Supplemental Worksheet #6

Prove each of the following identities.

1. $\cos\theta \cdot \cot\theta = \csc\theta - \sin\theta$

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

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

4. $\tan^2\theta - \sin^2\theta = \tan^2\theta \cdot \sin^2\theta$

5. $\dfrac{\sin\theta}{\sec\theta} = \dfrac{1}{\tan\theta + \cot\theta}$

6. $\dfrac{1}{\sec\theta} + \dfrac{\sin\theta}{\cot\theta} = \sec\theta$

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

8. $\sin^4\theta - \cos^4\theta = \sin^2\theta - \cos^2\theta$

9. $\dfrac{\sin^3\theta - \cos^3\theta}{\sin\theta - \cos\theta} = 1 + \sin\theta \cdot \cos\theta$

10. $\tan\theta \cdot \left(\sin^2\theta\right) - \cot\theta \cdot \left(\cos^2\theta\right) = \tan\theta - \cot\theta$

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

12. $\tan\theta + \dfrac{\cos\theta}{1+\sin\theta} = \sec\theta$

13. $\dfrac{\sec^2\theta}{1+\cot^2\theta} - \dfrac{1}{\cos^2\theta} + 1 = 0$

14. $\dfrac{\sec\theta - \csc\theta}{\sec\theta + \csc\theta} = \dfrac{\tan\theta - 1}{\tan\theta + 1}$