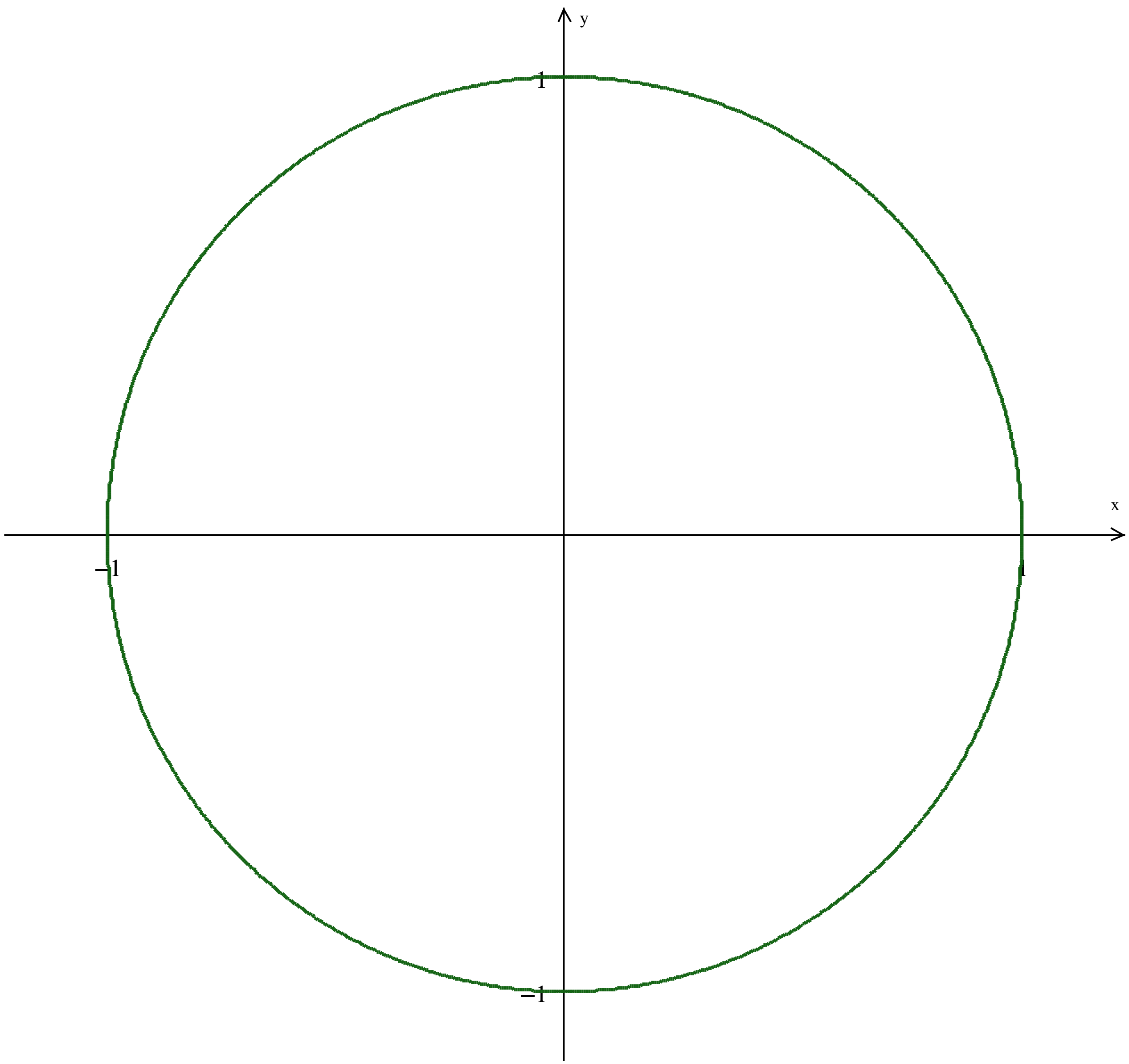
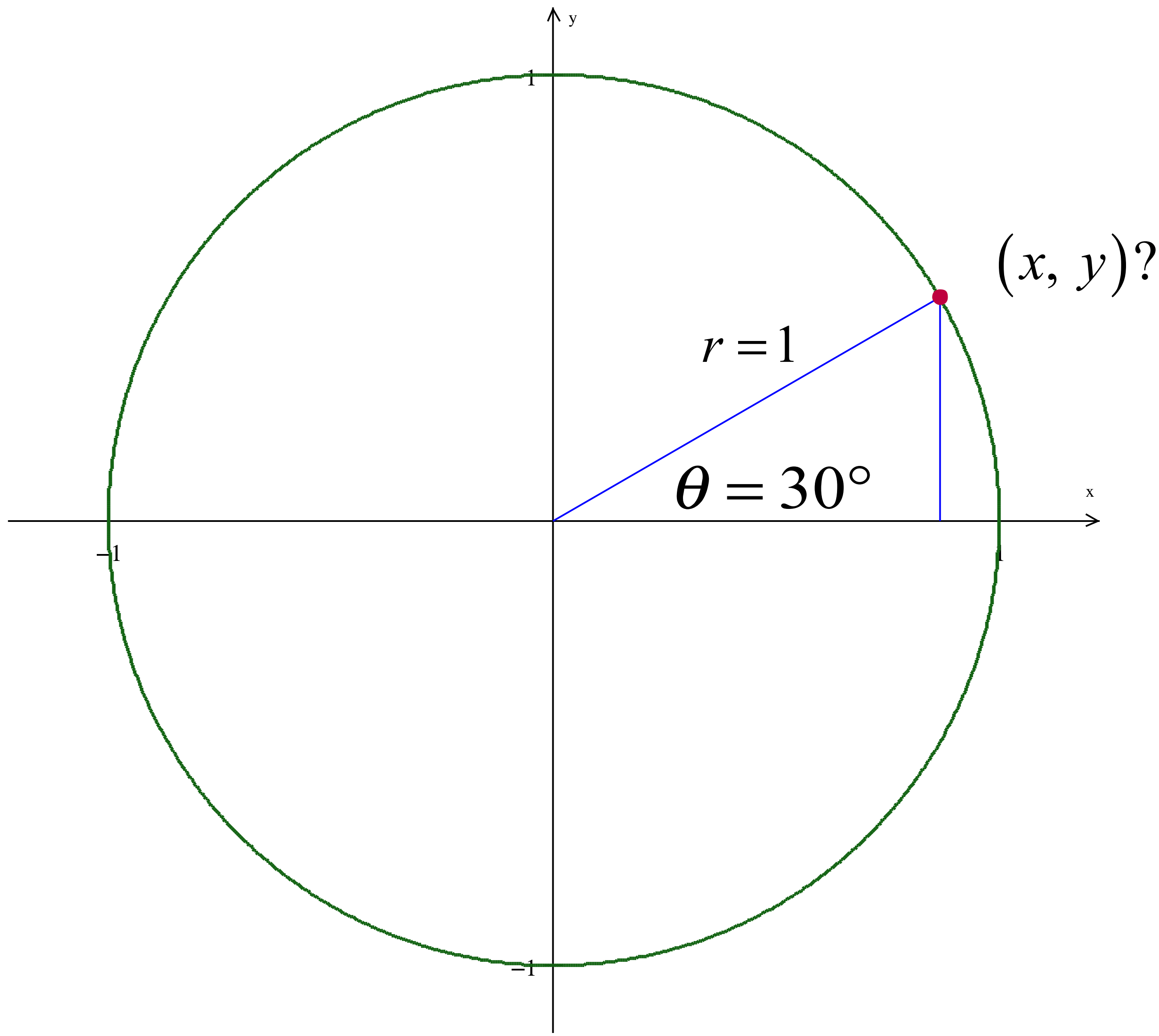
