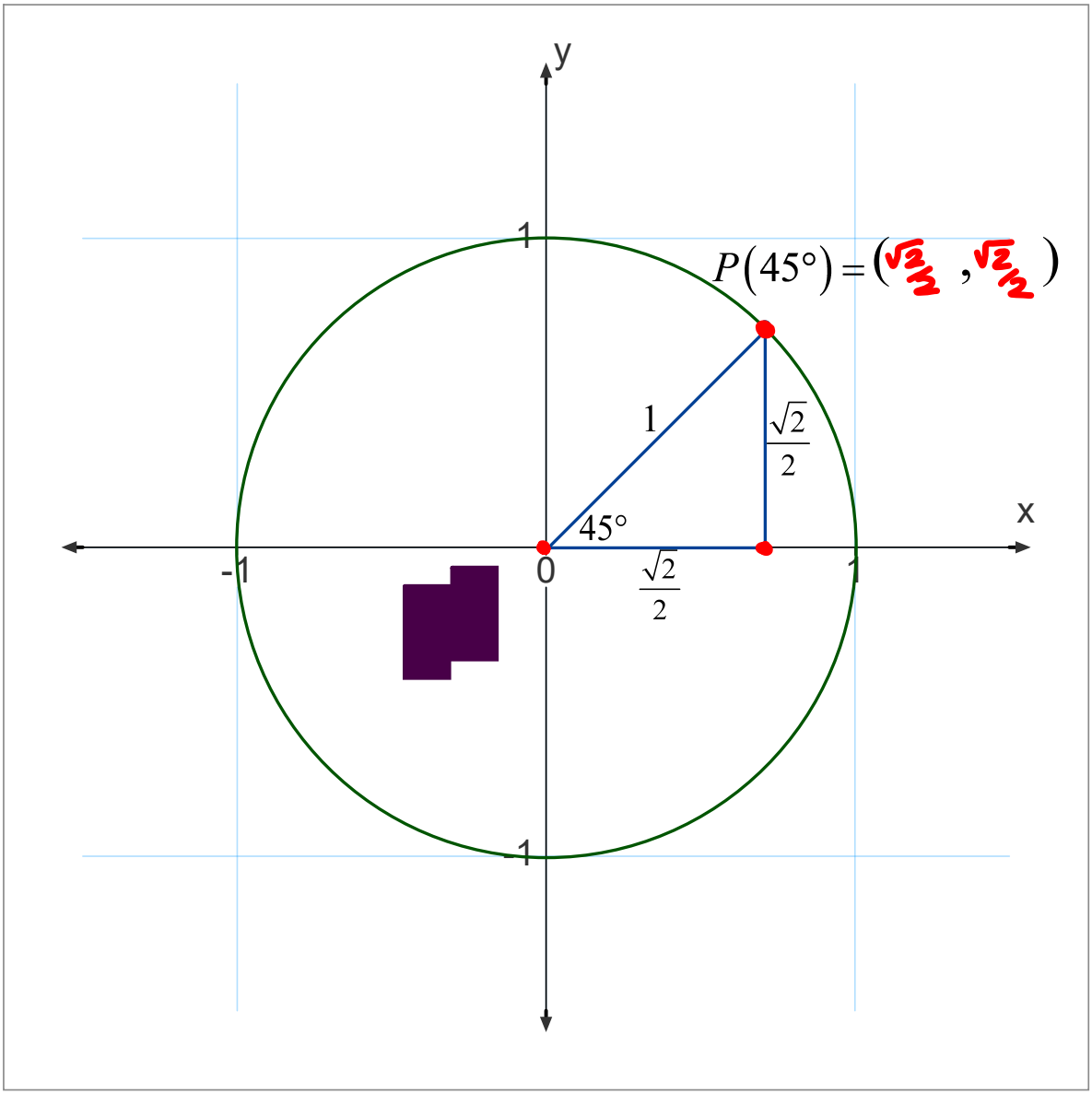
Every angle corresponds with a trigonometric point.

