MATH 11022: Fundamental Identities

Reciprocal Identities:

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

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

Quotient Identities:

$$\tan\theta = \frac{\sin\theta}{\cos\theta} \qquad \cot\theta = \frac{\cos\theta}{\sin\theta}$$

Pythagorean Identities:

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

$$\tan^2\theta + 1 = \sec^2\theta \iff \tan^2\theta = \sec^2\theta - 1$$

$$1 + \cot^2\theta = \csc^2\theta \iff \cot^2\theta = \csc^2\theta - 1$$

Negative Angle Identities:

$$\sin(-\theta) = -\sin\theta \qquad \cos(-\theta) = \cos\theta \qquad \tan(-\theta) = -\tan\theta$$

NOTE: That is, sine and tangent are odd functions, while cosine is an even function.