

## Quiz3 on PreCalculus 2

Name: \_\_\_\_\_ Student ID: \_\_\_\_\_ Section: \_\_\_\_\_

1. (7 points) Graph  $\cos^{-1} \theta$ ,  $\sin^{-1} \theta$ . Then find out the value of  $\sin(\cos^{-1}(\frac{\sqrt{3}}{2}))$

$$\sin(\cos^{-1}(\frac{\sqrt{3}}{2})) = \frac{1}{2}$$

Graphics are in the next page.

2. (3 points) Establish the identity.

$$\sec \theta - \tan \theta = \frac{\cos \theta}{1 + \sin \theta}$$

$$\begin{aligned} \sec \theta - \tan \theta &= \frac{1}{\cos \theta} - \frac{\sin \theta}{\cos \theta} \\ &= \frac{1 - \sin \theta}{\cos \theta} \\ &= \frac{1 - \sin \theta}{\cos \theta} \frac{1 + \sin \theta}{1 + \sin \theta} \\ &= \frac{1 - \sin^2 \theta}{\cos \theta (1 + \sin \theta)} \\ &= \frac{\cos^2 \theta}{\cos \theta (1 + \sin \theta)} \\ &= \frac{\cos \theta}{1 + \sin \theta} \end{aligned}$$

An alternative way by cross multiplication

$$\sec \theta - \tan \theta = \frac{1 - \sin \theta}{\cos \theta}$$

So the original identity is equivalent to

$$\frac{1 - \sin \theta}{\cos \theta} = \frac{\cos \theta}{1 + \sin \theta}$$

which is equivalent to  $(1 - \sin \theta)(1 + \sin \theta) = \cos^2 \theta$  or  $1 - \sin^2 \theta = \cos^2 \theta$ . That's true. So the original identity is also true.

