

Key

Math 4

4-3 Part 2 - Trigonometric Simplification

Name \_\_\_\_\_

Date \_\_\_\_\_

In this investigation, you will be working towards the following learning goals:

I can use and define the six trigonometric functions: sine, cosine, tangent, cosecant, secant, and cotangent

I can use the fundamental trigonometric identities to simplify expressions and verify equivalences

Simplify

Examples involving factoring (a little trickier...)

think  $1-x^2 = (1-x)(1+x)$

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

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

$$= \boxed{1-\cos x}$$

$$\frac{\cos^2 x - 1}{\cos^2 x \tan^2 x} = \frac{(\cos x - 1)(\cos x + 1)}{\cancel{\cos^2 x} \cdot \frac{\sin^2 x}{\cancel{\cos^2 x}}} = \frac{(\cos x - 1)(\cos x + 1)}{\sin^2 x} = \frac{(\cos x - 1)(\cos x + 1)}{1 - \cos^2 x}$$

OR

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

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

$$\sec x \cot x - \cot x \cos x =$$

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

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

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

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

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

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

$$= \boxed{-1}$$