

Name : _____ ID. # : _____ SER. # : _____

1. Find the value of the following:

$$\frac{-\tan 67.5^\circ}{1 - \tan^2 67.5^\circ} , \quad \sin^{-1}\left(\sin \frac{7\pi}{6}\right) , \quad \tan \left[\sec^{-1}\left(-\frac{13}{5}\right)\right] , \quad \sin \left(2 \sin^{-1} \frac{1}{3}\right) \quad (4 \text{ pts})$$

2. If $y = 2\sqrt{3}\sin 2x - 2\cos 2x$ is written in the form $y = k \sin(mx + \alpha)$, where $0 \leq \alpha < 2\pi$, then find k and α and then the range and phase shift of the function. (3 pts)

3. Verify the identity: $2 \cos^4 x - \cos^2 x - 2 \sin^2 x \cos^2 x + \sin^2 x = \cos^2 2x$ (3 pts)