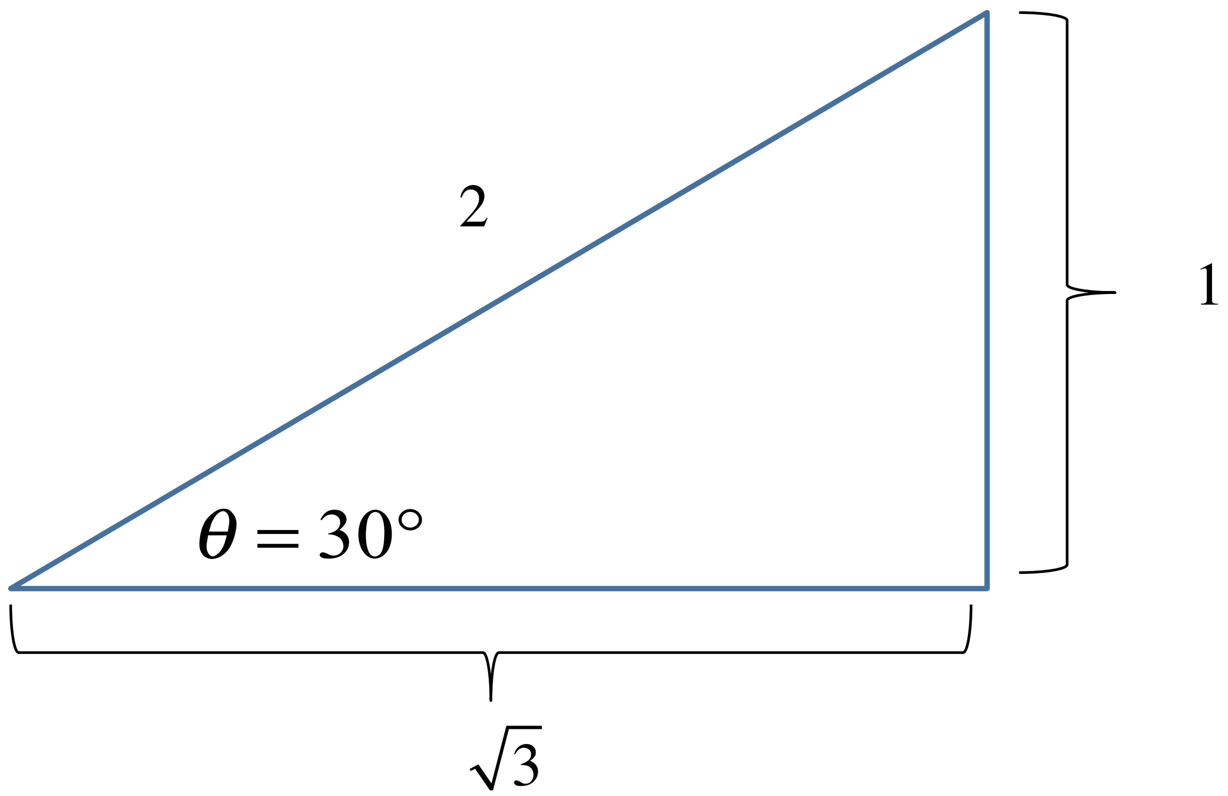
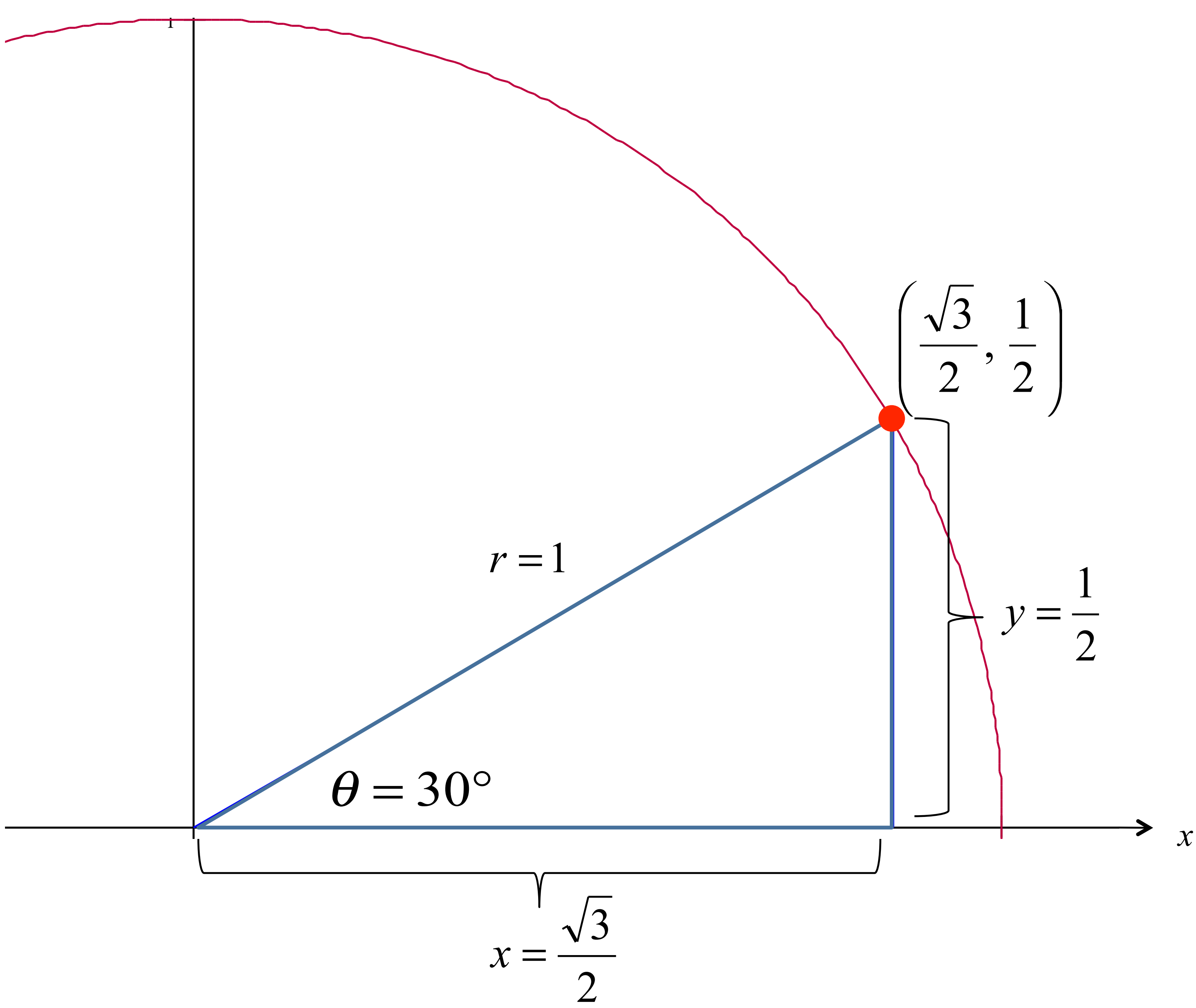

