Precalculus
9.1-9.4 Test Test A
Non-Calculator

Name:____________________

Prove the following identities. Show all solution steps for full credit!

1. $\sec^4 x - \tan^4 x = 2\tan^2 x + 1$	2. $\csc x(\csc x + \cot x) = \dfrac{1}{1-\cos x}$	3. $\dfrac{\cot x}{\csc x - \sin x} = \sec x$

For #4-8, simplify. Show all work for full credit!

4. $\left[\sin(x-y)+\sin(x+y)\right]$

4.____________________

5. $\tan(\pi + x)$

5.____________________

6. $\cos\left(\dfrac{\pi}{2} - x\right)$

6.____________________

7. Simplify: $\cos(x-y)\cos y - \sin(x-y)\sin y$ 7. ______________

8. Simplify: Sin 7 Cos 3 + Cos 7 Sin 3 8. ______________

For #9-11, use Addition and Subtraction Identities to find the **exact** values.

9. $\cos\frac{5\pi}{12}$ 9. ______________

10. $\sin 105^\circ$ 10. ______________

11. $\tan 75^\circ$ 11. ______________

Unrationalized

____

Rationalized

12. Given: $\cos x = -\frac{4}{5}$, *where* $\frac{\pi}{2} < x < \pi$, 12. ______________

evaluate and simplify $\cos\left(\frac{\pi}{4}+x\right)$. Find the **exact** value.

13. Given: $\sin x = \frac{4}{5}$, *where* $0 < x < \frac{\pi}{2}$ *and* $\csc y = \frac{13}{5}$, *where* $\frac{\pi}{2} < y < \pi$

evaluate and simplify $\sin(x+y)$. Find the **exact** value.

13. ______________

Precalculus
9.1-9.4 Test Test A
Non-Calculator

Name: Key

Prove the following identities. Show all solution steps for full credit!

1. $\sec^4 x - \tan^4 x = 2\tan^2 x + 1$

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

$1(\sec^2 x + \tan^2 x)$

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

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

$2\tan^2 x + 1$

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

$\frac{1}{\sin x}\left(\frac{1}{\sin x} + \frac{\cos x}{\sin x}\right)$

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

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

$\frac{1+\cos x}{1-\cos^2 x}$

$\frac{\cancel{(1+\cos x)}\cdot 1}{\cancel{(1+\cos x)}(1+\cos x)}$

$\frac{1}{1-\cos x}$

3. $\dfrac{\cot x}{\csc x - \sin x} = \sec x$

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

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

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

$\frac{\cos x}{\cos^2 x}$

$\frac{\cancel{\cos x}}{\cancel{\cos x}\cos x}$

$\frac{1}{\cos x} = \sec x$

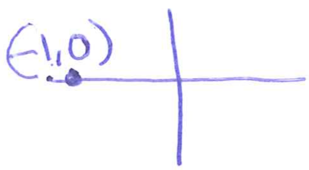
For #4-8, simplify. Show all work for full credit!

4. $[\sin(x-y) + \sin(x+y)]$ 4. $2\sin x\cos y$

$\sin x\cos y - \cancel{\sin y\cos x} + \sin x\cos y + \cancel{\sin y\cos x}$

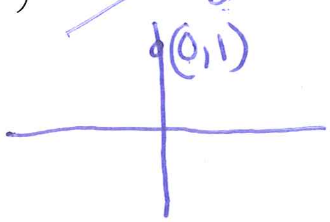
5. $\tan(\pi + x)$ 5. $\tan x$

$\dfrac{\cancel{\tan\pi}^{\,0} + \tan x}{1 - \cancel{\tan\pi}\cdot\tan x}$



6. $\cos\left(\frac{\pi}{2} - x\right)$ 6. $\sin x$

$\cancel{\cos\frac{\pi}{2}}^{\,0}\cdot\cos x + \sin\frac{\pi}{2}^{\,1}\cdot\sin x$



7. Simplify: $\cos(x-y)\cos y-\sin(x-y)\sin y$. 7. $\cos x$

$\cos(a+b)$ $\cos(x - \cancel{y} + \cancel{y})$

8. Simplify: Sin 7 Cos 3 + Cos 7 Sin 3 8. Sin 10

Sin 7 Cos 3 + Sin 3 Cos 7

Sin (7 + 3)

For #9-11, use Addition and Subtraction Identities to find the **exact** values.

