$\boxed{pg.8}$

Accelerated Pre-Calculus

4.03 Verifying Identities Practice Day 1

Name: ___________________

Date: __________ Period: ____

Tell whether or not f(x) = sin(x) is an identity.

1. $f(x) = \frac{tanx}{secx}$

$$\frac{\frac{sinx}{cosx}}{\frac{1}{cosx}} \rightarrow \frac{sinx}{\cancel{cosx}} \cdot \frac{\cancel{cosx}}{1} = \boxed{sinx}$$ ✓

Prove the following identities.

2. $(sinx)(cotx + cosxtanx) = cosx + sin^2x$

$$sinx\left(\frac{cosx}{sinx} + \cancel{cosx} \cdot \frac{sinx}{\cancel{cosx}}\right) = cosx + sin^2x$$ ✓

3. $(cosx - sinx)^2 = 1 - 2sinxcosx$ ✓

$$(cosx - sinx)(cosx - sinx)$$

$$cos^2x \underbrace{- cosx\,sinx - sinxcosx}_{-2sinxcosx} + sin^2x$$

$$\boxed{1 - 2sinxcosx}$$ ✓

4. $tanx + secx = \frac{cosx}{1-sinx}$

$$\frac{sinx}{cosx} + \frac{1}{cosx} = \frac{sinx + 1}{cosx} \frac{cosx}{\cdot cosx}$$

$$\frac{(sinx+1)(cosx)}{cos^2x} \rightarrow \frac{(sin\cancel{x+1})(cosx)}{\frac{1-sin^2x}{(1-sinx)(\cancel{1+sinx})}}$$

$$\frac{cosx}{1-sinx}$$ ✓

5. $\frac{sec^2\theta - 1}{sin\theta} = \frac{sin\theta}{1-sin^2\theta}$

$$\frac{tan^2\theta}{sin\theta} \rightarrow \frac{\frac{sin^2\theta}{cos^2\theta}}{sin\theta} \quad \frac{sin^{\cancel{2}}\theta}{cos^2\theta} \cdot \frac{1}{\cancel{sin\theta}} \rightarrow \frac{sin\theta}{cos^2\theta}$$

$$\frac{sin\theta}{1-sin^2\theta}$$

pg. 8 (b)

6. $\frac{1}{1-cosx}+\frac{1}{1+cosx}=2csc^2x$

$(1+cosx)$ $(1-cosx)$

$\frac{1+cosx}{(1-cosx)(1+cosx)}+\frac{1-cosx}{(1-cosx)(1+cosx)}$

$\frac{2}{(1-cosx)(1+cosx)}$

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

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

$\frac{2}{\frac{1}{csc^2x}}$

$2 \cdot \frac{csc^2x}{1}$

$=\boxed{2csc^2x}$

7. $sin^2\alpha - cos^2\alpha = 1-2cos^2\alpha$

$(1-cos^2\alpha)-cos^2\alpha = 1-2cos^2\alpha$ ✓

pythagorean Identity

8. $\frac{1}{tan\beta}+tan\beta = sec\beta csc\beta$ ✓

$(tan\beta)$

$\frac{1}{tan\beta}+\frac{tan^2\beta}{tan\beta}$

$\frac{1+tan^2\beta}{tan\beta}$

$\frac{sec^2\beta}{tan\beta}$

$\frac{sec^2\beta}{\frac{sin\beta}{cos\beta}}$

$sec^2\beta \cdot \frac{cos\beta}{sin\beta}$

$sec^2\beta \cdot \boxed{\frac{\frac{1}{sec\beta}}{\frac{1}{csc\beta}}} \rightarrow \frac{1}{sec\beta}\cdot\frac{csc\beta}{1}$

$sec^{\cancel{2}}\beta \cdot \frac{csc\beta}{\cancel{sec}\beta} \rightarrow sec\beta csc\beta$ ✓

Accelerated Pre-Calculus Name: ____________________

4.04 Verifying Identities Classwork Day 2 Date: __________ Period: ____

Prove the following identities.

1. $\frac{secx+1}{tanx}=\frac{sinx}{1-cosx}$

In Exercises 17–22, simplify the expression to either 1 or −1.

**17.** $\sin x \csc(-x)$ $\rightarrow (\sin x)(-\csc x) = \cancel{\sin x} \cdot \frac{-1}{\cancel{\sin x}} = -1$

**18.** $\sec(-x)\cos(-x)$

**19.** $\cot(-x)\cot(\pi/2 - x)$ $(-\cot x)(\tan x) = \boxed{-1}$

**20.** $\cot(-x)\tan(-x)$

**21.** $\sin^2(-x) + \cos^2(-x)$ $[\sin(-x)]^2 + [\cos(-x)]^2$

$[-\sin x]^2 + [\cos x]^2$

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

$\boxed{1}$

**22.** $\sec^2(-x) - \tan^2 x$

In Exercises 23–26, simplify the expression to either a constant or a basic trigonometric function. Support your result graphically.

**23.** $\dfrac{\tan(\pi/2 - x)\csc x}{\csc^2 x}$ $\rightarrow \dfrac{(\cot x)(\cancel{\csc x})}{\csc^{\cancel{2}} x}$

$$\frac{\frac{\cos x}{\sin x}}{\frac{1}{\sin x}} \rightarrow \frac{\cos x}{\cancel{\sin x}} \cdot \frac{\cancel{\sin x}}{1} = \boxed{\cos x}$$