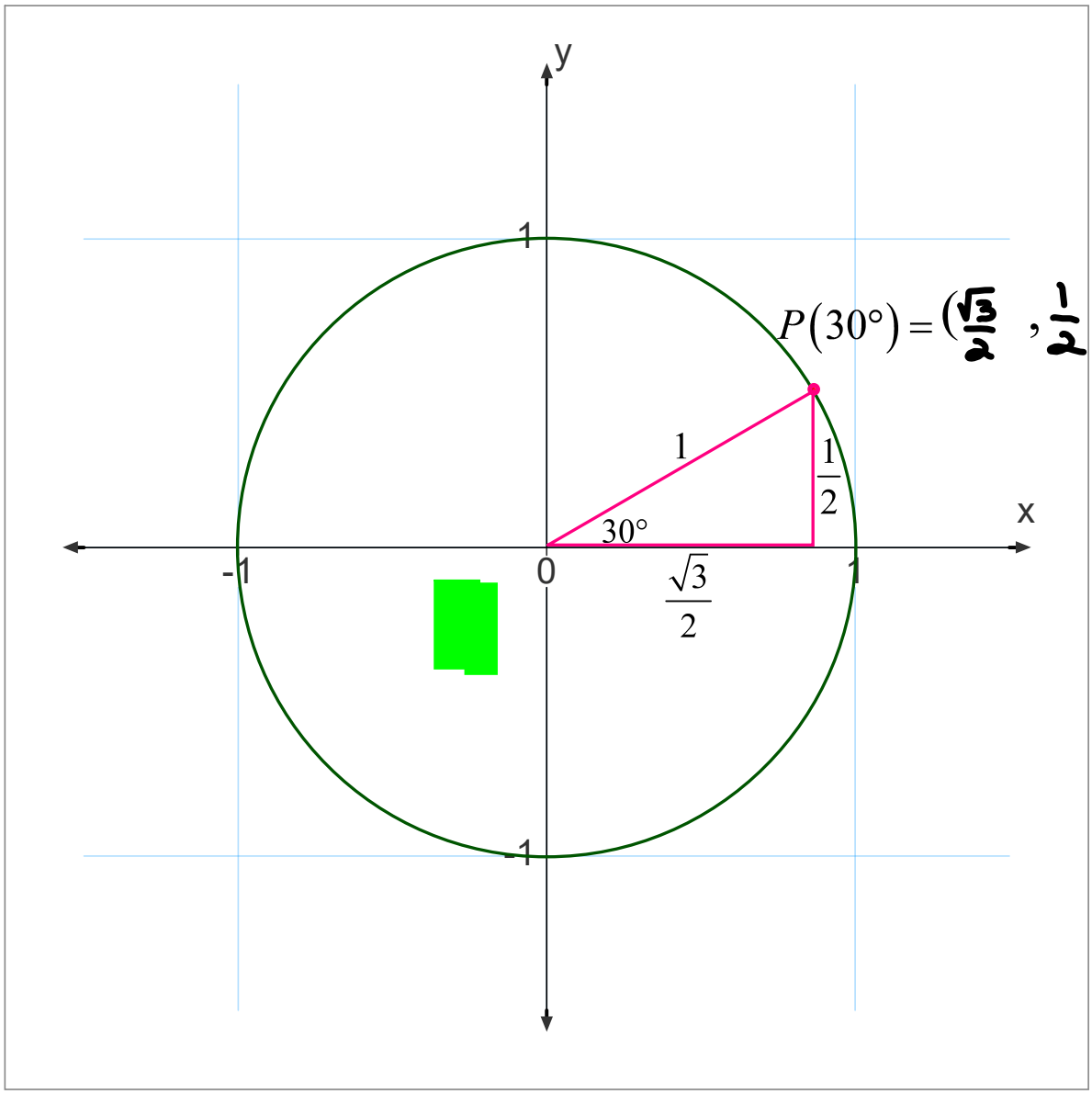
Known trig points:

