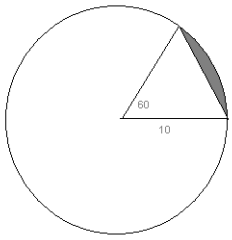

PRACTICE EXAM 4 - MATH 140

DATE: Monday, November 21
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Sketch the graph of $f(x) = \cos^{-1} x$.
2. Prove the trigonometric identities:
   (a) $\frac{1+sin\theta+\cos\theta}{1+\sin\theta-\cos\theta} = \frac{1+\cos\theta}{\sin\theta}$.
   (b) $\frac{\sin(\alpha+\beta)}{\sin(\alpha-\beta)} = \frac{\tan\alpha+\tan\beta}{\tan\alpha-\tan\beta}$
3. Find the exact value of the expression $\cos(\tan^{-1}\frac{4}{3} + \cos^{-1}\frac{12}{13})$.
4. Solve the following trigonometric equations:
   (a) $\cos(2\theta) + 5\cos\theta + 3 = 0$
   (b) $\sqrt{3}\sin\theta + \cos\theta = 1$
5. Two observers are 1000 feet apart. As an airplane passes over the line joining the two observers, each of the two is taking a sighting of the angle of elevation of the airplane. The first observers angle sighting is 45° and the second observer's angle sighting is 30°. How high is the airplane?
6. Find the area between the chord and the arc of a circle with radius 10 formed by a central angle of 60° as shown in Figure 6.