y
x
1
−1
−1
1


y
1
(x, y)?
r = 1
θ = 30°
x
−1
1
−1

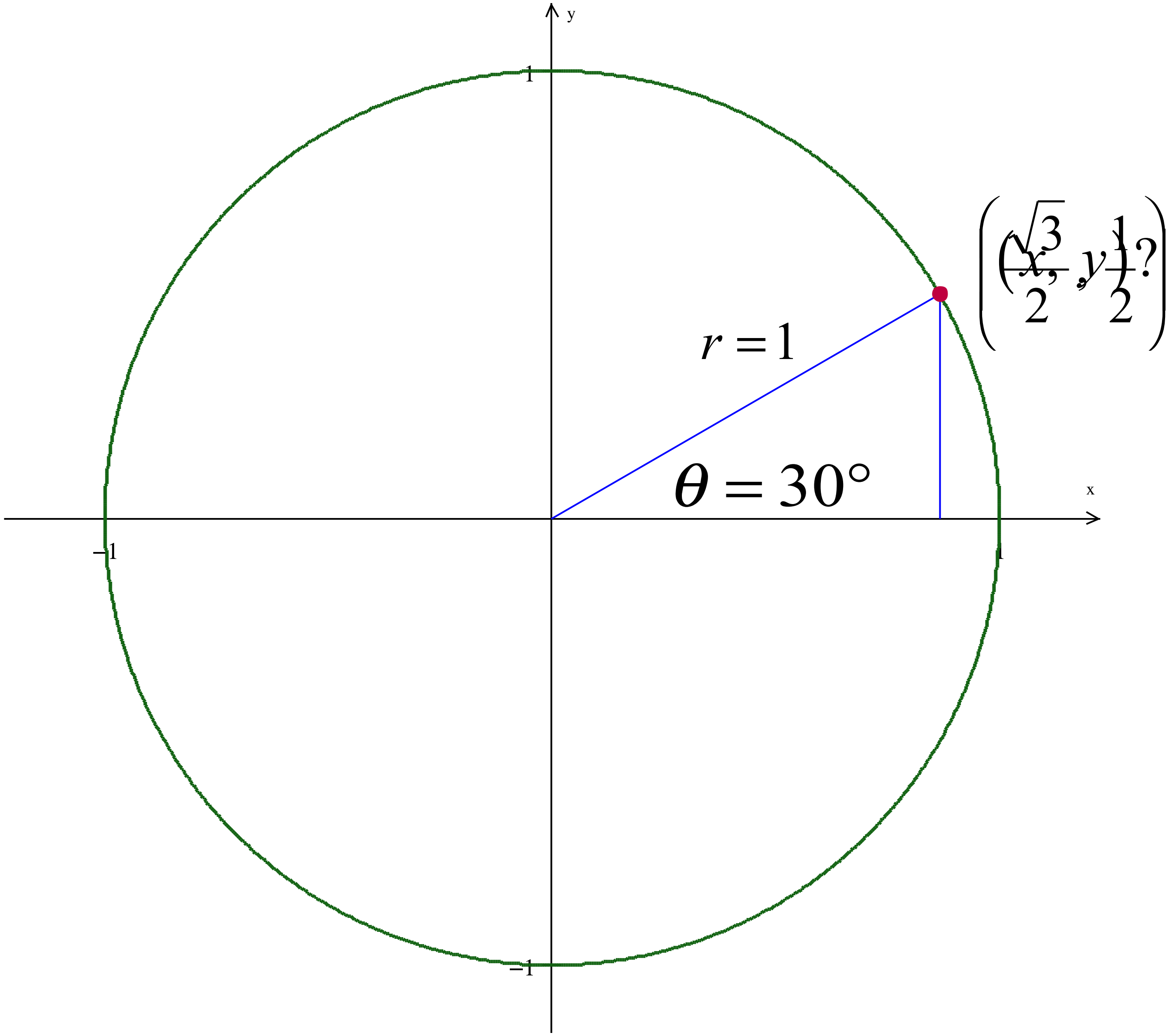
In a 30-60-90 triangle, the side opposite the 30° angle is half the hypotenuse

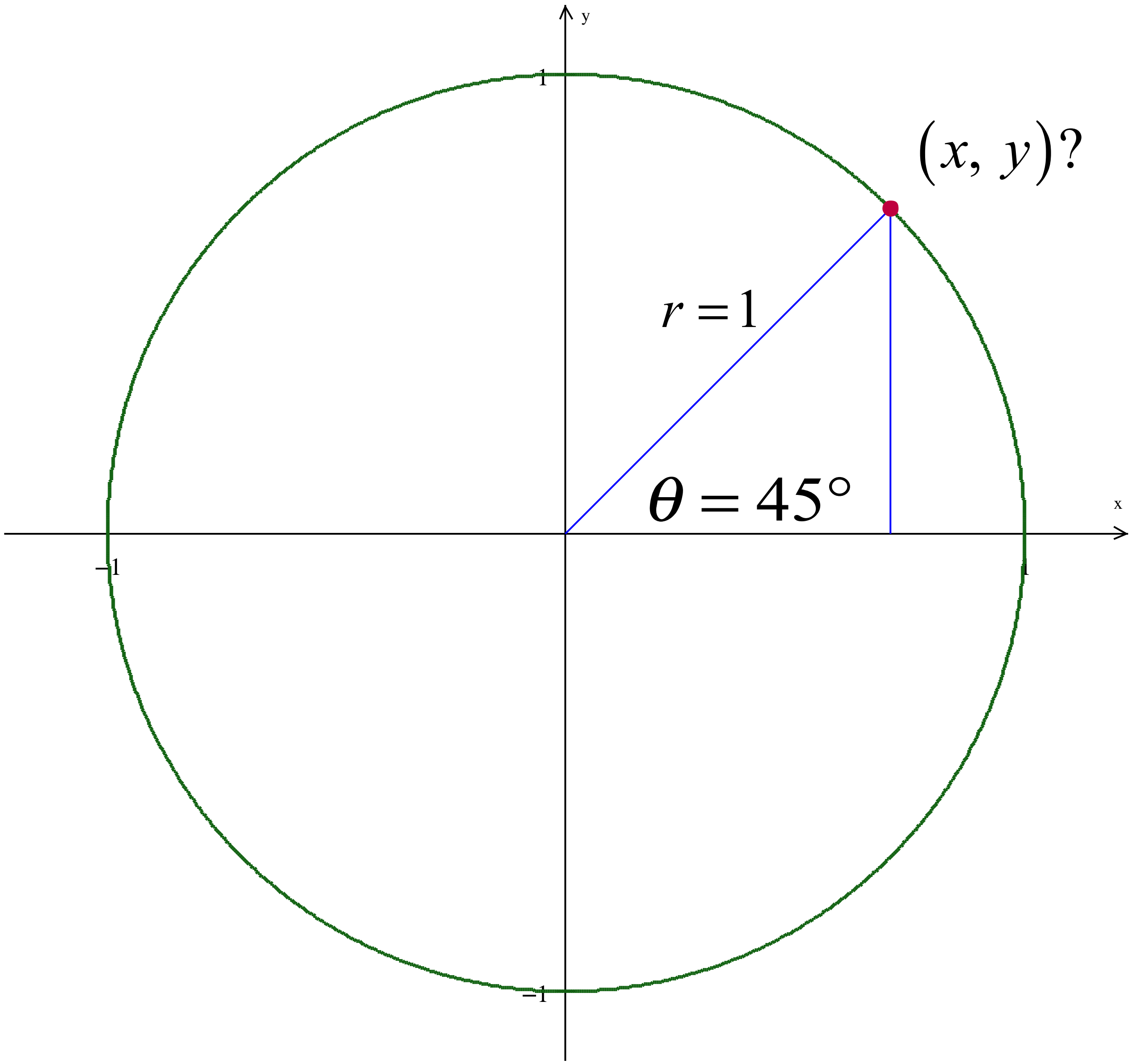


The Pythagorean Theorem tells us that the length of this side is



1
$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$
$r = 1$
$y = \frac{1}{2}$
$\theta = 30°$
x
$x = \frac{\sqrt{3}}{2}$


y
x
1
−1
1
−1
$r = 1$
$\theta = 30°$
$(x, y)?$
$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$