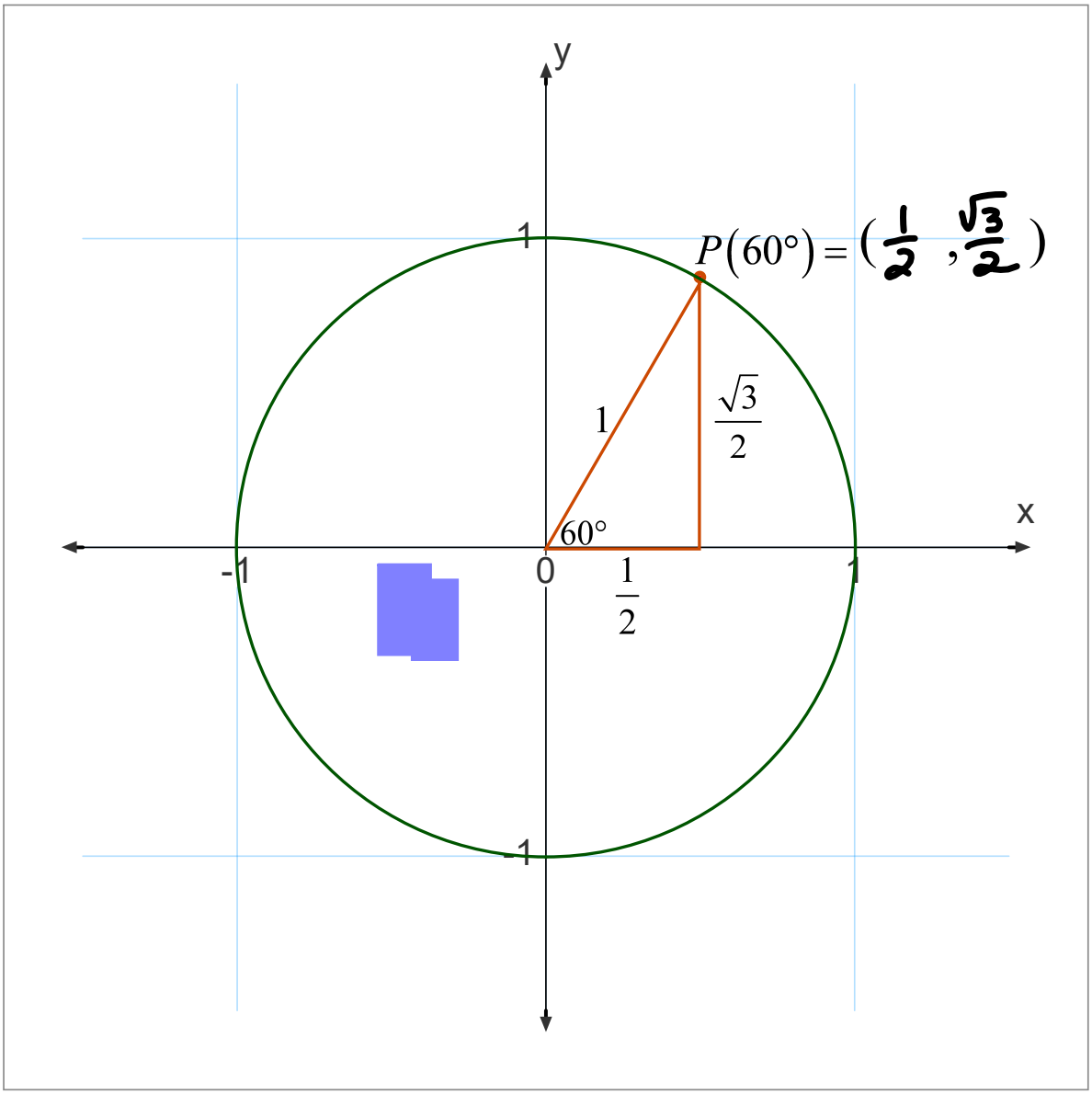


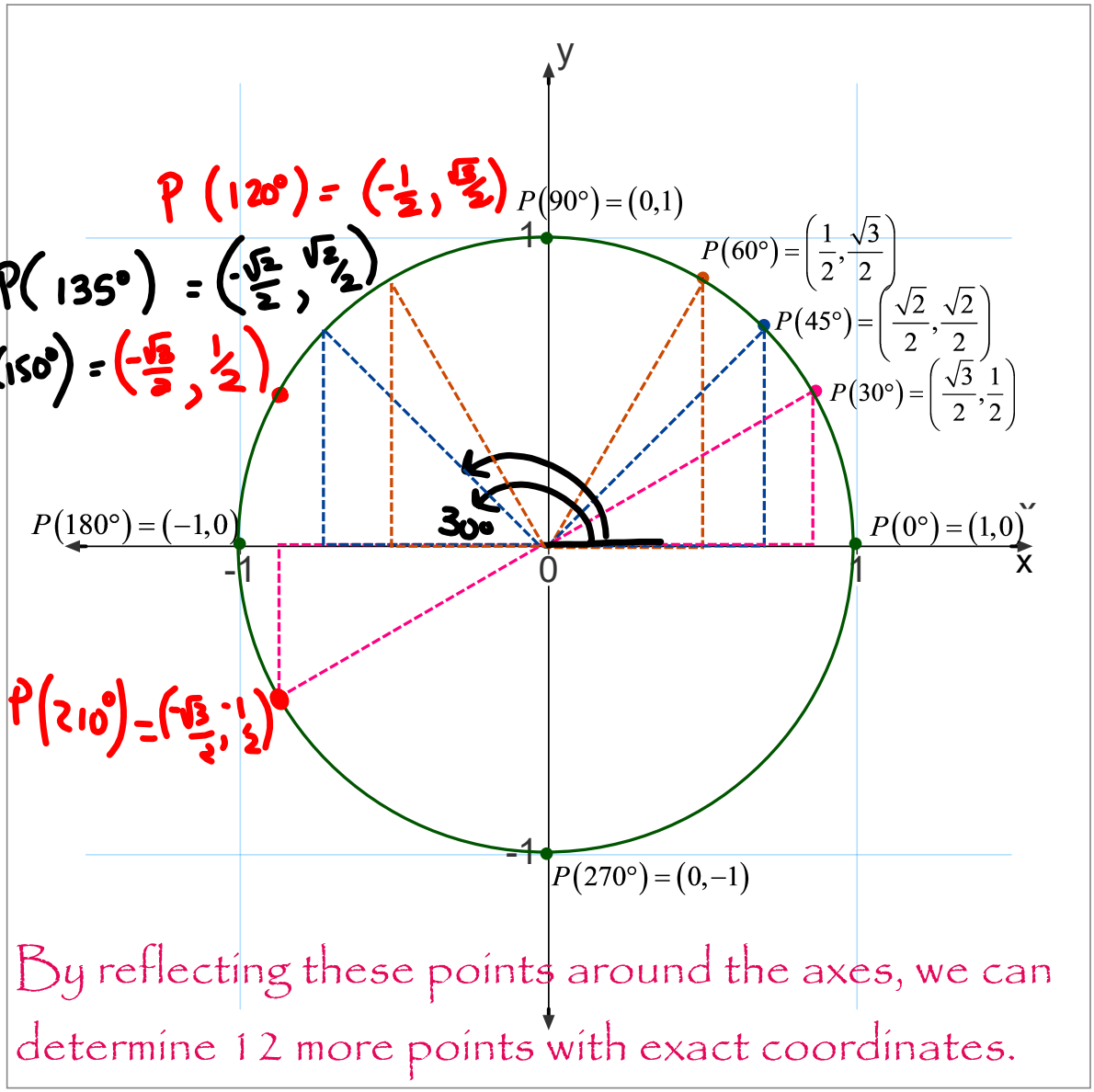
$$P(0°) = (1,0)$$
$$P(90°) = (0,1)$$
$$P(180°) = (-1,0)$$
$$P(270°) = (0,-1)$$
$$P(360°) = (1,0)$$