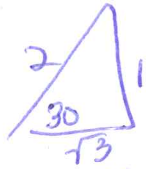
9. $\cos\frac{5\pi}{12}$

$\cos\left(\frac{3\pi}{12}+\frac{2\pi}{12}\right)$

$\cos\left(\frac{\pi}{4}+\frac{\pi}{6}\right)$

$\cos\frac{\pi}{4}\cdot\cos\frac{\pi}{6} - \sin\frac{\pi}{4}\cdot\sin\frac{\pi}{6}$

$\frac{\sqrt{2}}{2} \quad \frac{\sqrt{3}}{2} \quad - \quad \frac{\sqrt{2}}{2} \quad \frac{1}{2}$



9. $\frac{\sqrt{6}-\sqrt{2}}{4}$

10. $\sin 105^\circ$

$\sin(45+60)$

$\sin 45\cdot\cos 60 + \sin 60 \cos 45$

$\frac{\sqrt{2}}{2}\cdot\frac{1}{2} + \frac{\sqrt{3}}{2}\cdot\frac{\sqrt{2}}{2}$

$\frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4}$

10. $\frac{\sqrt{2}+\sqrt{6}}{4}$

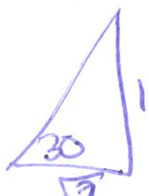
11. $\tan 75^\circ$

$\tan(30^\circ+45^\circ)$

$\dfrac{\tan 30 + \tan 45}{1-\tan 30\cdot\tan 45}$

(1) (1)

$\dfrac{\frac{\sqrt{3}}{3}+1}{1-\frac{\sqrt{3}}{3}}$



11. $\frac{3+\sqrt{3}}{3-\sqrt{3}}$

Unrationalized

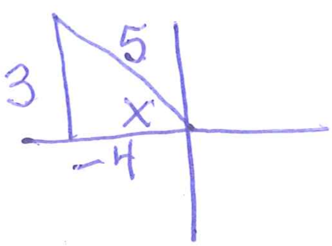
$2+\sqrt{3}$

Rationalized

12. Given: $\cos x = -\frac{4}{5}$, *where* $\frac{\pi}{2}<x<\pi$,

evaluate and simplify $\cos\left(\frac{\pi}{4}+x\right)$. Find the **exact** value.

12. $\frac{-7\sqrt{2}}{10}$



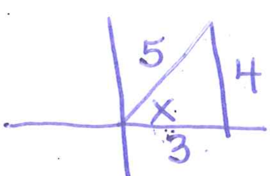
$\cos\frac{\pi}{4}\cdot\cos x - \sin\frac{\pi}{4}\sin x$

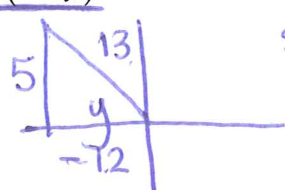
$\frac{\sqrt{2}}{2}\cdot\frac{-4}{5} - \frac{\sqrt{2}}{2}\cdot\frac{3}{5}$

$\frac{-4\sqrt{2}}{10} - \frac{3\sqrt{2}}{10} = \frac{-7\sqrt{2}}{10}$

13. Given: $\sin x = \frac{4}{5}$, *where* $0<x<\frac{\pi}{2}$ *and* $\csc y = \frac{13}{5}$, *where* $\frac{\pi}{2}<y<\pi$

evaluate and simplify $\sin(x+y)$. Find the **exact** value.





$\sin x\cdot\cos y + \sin y \cos x$

$\frac{4}{5}\cdot\frac{-12}{13} + \frac{5}{13}\cdot\frac{3}{5}$

$\frac{-48}{65} + \frac{15}{65}$

13. $-33/65$