Honors Algebra II
Proofs – Day 1

Name key
Date______________ Period_____

Verifying Trigonometric Identities

Review.

1. $\frac{x^5}{x^2} = x^{5-2}$

$= \boxed{x^3}$

2. $\frac{x^7y^4}{x^2} = x^{7-2}y^4$

$= \boxed{x^5y^4}$

3. $\frac{x^4-6}{x} = \frac{x^4}{x} - \frac{6}{x}$

$= \boxed{x^3 - \frac{6}{x}}$

4. $(x-3)^2$

$= (x-3)(x-3)$

$= x^2 - 3x - 3x + 9$

$= \boxed{x^2 - 6x + 9}$

5. $x^2 - 64$

$= \boxed{(x-8)(x+8)}$

6. $25x^4 - 49y^6$

$= \boxed{(5x^2 - 7y^3)(5x^2 + 7y^3)}$

Given $sin^2\theta + cos^2\theta = 1$, generate the other 8 Pythagorean identities.

- $\sin^2\theta + \cos^2\theta = 1$
- $\sin^2\theta = 1 - \cos^2\theta$
- $\cos^2\theta = 1 - \sin^2\theta$
- $\sec^2\theta - \tan^2\theta = 1$
- $\sec^2\theta = 1 + \tan^2\theta$
- $\tan^2\theta = \sec^2\theta - 1$
- $\csc^2\theta - \cot^2\theta = 1$
- $\csc^2\theta = 1 + \cot^2\theta$
- $\cot^2\theta = \csc^2\theta - 1$

Prove.

1. $\tan^2 \vartheta = \sec^2 \vartheta - 1$

- $TAN^2\theta = TAN^2\theta$

2. $\tan^2 \vartheta = \dfrac{1-\cos^2 \vartheta}{\cos^2 \vartheta}$

- $TAN^2\theta = \dfrac{1}{COS^2\theta} - \dfrac{COS^2\theta}{COS^2\theta}$
- $TAN^2\theta = SEC^2\theta - 1$
- $TAN^2\theta = TAN^2\theta$

3. $\tan \vartheta = \sin \vartheta \sec \vartheta$

- $TAN\theta = SIN\theta \cdot \dfrac{1}{COS\theta}$
- $TAN\theta = \dfrac{SIN\theta}{COS\theta}$
- $TAN\theta = TAN\theta$

4. $\dfrac{\cot^2 \vartheta}{\csc \vartheta} = \csc \vartheta - \sin \vartheta$

- $\dfrac{CSC^2\theta - 1}{CSC\theta} = CSC\theta - SIN\theta$
- $\dfrac{CSC^2\theta}{CSC\theta} - \dfrac{1}{CSC\theta} = CSC\theta - SIN\theta$
- $CSC\theta - SIN\theta = CSC\theta - SIN\theta$

5. $\dfrac{\cot \vartheta + 1}{\cot \vartheta} = 1 + \tan \vartheta$

- $\dfrac{COT\theta}{COT\theta} + \dfrac{1}{COT\theta} = 1 + TAN\theta$
- $1 + TAN\theta = 1 + TAN\theta$

6. $(\sin \vartheta + \cos \vartheta)^2 = 2 \sin \vartheta \cos \vartheta + 1$

- $(SIN\theta + COS\theta)(SIN\theta + COS\theta) = 2SIN\theta COS\theta + 1$
- $SIN^2\theta + SIN\theta COS\theta + COS\theta SIN\theta + COS^2\theta = 2SIN\theta COS\theta + 1$
- $2 SIN\theta COS\theta + 1 = 2SIN\theta COS\theta + 1$

7. $(1 + \sin \vartheta)(1 - \sin \vartheta) = \cos^2 \vartheta$

- $1 - SIN\theta + SIN\theta - SIN^2\theta = COS^2\theta$
- $1 - SIN^2\theta = COS^2\theta$
- $COS^2\theta = COS^2\theta$

8. $\csc^4 \vartheta - \cot^4 \vartheta = \csc^2 \vartheta + \cot^2 \vartheta$

- $(CSC^2\theta - COT^2\theta)(CSC^2\theta + COT^2\theta) = CSC^2\theta + COT^2\theta$
- $1\,(CSC^2\theta + COT^2\theta) = CSC^2\theta + COT^2\theta$
- $CSC^2\theta + COT^2\theta = CSC^2\theta + COT^2\theta$