Name: _____ Date: _____

Learning Goal 6.1	Using identities to reduce complexity in expressions and solve equations.

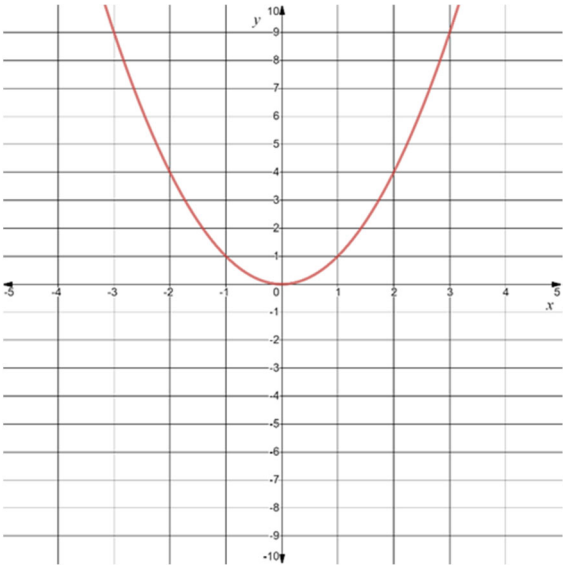
Identity

Example $x^2 - 9 = (x - 3)(x + 3)$ is an identity. Identities can be **proven** or **verified**.

a. Verify the function

Numerically

Graphically



b. Prove the identity

$x^2 - 9$	$(x - 3)(x + 3)$

Pythagorean Identities

$\sin^2 x + \cos^2 x = 1$ $\tan^2 x + 1 = \sec^2 x$

$1 + \cot^2 x = \csc^2 x$

Quotient Identities

$\tan x = \dfrac{\sin x}{\cos x}$ $\cot x = \dfrac{\cos x}{\sin x}$

$\csc x = \dfrac{1}{\sin x}$ $\sec x = \dfrac{1}{\cos x}$ $\cot x = \dfrac{1}{\tan x}$

Example a. Verify that $\tan^2 x + 1 = \sec^2 x$ using $\boldsymbol{x = \frac{\pi}{6}}$

b. Verify that $\tan^2 x + 1 = \sec^2 x$ could be an identity by starting from the original Pythagorean identity.

Example State any restrictions (non-permissible values) for the identity

$$\frac{\cot x}{\csc x \cos x}$$

then simplify.

Example Prove $\mathbf{1 + \cot^2 x = \csc^2 x}$.

$1 + cot^2 x$	$csc^2 x$