Pre-Calculus **HW#5.1-3** **Name:** Key

Verify each identity.

1. $\tan(-x)\cos x = -\sin x$

$-\tan x \cos x$

$-\dfrac{\sin x}{\cancel{\cos x}} \cdot \cancel{\cos x}$

$-\sin x$

2. $\sec x - \sec x \sin^2 x = \cos x$

$\sec x(1-\sin^2 x)$

$\dfrac{1}{\cancel{\cos x}} \cdot \cos^{\cancel{2}} x$

$\cos x$

3. $\sin^2 x(1+\cot^2 x) = 1$

$\sin^2 x \cdot \csc^2 x$

$\cancel{\sin^2 x} \cdot \dfrac{1}{\cancel{\sin^2 x}}$

1

4. $\dfrac{\csc^2 t}{\cot t} = \csc t \sec t$

$\dfrac{\frac{1}{\sin^2 t}}{\frac{\cos t}{\sin t}}$

$\dfrac{1}{\sin^{\cancel{2}} x} \cdot \dfrac{\cancel{\sin t}}{\cos t}$

$\csc t \quad \sec t$

5. $\tan t + \dfrac{\cos t}{1+\sin t} = \sec t$

$\dfrac{\sin t}{\cos t} + \dfrac{\cos t}{1+\sin t}$

$\dfrac{\sin t(1+\sin t) + \cos^2 t}{\cos t(1+\sin t)}$

$\dfrac{\sin t + \sin^2 t + \cos^2 t}{\cos t(1+\sin t)}$

$\dfrac{\cancel{\sin t + 1}}{\cos t(\cancel{1+\sin t})}$

$\dfrac{1}{\cos t}$

$\sec t$

6. $\tan^2 2x + \sin^2 2x + \cos^2 2x = \sec^2 2x$

$\tan^2 2x + 1$

$\sec^2 2x$

7. $\dfrac{\sec t+1}{\tan t}=\dfrac{\tan t}{\sec t-1}$

$\dfrac{\tan t\,(\sec t+1)}{(\sec t-1)(\sec t+1)}$

$\dfrac{\tan t\,(\sec t+1)}{\sec^2 t-1}$

$\dfrac{\cancel{\tan t}\,(\sec t+1)}{\tan^{\cancel{2}} t}$

$\dfrac{\sec t+1}{\tan t}$

8. $\cos^4 t-\sin^4 t=1-2\sin^2 t$

$(\cos^2 t-\sin^2 t)(\cos^2 t+\sin^2 t)$

$(\cos^2 t-\sin^2 t)\cdot 1$

$1-\sin^2 t-\sin^2 t$

$1-2\sin^2 t$

9. $(\tan^2 x+1)(\cos^2 x+1)=\tan^2 x+2$

$\sec^2 x\,(\cos^2 x+1)$

$\dfrac{1}{\cos^2 x}\cdot(\cos^2 x+1)$

$1+\dfrac{1}{\cos^2 x}$

$1+\sec^2 x$

$1+1+\tan^2 x$

$2+\tan^2 x$

10. $\dfrac{\cos^2 x-\sin^2 x}{1-\tan^2 x}=\cos^2 x$

$\dfrac{\cos^2 x-\sin^2 x}{\dfrac{\cos^2 x}{\cos^2 x}-\dfrac{\sin^2 x}{\cos^2 x}}$

$\dfrac{\cos^2 x-\sin^2 x}{\dfrac{\cos^2 x-\sin^2 x}{\cos^2 x}}$

$\cancel{(\cos^2 x-\sin^2 x)}\cdot\dfrac{\cos^2 x}{\cancel{(\cos^2 x-\sin^2 x)}}$

$\cos^2 x$