y
x
1
-1
0
1
-1
(x,y)
1
y
θ
x
1
y
θ
x

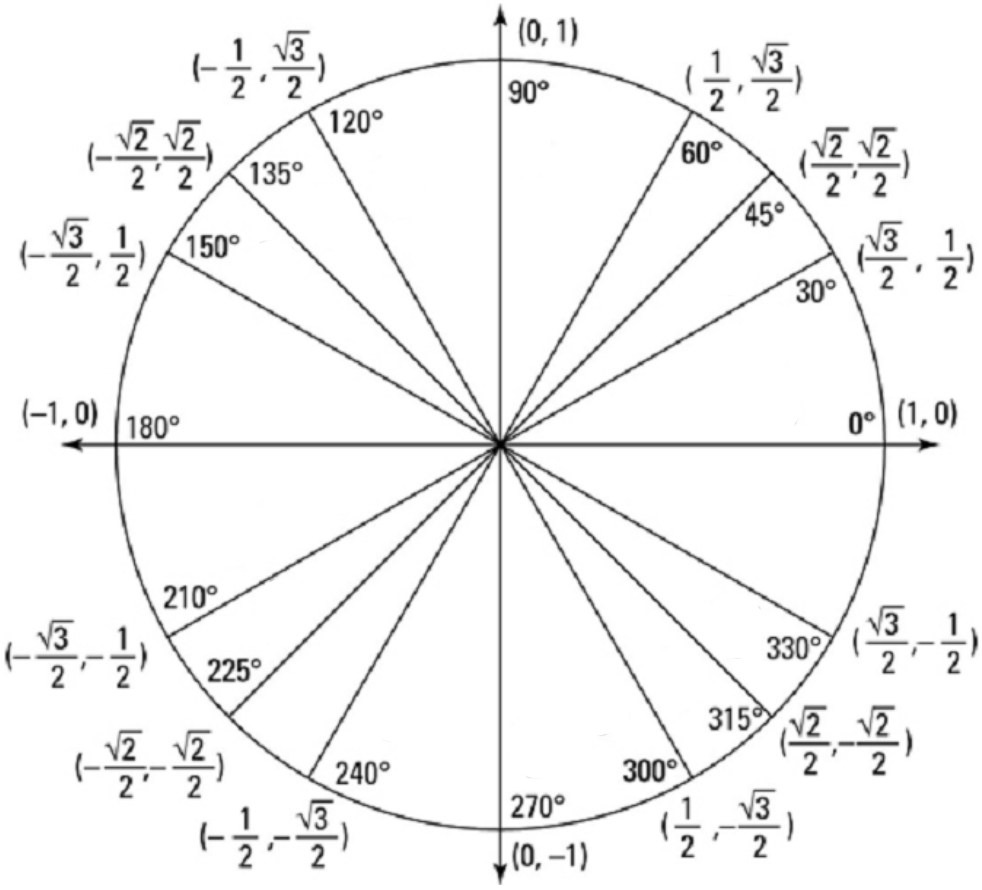

y
x
1
-1
0
1
-1
45°
1
$\frac{\sqrt{2}}{2}$
$\frac{\sqrt{2}}{2}$
$P(45°) = (\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$


y
1
$P(30°) = (\frac{\sqrt{3}}{2}, \frac{1}{2})$
1
$\frac{1}{2}$
30°
x
-1
0
$\frac{\sqrt{3}}{2}$
1
-1


y
x
1
-1
0
1
-1
$P(60°) = (\frac{1}{2}, \frac{\sqrt{3}}{2})$
1
$\frac{\sqrt{3}}{2}$
60°
$\frac{1}{2}$


y
x
1
-1
0
$P(90°) = (0,1)$
$P(60°) = \left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$
$P(45°) = \left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
$P(30°) = \left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$
$P(180°) = (-1,0)$
$P(0°) = (1,0)$
$P(270°) = (0,-1)$
30°
P (120°) = $(-\frac{1}{2}, \frac{\sqrt{3}}{2})$
P(135°) = $(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$
P(150°) = $(-\frac{\sqrt{3}}{2}, \frac{1}{2})$
P(210°) = $(-\frac{\sqrt{3}}{2}, -\frac{1}{2})$
By reflecting these points around the axes, we can determine 12 more points with exact coordinates.

This circle, with all of the exact trigonometric points, is known as the trigonometric circle .



Angles that have the same terminal arm , but different rotations, are called coterminal .

They are created by going around the circle more than once, or by going in a clockwise $(-)$ direction.

Examples: $135°$ and $495°$

$135°$ and $-585°$