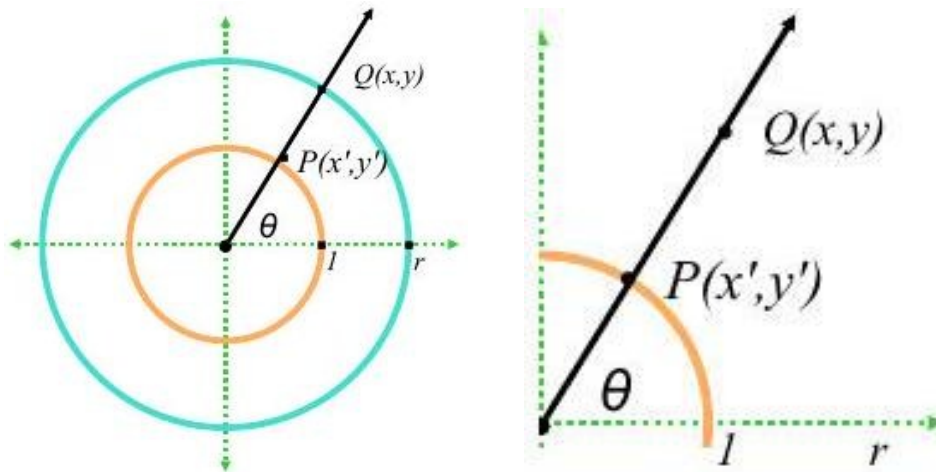


Math 1060 ~ Trigonometry

6 Beyond The Unit Circle

Determining Sine and Cosine

Consider the acute angle θ drawn in standard position.



$Q(x, y)$ is a point on the terminal side of θ which lies on the circle $x^2 + y^2 = r^2$.

$P(x', y')$ is a point on the terminal side of θ which lies on the Unit Circle.

Theorem

If $Q(x, y)$ is a point on the terminal side of an angle θ , plotted in standard position, which lies on the circle $x^2 + y^2 = r^2$, then
 $x = r \cos \theta$ and $y = r \sin \theta$.

$$\cos \theta = \frac{x}{r} = \frac{x}{\sqrt{x^2 + y^2}}$$
$$\sin \theta = \frac{y}{r} = \frac{y}{\sqrt{x^2 + y^2}}$$

From these it is possible to determine all of the other four functions.

EX 1

Determine the sine, secant and tangent of an angle which contains the point $Q(3, -2)$ when plotted in standard position.

EX 2

If the terminal side of θ lies on the line $3x - 4y = 0$ in the third quadrant, find the values of the six trigonometric functions of θ by finding a point on the line.

EX 3

Determine the radius of the circle of revolution for Salt Lake City, which is located at a latitude of 40.76°N . Assume the radius at the equator to be 3960 miles.

3960 miles.

$$\theta = 40.76^\circ$$

