Name: _____   Date: _____

4.5 Prove Trigonometric Identities

1. Use a compound angle formula to prove that $\sin\left(x + \dfrac{\pi}{2}\right) = \cos x$.

2. Use a compound angle formula to prove that $\cos\left(x + \dfrac{\pi}{2}\right) = -\sin x$.

3. a) Use a compound angle formula to prove that $\tan(\pi - x) = -\tan x$.
   b) Use Technology Use graphing technology to illustrate the identity.

4. Prove that $\cos\left(\dfrac{3\pi}{4} - x\right) - \sin\left(\dfrac{3\pi}{4} + x\right) = -\sqrt{2}\left(\cos x - \sin x\right)$.

5. Prove that $\sin(\pi - x) - \tan(\pi + x) = \dfrac{\sin x(\cos x - 1)}{\cos x}$.

6. a) Prove that $\dfrac{\sin 2x}{1 - \cos 2x} = \cot x$.
   b) Use Technology Illustrate the identity by graphing with technology.

7. Prove that $\dfrac{2\csc 2x \tan x}{\sec x} = \sec x$.

8. a) Use Technology Use graphing technology to determine whether it is reasonable to conjecture that $\sin^4 x - \cos^4 x = 2\sin^2 x + 1$ is an identity.
   b) If it appears to be an identity, prove the identity. If not, determine a counterexample.