y
1
(x, y)?
r = 1
θ = 45°
x
−1
1
−1

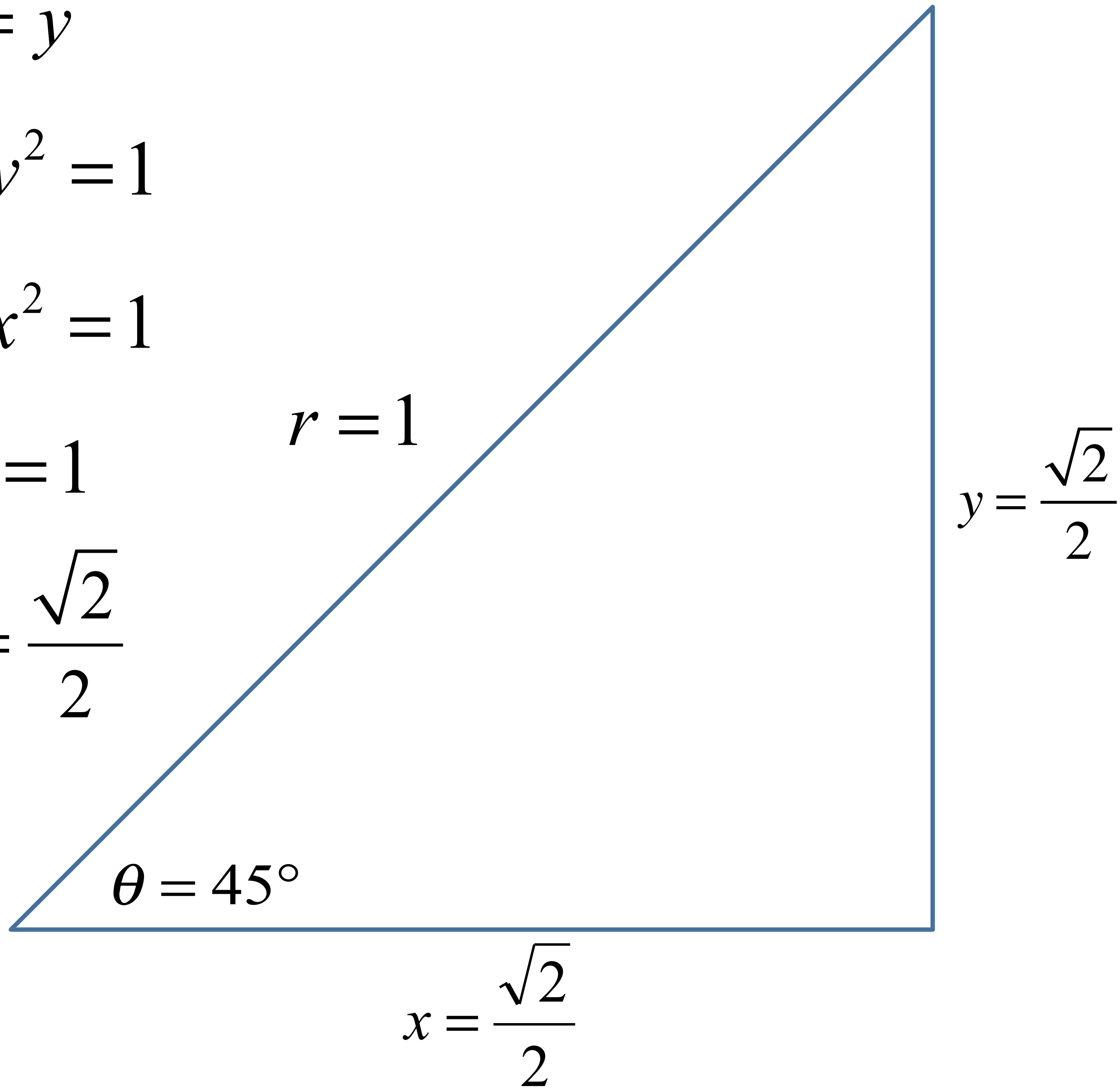
$$x = y$$

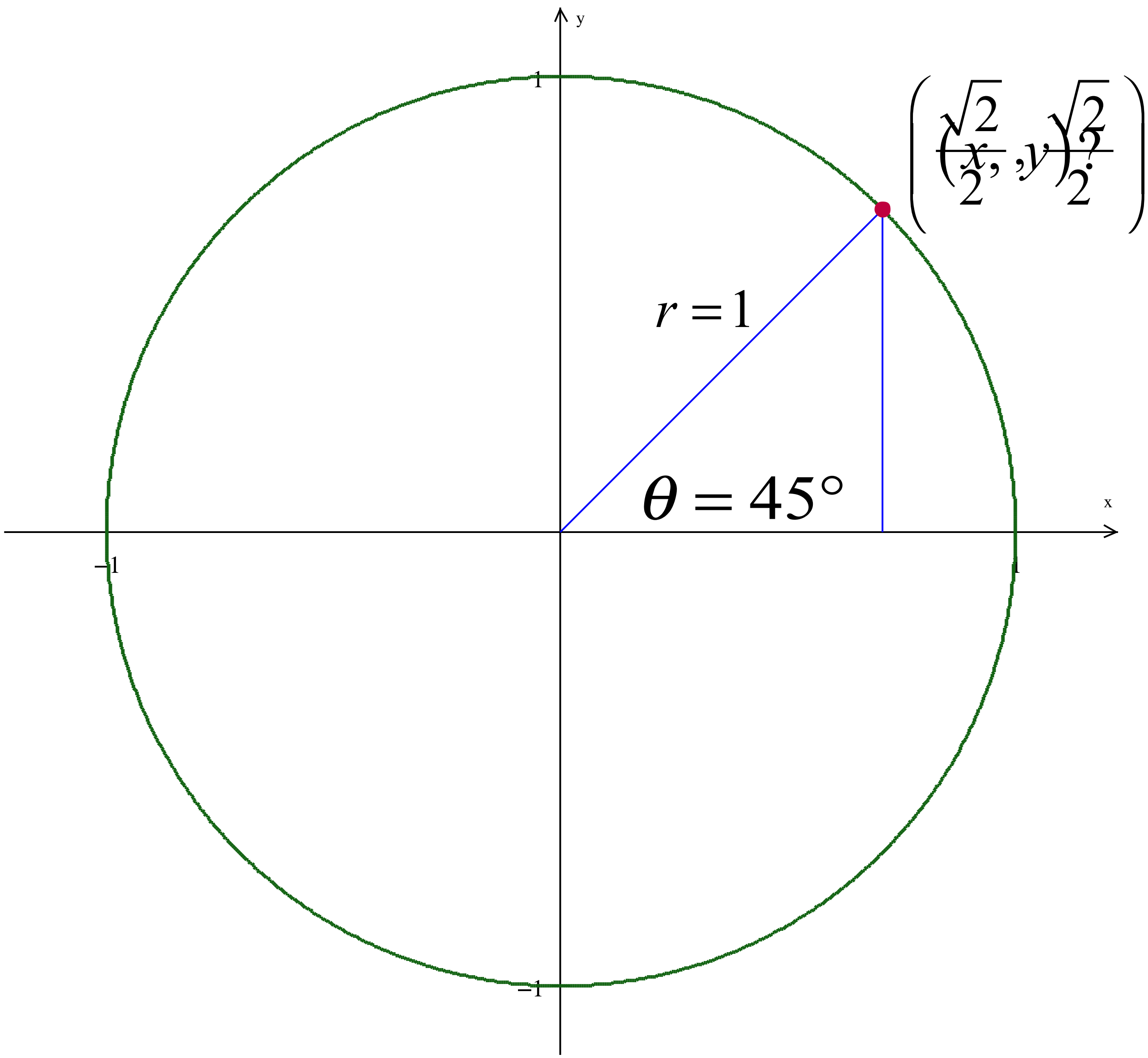
$$x^2 + y^2 = 1$$

$$x^2 + x^2 = 1$$

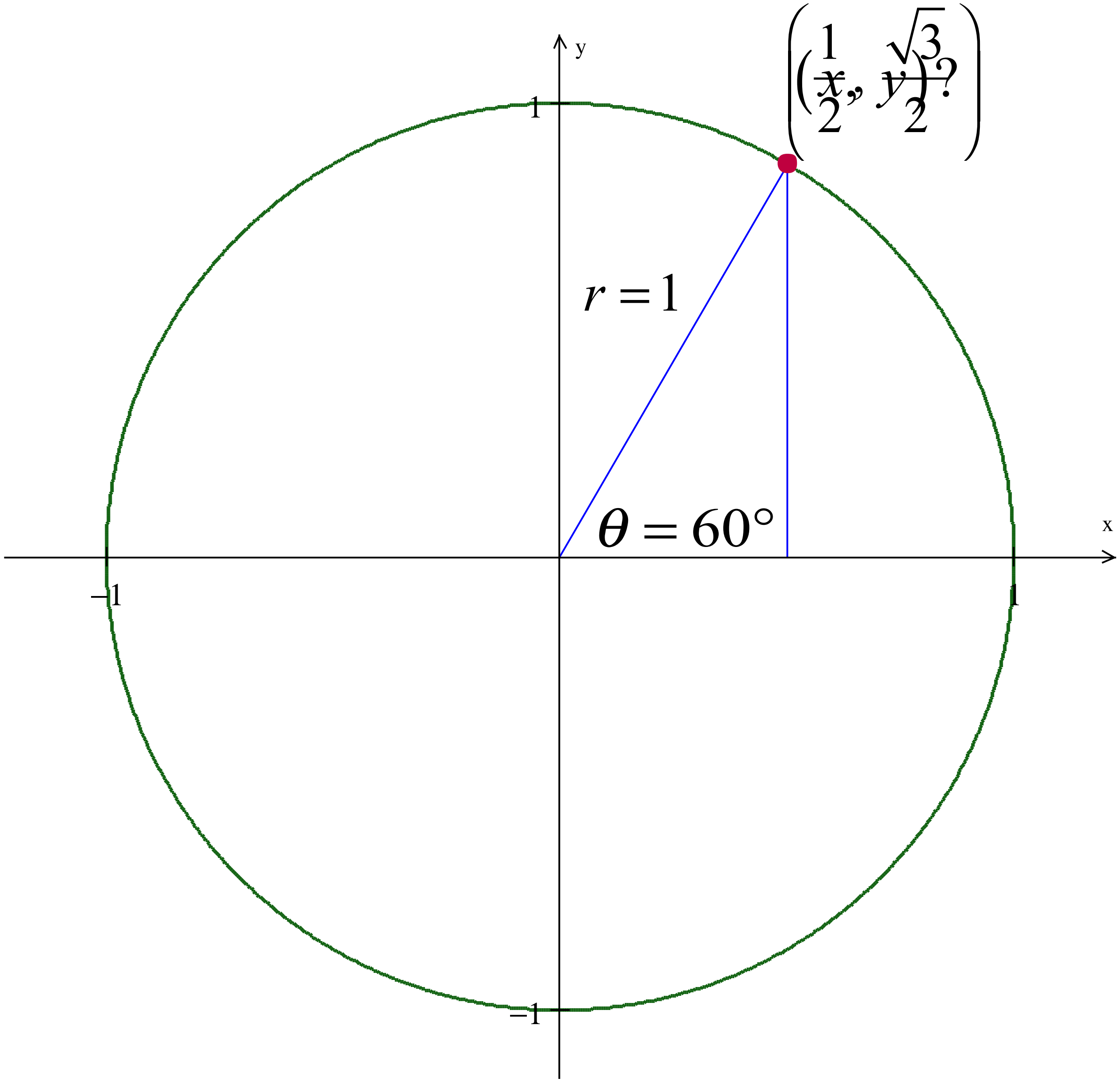
$$2x^2 = 1$$

$$x = y = \frac{\sqrt{2}}{2}$$

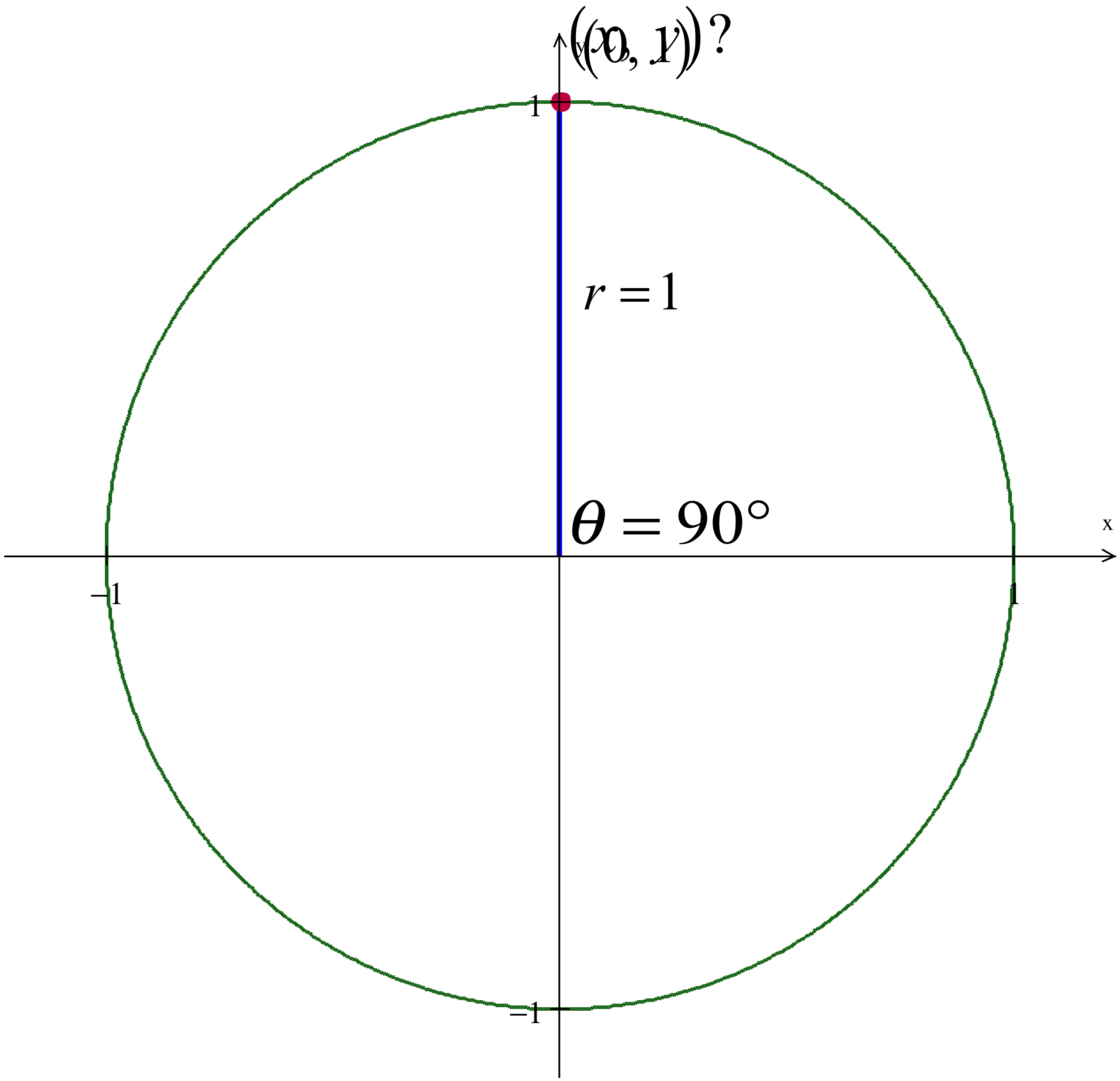


