

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Learning Goal 6.1**

Using identities to reduce complexity in expressions and solve equations.

**Double Angle Identities**

$$\begin{aligned}\cos 2A &= \cos^2 A - \sin^2 A \\ &= 2 \cos^2 A - 1 \\ &= 1 - 2 \sin^2 A\end{aligned}$$

$$\sin 2A = 2 \sin A \cos A$$

$$\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

**Example** Verify the identity numerically.

$$\cos 2A = \cos^2 A - \sin^2 A, \quad \nexists A = \frac{\pi}{4}$$

**Example** Express the following as a single trigonometric function of a single angle (do not evaluate).

a.  $2 \sin\left(\frac{\pi}{5}\right) \cos\left(\frac{\pi}{5}\right)$

b.  $4 \cos^2 35^\circ - 2$

c.  $\sin 60^\circ \cos 60^\circ$

**Example** If  $\cos A = 12/13$  and  $\angle A$  is in the fourth quadrant, find the exact value of  $\sin 2A$ .

**Example** Prove the following equation.

$$\frac{1 + \cos 2x}{\sin 2x} = \cot x$$