Pre-Calculus
Section 5.1 Practice A

Name: Key

1. Since $\sin^2 x + \cos^2 x = 1$: a) $1 - \sin^2 x =$ $\cos^2 x$ b) $1 - \cos^2 x =$ $\sin^2 x$

2. Since $1 + \tan^2 x = \sec^2 x$: a) $\sec^2 x - 1 =$ $\tan^2 x$ b) $\sec^2 x - \tan^2 x =$ 1

3. Since $1 + \cot^2 x = \csc^2 x$ a) $\csc^2 x - 1 =$ $\cot^2 x$ b) $\csc^2 x - \cot^2 x =$ 1

For numbers 4 – 11, simplify.

4. $\tan\theta \cdot \cos\theta$

$\frac{\sin\theta}{\cos\theta} \cdot \cos\theta$

$\sin\theta$

5. $\sin^2 x - 1$

$-\cos^2 x$

$\sin^2 x + \cos^2 x = 1$
$-1 \quad -1$
$-\cos^2 x \quad -\cos^2 x$
$\sin^2 x - 1 = -\cos^2 x$

6. $(\csc^2 x - \cot^2 x)(\sec^2 x - 1)$

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

$\tan^2 x$

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

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

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

$\dfrac{\cos x}{\sin x}$

$\cot x$

8. $\sin^2 x(\csc^2 x - 1)$

$\sin^2 x(\cot^2 x)$

$\sin^2 x\left(\dfrac{\cos^2 x}{\sin^2 x}\right)$

$\cos^2 x$

For numbers 9 – 14, match the trigonometric identity with one of the expressions:

B 9. $\sin x \cot x$ $\dfrac{\sin x \cdot \cos x}{\sin x}$ $\cos x$ a) $\sec x$

C 10. $\cos x \tan x$ $\dfrac{\cos x \cdot \sin x}{\cos x}$ $\sin x$ b) $\cos x$

E 11. $\sin x(\csc x - \sin x)$ $\sin x\left(\dfrac{1}{\sin x} - \sin x\right)$ $\dfrac{\sin x}{\sin x} - \dfrac{\sin^2 x}{\sin x}$ $1 - \sin^2 x$ $\cos^2 x$ c) $\sin x$

F 12. $\sec^2 x(1 - \sin^2 x)$ $\left(\dfrac{1}{\cos^2 x}\right)\cos^2 x$ 1 d) $\tan x$

A 13. $\dfrac{\csc x}{\cot x}$ $\dfrac{\frac{1}{\sin x}}{\frac{\cos x}{\sin x}} = \dfrac{1}{\sin x} \cdot \dfrac{\sin x}{\cos x} = \dfrac{1}{\cos x} = \sec x$ e) $\cos^2 x$

D 14. $\dfrac{\sec x}{\csc x} = \dfrac{\frac{1}{\cos x}}{\frac{1}{\sin x}} = \dfrac{\sin x}{\cos x} = \tan x$ f) 1

Pre-Calculus
Section 5.1 Practice B

Name: Key

For numbers 1 – 7, simplify.

1. $(1 - \cos x)(1 + \cos x)$

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

$1 - \cos^2 x$

$\sin^2 x$

$\cos^2 x + \sin^2 x = 1$

$-\cos^2 x \quad -\cos^2 x$

$\sin^2 x = 1 - \cos^2 x$

2. $\cot y \cdot \sin y$

$\frac{\cos y}{\sin y} \cdot \sin y$

$\cos y$

3. $1 - \frac{\sin^2 \theta}{\tan^2 \theta}$

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

$1 - \sin^2 \theta \left(\frac{\cos^2 \theta}{\sin^2 \theta}\right)$

$1 - \cos^2 \theta$ (see #1)

$\sin^2 \theta$

4. $\sec x \cos x$

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

1

5. $\cos^3 x + \cos x \sin^2 x$

$\cos x \left(\cos^2 x + \sin^2 x\right)$

$\cos x (1)$

$\cos x$

6. $\frac{\sin^2 \theta}{1 - \cos^2 \theta} = \frac{\sin^2 \theta}{\sin^2 \theta} = 1$

7. $\frac{1}{\cos^2 x} - \frac{1}{\cot^2 x}$

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

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

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

$\frac{\cos^2 x}{\cos^2 x}$ (1)

For numbers 8 – 12, match the trigonometric identity with one of the expressions:

B 8. $\sin x \sec x$ $\sin x \left(\frac{1}{\cos x}\right) = \frac{\sin x}{\cos x} = \tan x$

C 9. $\cos^2 x\left(\sec^2 x - 1\right)$ $\cos^2 x (\tan^2 x)$ $\cos^2 x \cdot \frac{\sin^2 x}{\cos^2 x} = \sin^2 x$

D 10. $\sec^2 x \cot^2 x$ $\left(\frac{1}{\cos^2 x}\right)\left(\frac{\cos^2 x}{\sin^2 x}\right) = \frac{1}{\sin^2 x} = \csc^2 x$

A 11. $\cot x \sec x$ $\frac{\cos x}{\sin x} \cdot \frac{1}{\cos x} = \frac{1}{\sin x} = \csc x$

E 12. $\frac{\sec^2 x - 1}{\sin^2 x} = \frac{\tan^2 x}{\sin^2 x} = \frac{\frac{\sin^2 x}{\cos^2 x}}{\sin^2 x} = \frac{\sin^2 x}{\cos^2 x} \cdot \frac{1}{\sin^2 x} = \frac{1}{\cos^2 x} = \sec^2 x$

a) $\csc x$

b) $\tan x$

c) $\sin^2 x$

d) $\csc^2 x$

e) $\sec^2 x$