Name: KEY

Date: _____

Pre-Calculus: 5.1-5.3 Practice

Verify the identities. You may only work with <u>one</u> side of the identity.

1. $\dfrac{\cos^3 u+\sin^3 u}{\cos u+\sin u}=1-\sin u\cos u$

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

$\cos u+\sin u$

$\cos^2 u+\sin^2 u-\sin u\cos u$

$1-\sin u\cos u$

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

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

$\dfrac{\sin\theta}{\cos\theta}\cdot\dfrac{\cos\theta}{1}+\cos\theta$

$\sin\theta+\cos\theta$

4. $\dfrac{\sec^2 x}{\cot x}-\tan^3 x=\tan x$

$\tan x\sec^2 x-\tan^3 x$

$\tan x(\sec^2 x-\tan^2 x)$

$\tan x(1)$

$\tan x$

5. $\dfrac{\sec x-\cos x}{\tan x}=\sin x$

$\dfrac{\sec x}{\tan x}-\dfrac{\cos x}{\tan x}$

$\dfrac{\cos x}{\sin x}\cdot\dfrac{1}{\cos x}-\dfrac{\cos x}{\sin x}\cdot\dfrac{\cos x}{1}$

$\dfrac{1}{\sin x}-\dfrac{\cos^2 x}{\sin x}$

$\dfrac{1-\cos^2 x}{\sin x}$

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

$\sin x$

6. $\dfrac{\tan^2 x+5\tan x+6}{\sec^2 x-10}=\dfrac{\tan x+2}{\tan x-3}$

$\dfrac{(\tan x+3)(\tan x+2)}{\tan^2 x+1-10}$

$\dfrac{(\tan x+3)(\tan x+2)}{\tan^2 x-9}$

$\dfrac{(\tan x+3)(\tan x+2)}{(\tan x+3)(\tan x-3)}$

$\dfrac{\tan x+2}{\tan x-3}$

7. $\cos^4 x-\sin^4 x=2\cos^2 x-1$

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

$(1)(\cos^2 x-(1-\cos^2 x))$

$\cos^2 x-1+\cos^2 x$

$2\cos^2 x-1$

8. $\dfrac{1+\sin x}{1-\sin x}-\dfrac{1-\sin x}{1+\sin x}=4\tan x\sec x$

$\dfrac{1+2\sin x+\sin^2 x}{1-\sin^2 x}-\dfrac{1-2\sin x+\sin^2 x}{1-\sin^2 x}$

$\dfrac{4\sin x}{\cos^2 x}$

$4\tan x\sec x$

9. $(1+\sin^2 x)^2=\cos^4 x+4\sin^2 x$

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

$1+2\sin^2 x+\sin^2 x\cdot\sin^2 x$

$1+2\sin^2 x+(1-\cos^2 x)(1-\cos^2 x)$

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

$2-2\cos^2 x+2\sin^2 x+\cos^4 x$

$2(1-\cos^2 x)+2\sin^2 x+\cos^4 x$

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

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

10. $\csc x(\csc x - \sin x) + \dfrac{\sin x - \cos x}{\sin x} + \cot x = \csc^2 x$

$\csc^2 x - 1 + \dfrac{\sin x}{\sin x} - \dfrac{\cos x}{\sin x} + \cot x$

$\csc^2 x - 1 + 1 - \cot x + \cot x$

$\csc^2 x$

11. $\dfrac{1+\sin x}{1-\sin x} \cdot \dfrac{1+\sin x}{1+\sin x} = 2\sec^2 x + 2\sec x \tan x - 1$

$\dfrac{1 + 2\sin x + \sin^2 x}{1 - \sin^2 x}$

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

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

$\sec^2 x + 2\sec x \tan x + \dfrac{1 - \cos^2 x}{\cos^2 x}$

$\sec^2 x + 2\sec x \tan x + \dfrac{1}{\cos^2 x} - \dfrac{\cos^2 x}{\cos^2 x}$

$\sec^2 x + 2\sec x \tan x + \sec^2 x - 1$

$2\sec^2 x + 2\sec x \tan x - 1$