Name_____

Circle your answers to problems 1-3. You must show your work to receive credit.

(8 pts)   1.   Completely simplify the expression $\dfrac{1 - \sin x}{\cos x} - \dfrac{\cos x}{1 + \sin x}$.

A. $\dfrac{2}{(1 + \sin x)\cos x}$

B. 2

C. $-\dfrac{2 \sin^2 x}{(1 + \sin x)\cos x}$

D. 0

E. $\dfrac{2 \sin x}{1 + \sin x}$

(8 pts)   2.   Find all the solutions of $1 + 2 \cos x = 0$ in the interval $[0, 2\pi)$.

A. $\dfrac{\pi}{6}, \dfrac{5\pi}{6}$

B. $\dfrac{\pi}{3}, \dfrac{2\pi}{3}$

C. $\dfrac{2\pi}{3}, \dfrac{5\pi}{3}$

D. $\dfrac{7\pi}{6}, \dfrac{11\pi}{6}$

E. $\dfrac{2\pi}{3}, \dfrac{4\pi}{3}$

(8 pts)   3.   Find the exact value of $\tan \dfrac{5\pi}{12}$.

A. $\sqrt{3} + 1$

B. $\sqrt{3} - 1$

C. $2 + \sqrt{3}$

D. $2 - \sqrt{3}$

E.   None of these.

Name_____

Place your answers in the spaces provided. You must show your work to receive credit.

(12 pts)   4.   Find all the solutions of $2 \sin^2 x = 3 \sin x - 1$ in the interval $[0, 2\pi)$.

$=$ ☐

(12 pts)   5.   If α and β are acute angles such that $\cos \alpha = \dfrac{24}{25}$ and $\tan \beta = \dfrac{15}{8}$, find the exact value of $\sin (\alpha - \beta)$. Simplify your answer.

$\sin (\alpha - \beta) =$ ☐

(12 pts)   6.   Find the exact value of $\cos 105^0$. Do not use a calculator. Simplify your answer.

$\cos 105^0 =$ ☐

Name_____

Place your answers in the spaces provided. You must show your work to receive credit.

(16 pts)　　7.　　Find the exact value of the following. Do not use a calculator.

　　　　　　　(8 pts) a)　　　$\cos^{-1}\left(-\dfrac{\sqrt{3}}{2}\right)$

$$\cos^{-1}\left(-\dfrac{\sqrt{3}}{2}\right) = \boxed{}$$

　　　　　　　(8 pts) b)　　　$\tan\left(\arcsin\dfrac{2}{3}\right)$

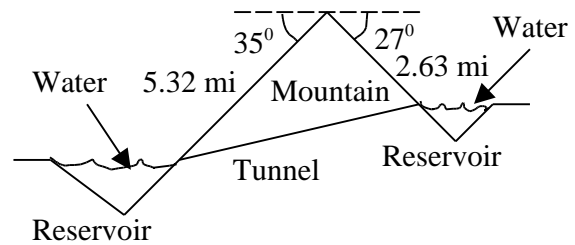$$\tan\left(\arcsin\dfrac{2}{3}\right) = \boxed{}$$

(12 pts)　　8.　　Radio direction finders are set up at points A and B, which are 2.50 miles apart on an east-west line. From A it is found that the bearing to a radio transmitter is N 15^{0} E, while from B the bearing to the same radio transmitter is N 41^{0} W. Find the distance from each of the radio finders, A and B, to the radio transmitter. (Draw and label a sketch, set up an equation(s) and solve.) Round your answers to the nearest hundredth of a mile.

Distance from A = $\boxed{}$

Distance from B = $\boxed{}$

Name_____

Place your answers in the spaces provided. You must show your work to receive credit.

(12 pts)   9.   A tunnel for hydroelectric power is to be constructed through a mountain from one reservoir to another at a lower level. The distance from the top of the mountain to the lower end of the tunnel is 5.32 mi, and from the top of the mountain to the upper end of the tunnel is 2.63 mi. The angles of depression of the two slopes of the mountain are 35^0 and 27^0 respectively. What is the length of the tunnel? (Name a variable, set up an equation(s), and solve.) Round your answer to the nearest hundredth of a mile.

Length =