## Trigonometric Identities

While working in a group make sure you:

- Expect to make mistakes but be sure to reflect/learn from them!
- Are civil and are aware of your impact on others.
- Assume and engage with the strongest argument while assuming best intent.
- 1. For each of the following determine if the equation is an identity (true for all values in the domain). If not an identity solve for x.

$$\log(\frac{x}{2}) = \log(x) - \log(2) \qquad x^2 = 4x - 3$$

$$5 \cdot 3^x = 10 \qquad \qquad \tan(x) = \frac{\sin(x)}{\cos(x)}$$

2. Determine if the identity is true or false:

$$\cos x(\sec(x) - \cos(x)) = \sin^2(x)$$

The big three identities:

- (a) The definitions of sine, cosine, and tangent.
- (b) The Pythagorean Identity:  $\cos^2(x) + \sin^2(x) = 1$
- (c) The Additive Identities:
  - i.  $\cos(\theta + \phi) = \cos(\theta)\cos(\phi) \sin(\theta)\sin(\phi)$
  - ii.  $\sin(\theta + \phi) = \cos(\theta)\sin(\phi) + \sin(\theta)\cos(\phi)$

3. Find the exact value of  $\sin\left(\frac{\pi}{12}\right)$ 

4. Determine if the identity is true or false:

$$\cos^2(x) - \sin^2(x) = \cos(2x)$$

5. Let  $\sin(x) = \frac{-3}{5}$  and x is in quadrant III.

(a) Find 
$$\cos(2x)$$

(b) Find  $\tan(2x)$