

1. Evaluate

$$\sin(\arctan(\frac{5}{12}) - \arctan(-\frac{4}{3}))$$

2. Assuming all angles are in the first quadrant, rewrite the following trigonometric function to an algebraic function. Also, find the domain of the function $f(x)$. Express the domain of function $f(x)$ in the interval notation.

$$f(x) = \sin(\arcsin \frac{1}{x} + \arctan x)$$

3. Solve for x if $x \in [0, 2\pi)$

$$\sin\left(x + \frac{\pi}{6}\right) - \sin\left(x - \frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$$

4. Solve for x if $x \in (0, \pi)$

$$4\sec x = \tan x + 4$$

5. Verify the following identity

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

6. Evaluate $\tan \frac{5\pi}{12}$ without a calculator.