## 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 $x$.

$$
\log \left(\frac{x}{2}\right)=\log (x)-\log (2) \quad x^{2}=4 x-3
$$

$5 \cdot 3^{x}=10$

$$
\tan (x)=\frac{\sin (x)}{\cos (x)}
$$

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:

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

5. Let $\sin (x)=\frac{-3}{5}$ and $x$ is in quadrant III.
(a) Find $\cos (2 x)$
(b) Find $\tan (2 x)$