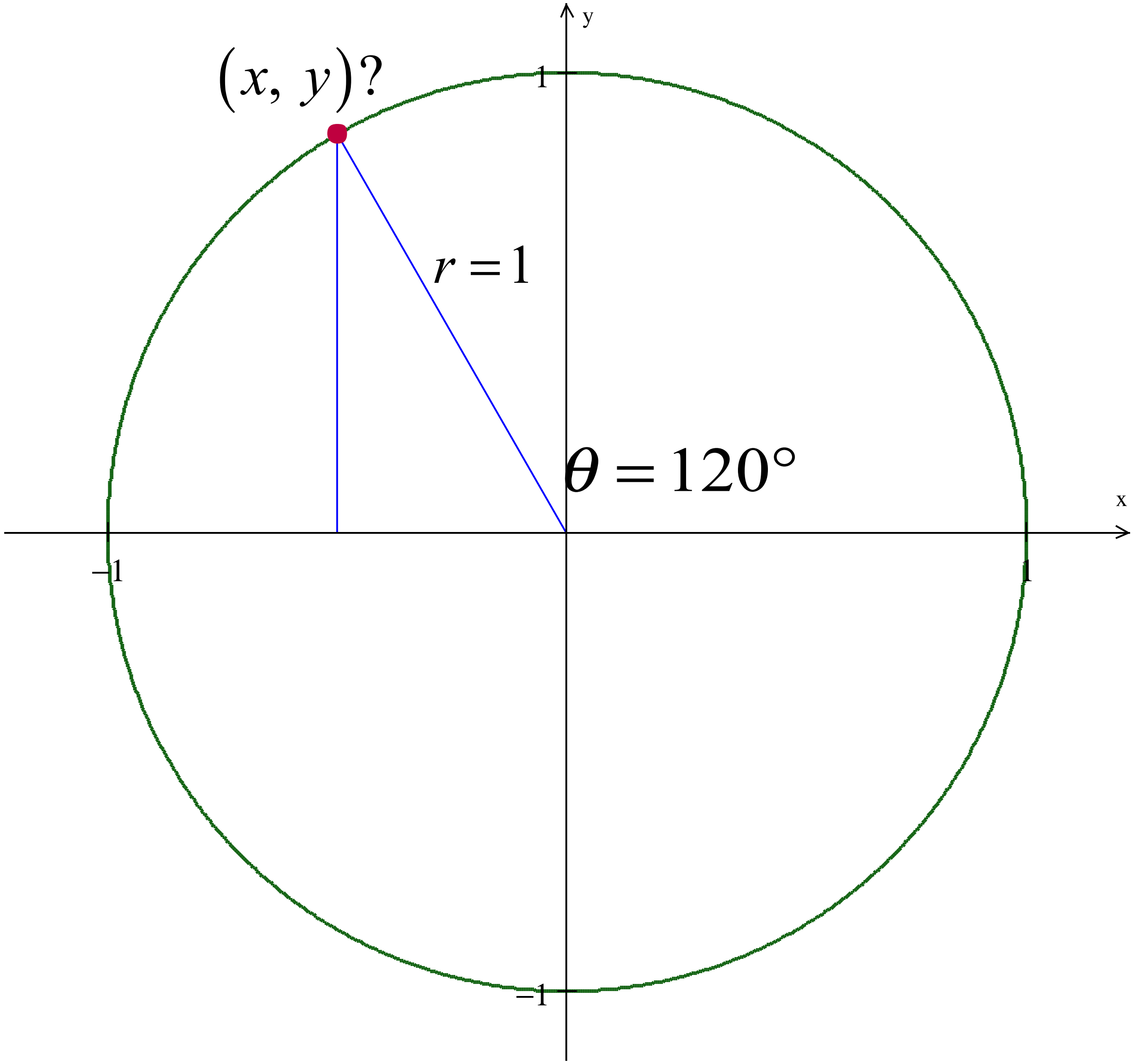


y
x
1
−1
1
−1
$\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
(x, y)?
$r = 1$
$\theta = 45°$



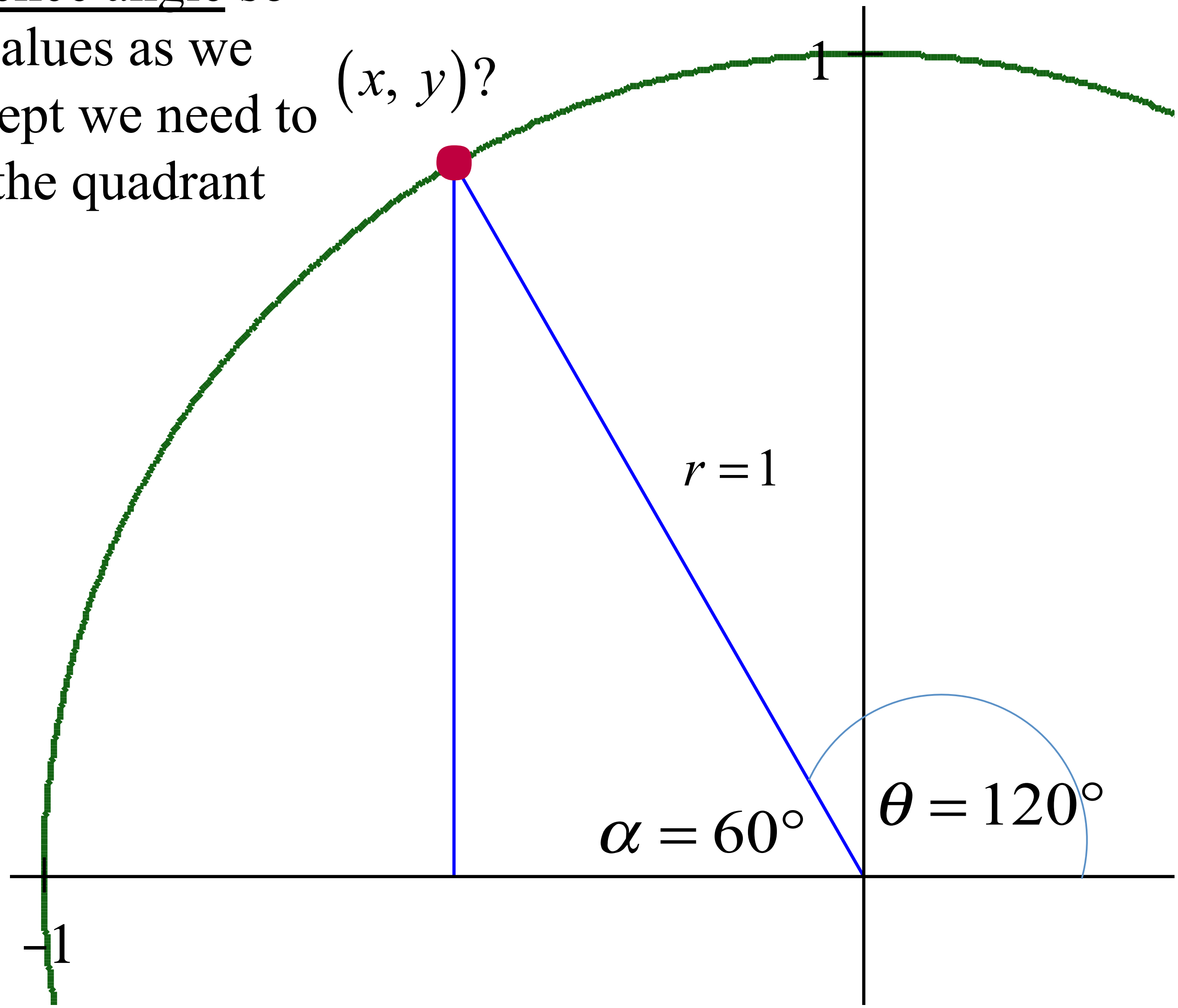
y
x
1
−1
1
−1
$r = 1$
$\theta = 60°$
$(x, y)?$
$\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$


(x, y)?
$(0, 1)$
y
1
$r = 1$
$\theta = 90°$
x
−1
1
−1



y
$(x,\ y)?$
$r = 1$
$\theta = 120°$
x
1
−1
1
−1

α here is the <u>reference angle</u> so we use the same values as we would for 60° except we need to take into account the quadrant

