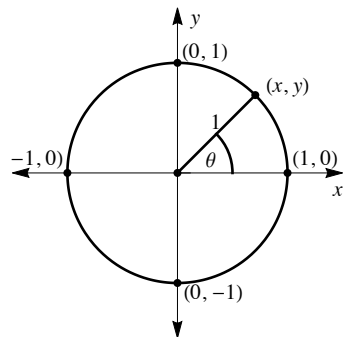
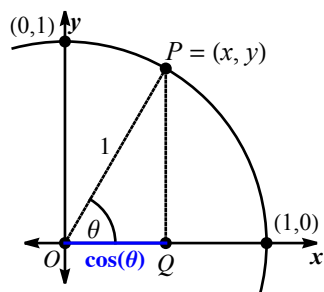


## Trigonometry 7: The Definition of Cosine

When began looking at points on the unit circle, we started by considering a radial line making an angle with the positive  $x$ -axis. We called the angle formed  $\theta$  and we said the corresponding coordinate point on the unit circle had an  $x$ -coordinate  $x$  and a  $y$ -coordinate  $y$ , as shown in this figure:



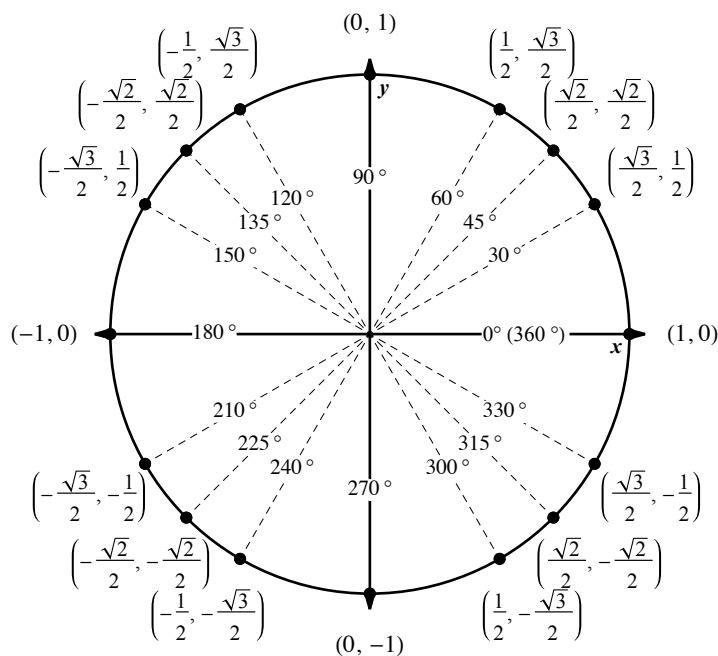
Consider a Unit Circle with some point (in the first quadrant) with coordinate point  $P = (x, y)$ . As before, a radial line from this point to the origin (point  $O$ ) makes an angle  $\theta$  with the positive  $x$ -axis, as shown in the figure below:



Since it is very cumbersome for mathematicians to have to say “the corresponding  $x$ -coordinate for the point on the unit circle when a radial line makes an angle of  $\theta$  degrees with the  $x$ -axis”, they instead use shorthand notation:

$$\cos(\theta) = x$$

or, in words, the **cosine** of  $\theta$  is  $x$ . Very often the parentheses are omitted and we use:  $\cos \theta = x$ . Also note that  $\cos(\theta)$  corresponds to the length OQ (highlighted in blue).



$\theta$	$\cos \theta$	$\theta$	$\cos \theta$
$0^\circ$		$180^\circ$	
$30^\circ$		$210^\circ$	
$45^\circ$		$225^\circ$	
$60^\circ$		$240^\circ$	
$90^\circ$		$270^\circ$	
$120^\circ$		$300^\circ$	
$135^\circ$		$315^\circ$	
$150^\circ$		$330^\circ$	