

The Unit Circle Revisited

by: George Milauskas
Illinois Mathematics and Science Academy

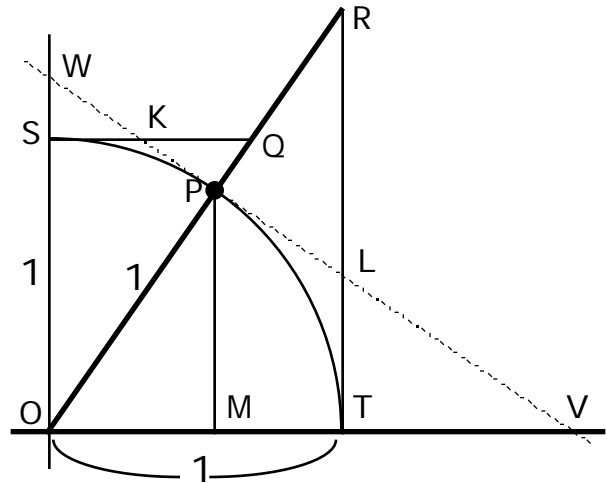
In developing a typical unit circle model for trigonometry, we see that for any angle, θ , in standard position, we can find segments whose lengths are the sine and cosine of θ .

$$PM = \sin \theta \quad \text{and} \quad OM = \cos \theta$$

Notice the "Pythagorean Identity":

$$\sin^2 \theta + \cos^2 \theta = 1$$

is modeled by the right triangle MOP.



We can extend the terminal ray OP and draw tangents: SQ, TR, and WV to meet OP.

See if you can find segments in the figure whose lengths are the tangent, secant, cosecant and cotangent of θ . Also, find as many relationships between trigonometric functions, made evident by the diagram. Watch for two other Pythagorean Identities as well as some other interesting formulas such as:

$$\cot \theta + \tan \theta = \sec \theta \cdot \csc \theta$$