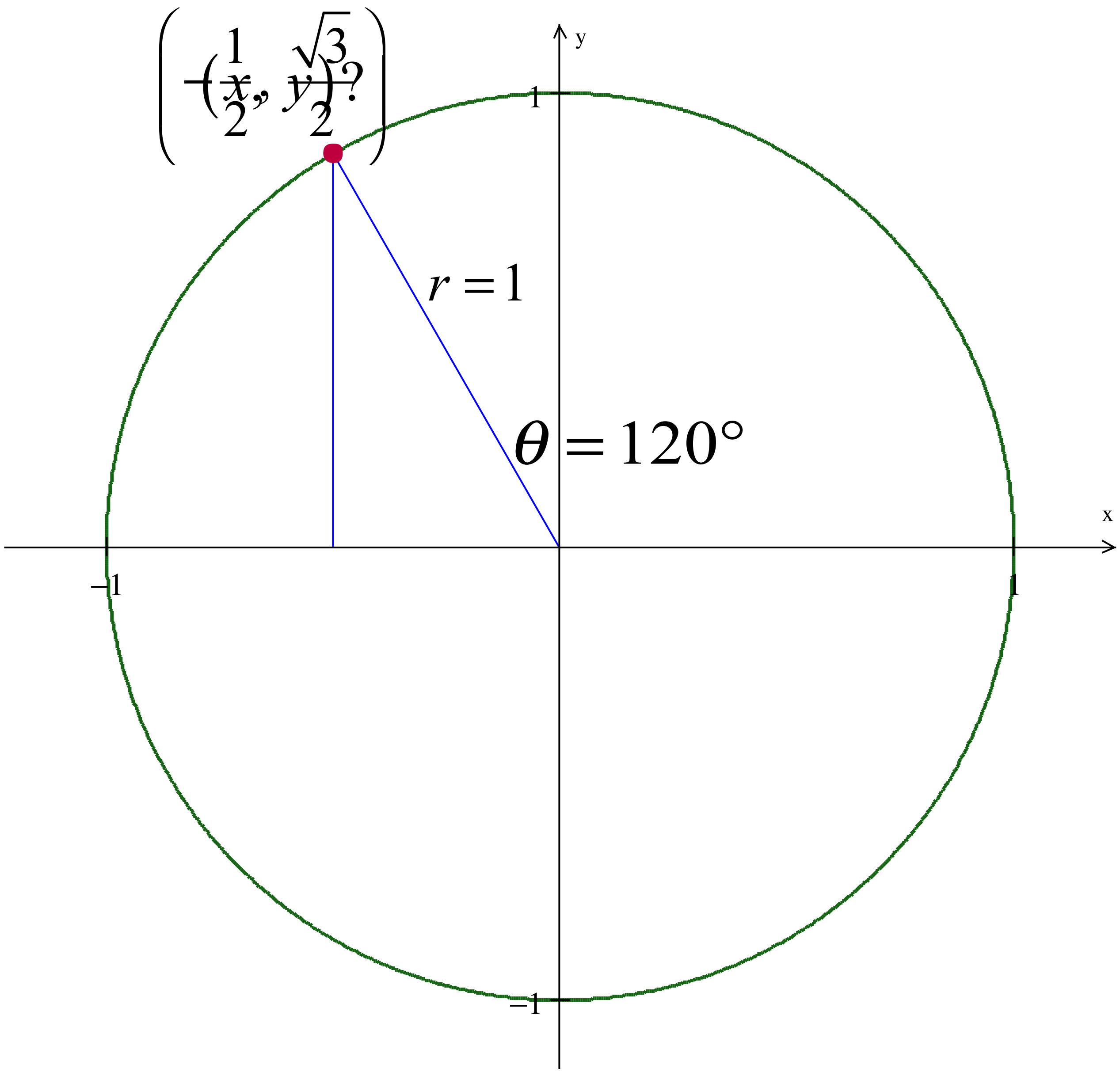


$\sin 60° =$

$\cos 60° =$

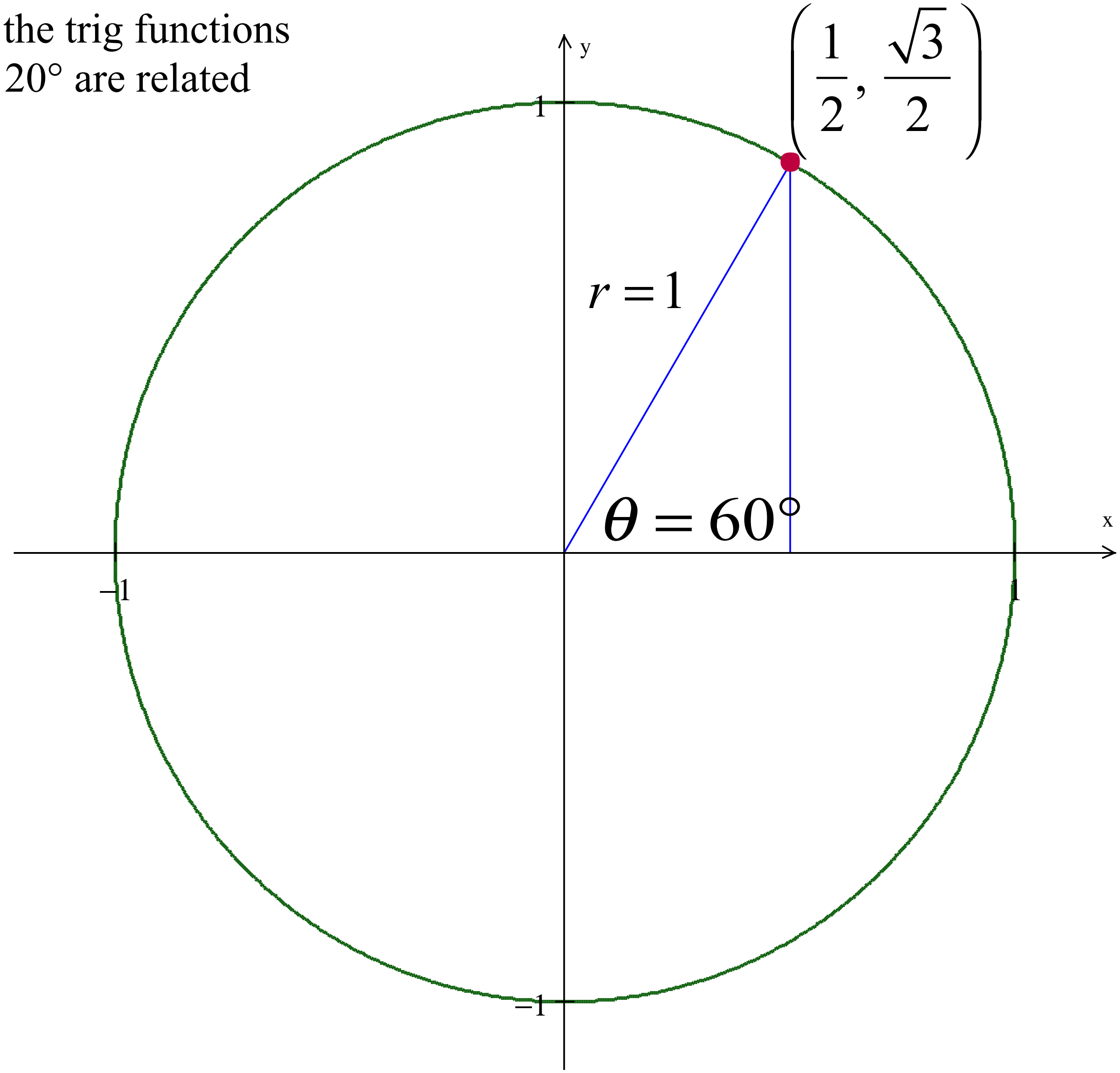
$\sin 120° =$

$\cos 120° =$

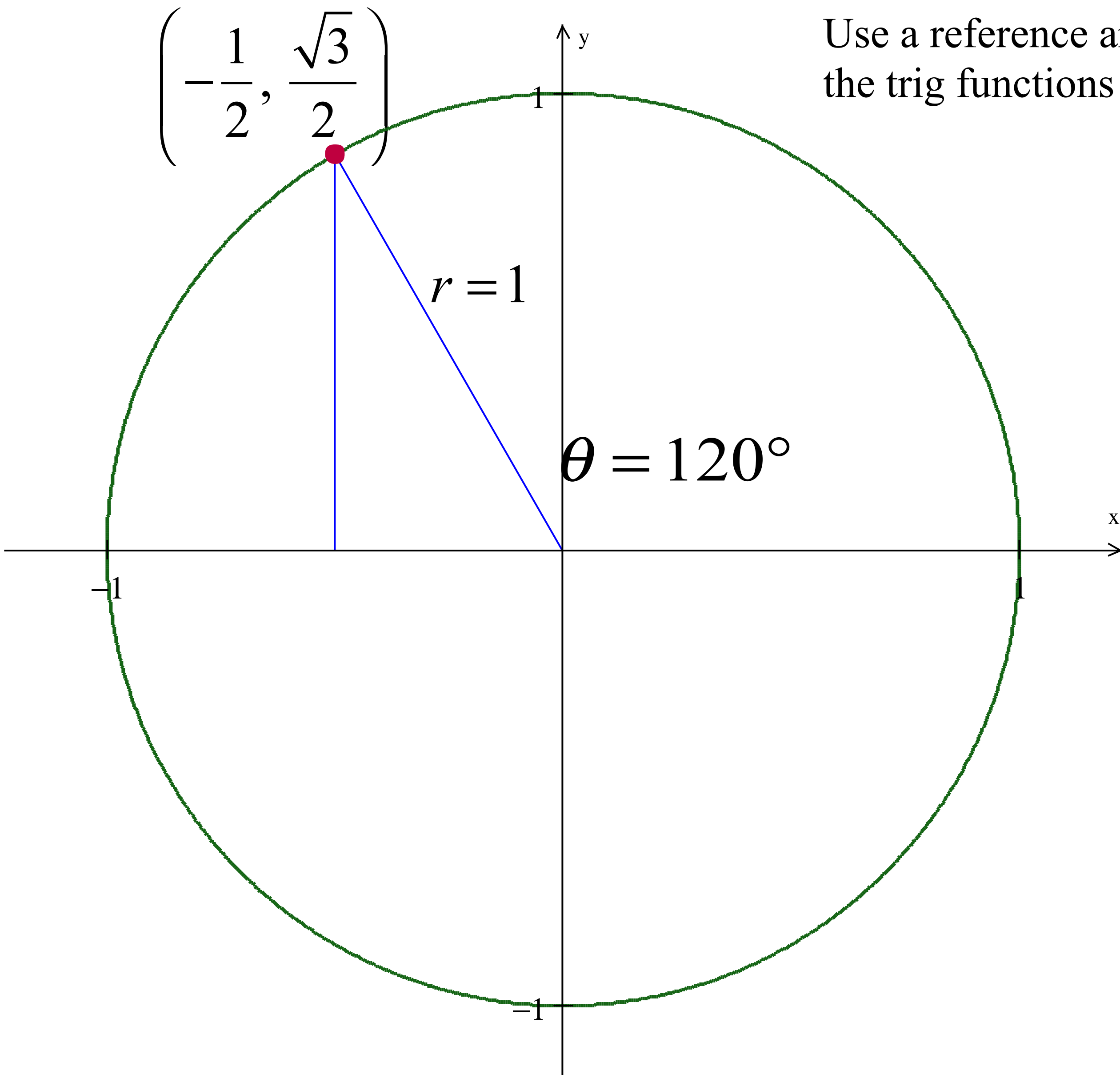


$\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$
(x, y)?
y
1
$r = 1$
$\theta = 120°$
x
−1
1
−1

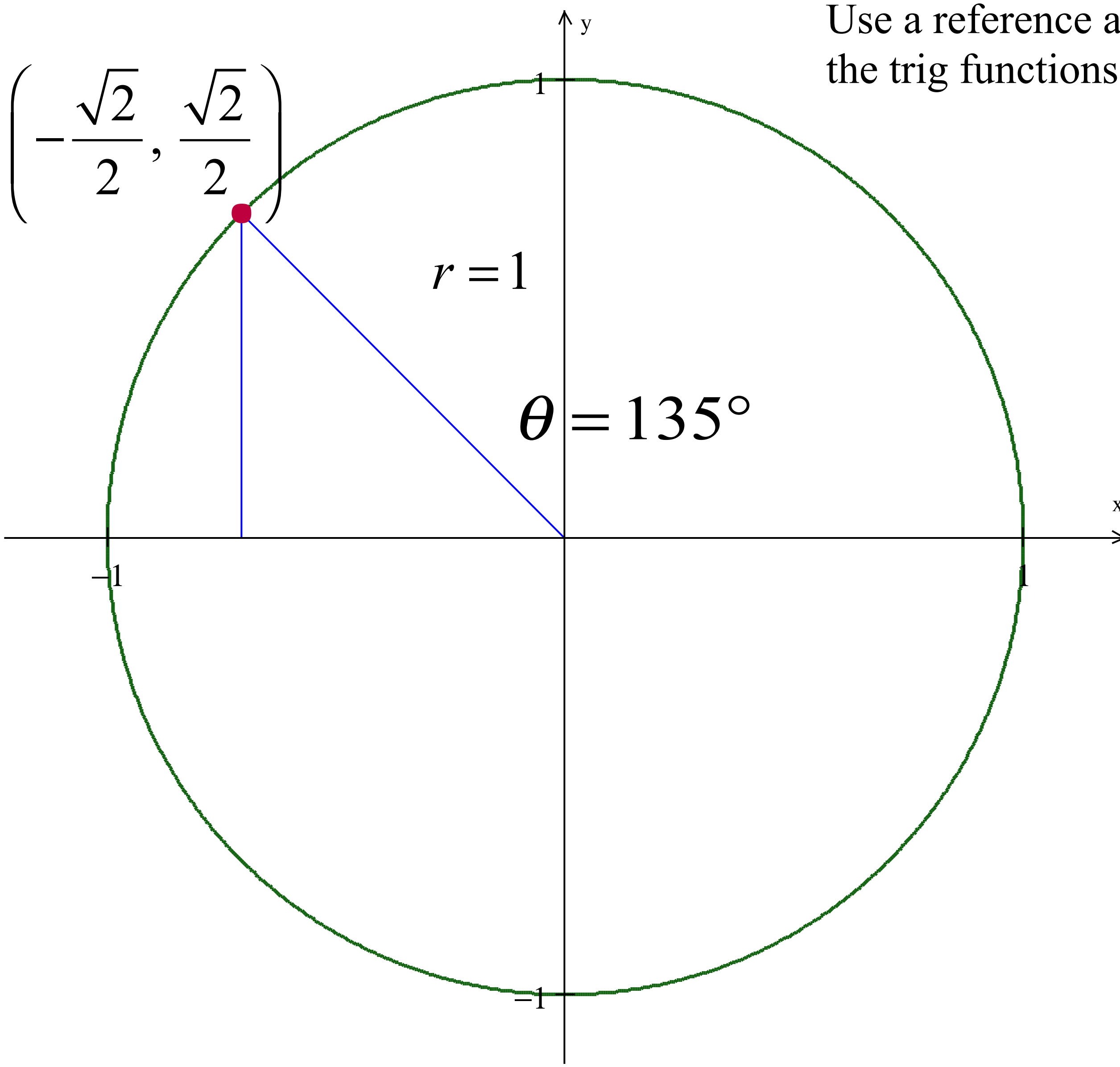
Notice how the trig functions
of 60° and 120° are related



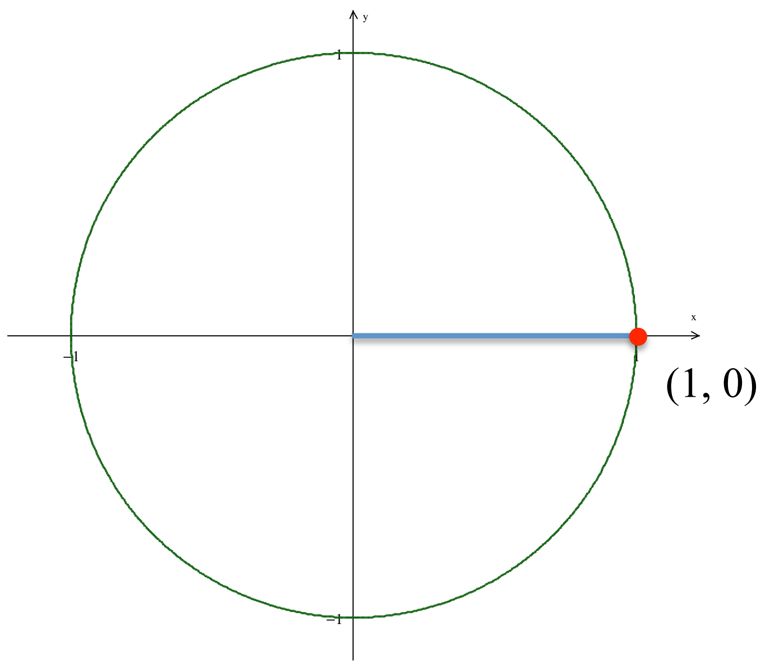
Use a reference angle to find the trig functions for 135°



Use a reference angle to find the trig functions for 135°



	0°	30°	45°	60°	90°	120°	135°	150°	180°
θ^{rad}	0^{rad}	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π
$\sin\theta$	$\frac{\sqrt{0}}{2}$	$\frac{\sqrt{1}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{4}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{1}}{2}$	$\frac{\sqrt{0}}{2}$
$\cos\theta$	$\frac{\sqrt{4}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{1}}{2}$	$\frac{\sqrt{0}}{2}$	$-\frac{\sqrt{1}}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{4}}{2}$



	0°	30°	45°	60°	90°	120°	135°	150°	180°
θ^{rad}	0^{rad}	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π
$\sin\theta$	$\frac{\sqrt{0}}{2}$	$\frac{\sqrt{1}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{4}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{1}}{2}$	$\frac{\sqrt{0}}{2}$
$\cos\theta$	$\frac{\sqrt{4}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{1}}{2}$	$\frac{\sqrt{0}}{2}$	$-\frac{\sqrt{1}}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{4}}{2}$