

SCORE: ___ / 20 POINTS

What month is your birthday? ___

What are the first 2 digits of your address? ___

What are the last 2 digits of your zip code? ___

What are the last 2 digits of your social security number? ___

[IF YOU DO NOT HAVE A SOCIAL SECURITY NUMBER,
USE YOUR STUDENT ID NUMBER]**NO CALCULATORS ALLOWED**Simplify $\frac{1}{\sin x - 1} - \frac{1}{\sin x + 1}$.

SCORE: ___ / 4 POINTS

$$= \frac{\cancel{\sin x} + 1 - (\cancel{\sin x} - 1)}{(\sin x - 1)(\sin x + 1)}$$

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

$$= \frac{2}{-\cos^2 x} = -2\sec^2 x$$

Write $\csc x$ in terms of $\cos x$.

SCORE: ___ / 3 POINTS

$$\csc x = \frac{1}{\sin x} = \frac{1}{\pm \sqrt{1 - \cos^2 x}} = \pm \frac{\sqrt{1 - \cos^2 x}}{1 - \cos^2 x}$$

Simplify $\frac{\csc x \sec x}{\cot x}$. The final result should be a constant, a single function or a power of a function.

SCORE: ___ / 3 POINTS

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

$$= \frac{1}{\cancel{\sin x} \cos x} \frac{\cancel{\sin x}}{\cos x}$$

$$= \frac{1}{\cos^2 x} = \sec^2 x$$

Prove $\frac{\sec x - 1}{1 - \cos x} = \sec x$.

SCORE: ___ / 5 POINTS

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

$$= \frac{1 - \cancel{\cos x}}{(1 - \cancel{\cos x}) \cos x}$$

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

$$= \sec x \quad \boxed{\text{QED}}$$

Prove $\tan^2 x \sin^2 x = \tan^2 x + \cos^2 x - 1$.

SCORE: ___ / 5 POINTS

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

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

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

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

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

$$= \tan^2 x \sin^2 x$$