

Use the reciprocal, quotient, and Pythagorean identities to simplify.

1. $\sin^2 x \cos^2 x + \sin^4 x$

2. $\frac{\cos^2 \theta}{1 + \sin \theta}$

3. $\frac{\cos \theta}{\sec \theta - \tan \theta}$

4. $\cos^4 x + 2\cos^2 x \sin^2 x + \sin^4 x$ (*hint: Factor!*)



5. $1 + \cot^2 x - \cos^2 x - \cos^2 x \cot^2 x$

Use the given information and the Pythagorean identities to determine the exact trigonometric value.

6. Given $\csc \theta = \frac{3}{2}$, $\tan \theta < 0$, find $\cot \theta$.

7. Given $\sec x = -3$, $\sin x < 0$, find $\tan x$.

Factor completely.

8. $12x^2 + 24x + 12$

9. $9x^2 - 16y^2$

10. $4x^4 + 20x^3 - 96x^2$