Name _____ Rec. Instr. _____

Rec. Time _____

PLANE TRIGONOMETRY

Exam III
April 13, 2006

Page 1 (10 pts.)	**Page 2** (30 pts.)	**Page 3** (30 pts.)	**Page 4** (30 pts.)	**TOTAL** (100 pts.)

Below you will find 10 problems, each worth 10 points. Solve the problems in the space provided. When writing a solution to a problem, **show all work**. No books or notes are allowed. **Sign and submit your formula sheet with the exam.**

Problem 1. **(a)** Write the complex number $w = -8-8\sqrt{3}i$ in trigonometric form $w = r\operatorname{cis}\theta$, with $0 \leq \theta \leq 2\pi$.

(b) Using part (a) find all complex solutions of the equation $z^4 = w$. Write all solutions in the form $a + bi$, with a, b real numbers.

Problem 2. In parts (a) and (b) below, find the area of $\triangle ABC$, based on the given information. (Use **exact** values.)
(a) $a = 8$, $b = 6$, $\hat{C} = 30°$.

(b) $a = 5$, $b = 6$, $c = 7$.

Problem 3. Find all solutions of the equation $\sin 5t + \sin 3t = 0$. (Use **exact** values.)

Problem 4. A triangle ABC has $a = 3$ in, $b = 4$ in, and $\widehat{A} = 30°$. Find the remaining parts: $\widehat{B}$, $\widehat{C}$, and c. (Express all angles in degrees. Round to two decimal places.)

Problem 5. A triangle ABC has $a = 10$ in, $b = 4$ in, and $\widehat{C} = 45°$. Find the remaining parts: c, $\widehat{A}$, and $\widehat{B}$. (Express all angles in degrees. Round to two decimal places.)

Problem 6. A triangle ABC has $a = 6$ in, $b = 7$ in, and $c = 8$ in. Find the remaining parts: $\widehat{A}$, $\widehat{B}$, and $\widehat{C}$. (Express all angles in degrees. Round to two decimal places.)

Problem 7. Verify the identity: $\dfrac{\sin 4t + \sin 2t}{\cos 4t + \cos 2t} = \tan 3t$.

Problem 8. A triangle ABC has $a = 3$ in, $\widehat{B} = 30°$, and $\widehat{C} = 45°$. Find the remaining parts: $\widehat{A}$, b, and c. (Express all angles in degrees. Round to two decimal places.)

Problem 9. Find the **exact** value of $\tan\left[\frac{1}{2}\arccos\left(-\frac{5}{13}\right)\right]$.

Problem 10. Find the solutions of the equation $3\tan^2 t + 5\tan t - 2 = 0$, that are in the interval $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$. (Use radians. Round to two decimal places.)