NAME _____ DATE _____ PERIOD _____

14-2 Practice

Verifying Trigonometric Identities

Verify that each equation is an identity.

1. $\dfrac{\sin^2 \theta + \cos^2 \theta}{\cos^2 \theta} = \sec^2 \theta$

2. $\dfrac{\cos^2 \theta}{1 - \sin^2 \theta} = 1$

3. $(1 + \sin \theta)(1 - \sin \theta) = \cos^2 \theta$

4. $\tan^4 \theta + 2 \tan^2 \theta + 1 = \sec^4 \theta$

5. $\cos^2 \theta \cot^2 \theta = \cot^2 \theta - \cos^2 \theta$

6. $(\sin^2 \theta)(\csc^2 \theta + \sec^2 \theta) = \sec^2 \theta$

7. PROJECTILES The square of the initial velocity of an object launched from the ground is $v^2 = \dfrac{2gh}{\sin^2 \theta}$, where θ is the angle between the ground and the initial path h is the maximum height reached, and g is the acceleration due to gravity. Verify the identity $\dfrac{2gh}{\sin^2 \theta} = \dfrac{2gh \sec^2 \theta}{\sec^2 \theta - 1}$.

8. LIGHT The intensity of a light source measured in candles is given by $I = ER^2 \sec \theta$, where E is the illuminance in foot candles on a surface, R is the distance in feet from the light source, and θ is the angle between the light beam and a line perpendicular to the surface. Verify the identity $ER^2(1 + \tan^2 \theta) \cos \theta = ER^2 \sec \theta$.