Instructions: Verify the following identities.

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

2. $2\csc^2\beta = \dfrac{1}{1-\cos\beta} + \dfrac{1}{1+\cos\beta}$

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

4. $\left(\sec^2 x - 1\right)\left(\sin^2 x - 1\right) = -\sin^2 x$

5. $\csc x - \sin x = \cos x \cot x$

6. $\csc(x) + \cot(x) = \dfrac{\sin(x)}{1 - \cos(x)}$

7. $\dfrac{\tan^2\theta}{1 + \sec\theta} = \dfrac{1 - \cos\theta}{\cos\theta}$

8. $\tan^3 x = \tan x \sec^2 x - \tan x$

9. $\sin^3 x \cos^4 x = \left(\cos^4 x - \cos^6 x\right) \sin x$

10. $\sqrt{\dfrac{1 + \sin\theta}{1 - \sin\theta}} = \dfrac{1 + \sin\theta}{|\cos\theta|}$