

# Math 1316: 4-19 Worksheet

April 19, 2022

These exercises are about using the Pythagorean identity, and other identities about trig functions. Here's the basic form of the Pythagorean identity:

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

1. Suppose you know that  $\tan \alpha = 1/7$  and that  $\alpha$  is in Quadrant 3. Use a Pythagorean identity to calculate  $\sec \alpha$ .
2. Rewrite the following expression just in terms of  $\sin$  and  $\cos$ , then simplify as much as you can:

$$\frac{\sec x \tan x}{\sin x \cot x} - \frac{\sin x + \tan x}{\sin x \cos x}.$$

3. Simplify the expression

$$\frac{1 + \sin^2 x}{\cos^2 x}.$$

4. Consider the following equation:

$$\cos x(\tan x - \sec(-x)) = \sin x - 1.$$

Graph both sides of the equations to see whether it looks to be true for all inputs  $x$ . If it looks to always be true, then simplify one side to be the same as the other side. If it looks to not always be true, check this by finding a value for the input  $x$  for which the two sides differ.

5. Do the same with the following equation:

$$\frac{\sec x + \tan x}{\cos x + \cot x} = \sec^2 x.$$