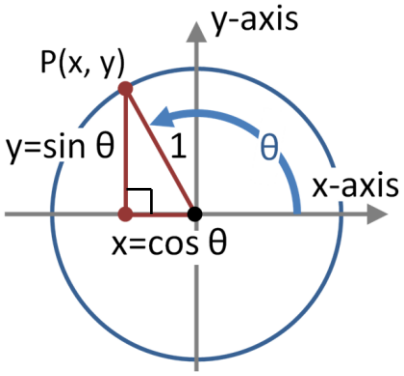
Vocabulary: Simplifying Trigonometric Expressions

Vocabulary

- Identity – an equation that is true for all values.
  - A *trigonometric identity* is an equation involving trigonometric functions that is true for all possible angles.
    - The *Pythagorean identities* are:
      - $\sin^2\theta + \cos^2\theta = 1$
      - $1 + \tan^2\theta = \sec^2\theta$
      - $1 + \cot^2\theta = \csc^2\theta$
    - The *reciprocal identities* are:
      - $\sin\theta = \frac{1}{\csc\theta}$ $\cos\theta = \frac{1}{\sec\theta}$ $\tan\theta = \frac{1}{\cot\theta}$
      - $\csc\theta = \frac{1}{\sin\theta}$ $\sec\theta = \frac{1}{\cos\theta}$ $\cot\theta = \frac{1}{\tan\theta}$

- Trigonometric function – a function of an angle that relates the angles of a triangle to the lengths of its sides.
  - There are six trigonometric functions: sine, cosine, tangent, cotangent, secant, and cosecant.
  - The values of the trigonometric functions are determined by the point where an angle (θ) in standard position, placed on a unit circle, intersects the circle. In the diagram below, that point is labeled $P(x, y)$.
  - The sine of θ ($\sin\theta$) is the y-value of the point (x, y). So, in the diagram, $\sin\theta = y$.
  - The cosine of θ ($\cos\theta$) is the x-value of the point (x, y). So, in the diagram, $\cos\theta = x$.
  - The tangent of θ ($\tan\theta$) is the ratio of the sine to the cosine. So, $\tan\theta = \frac{\sin\theta}{\cos\theta}$.
  - The cotangent ($\cot\theta$), cosecant ($\csc\theta$), and secant ($\sec\theta$) are reciprocals of the other functions.



$\cot\theta = \frac{1}{\tan\theta} = \frac{\cos\theta}{\sin\theta}$ $\csc\theta = \frac{1}{\sin\theta}$ $\sec\theta = \frac{1}{\cos\theta}$