Name _____ Rec. Instr. _____

Rec. Time _____

PLANE TRIGONOMETRY

Exam I

September 8, 2005

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. Convert the units as indicated:

(a) $17.45°$ to degrees, minutes and seconds.

(b) $\frac{5\pi}{72}$ (radians) to degrees, minutes and seconds.

Problem 2. Find two positive coterminal angles and one negative coterminal angle for each of the following angles:

(a) $-210°$ (use degrees);

(b) $\frac{7\pi}{6}$ (use radians).

Problem 3. An angle θ, in standard position, is located in the third quadrant and has $\cot\theta = \frac{5}{12}$. Find the **exact** values of $\sin\theta$ and $\cos\theta$. (HINT. Use the given information to find the *signs* of $\sin\theta$ and $\cos\theta$ first.)

Problem 4. Find the **exact** values of $\sin\left(-\frac{5\pi}{6}\right)$ and $\cos\left(-\frac{5\pi}{6}\right)$.

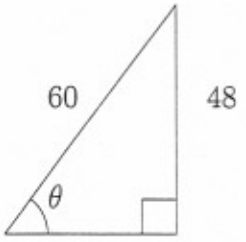
Problem 5. Find the length of the the arc that subtends the angle 150° on a circle of diameter 10 in.

Problem 6. Prove the identity:

$$\sin^2 t(\csc^2 t - 1) = \cos^2 t.$$

Problem 7. The angle θ is an acute angle in the right triangle shown in the figure.

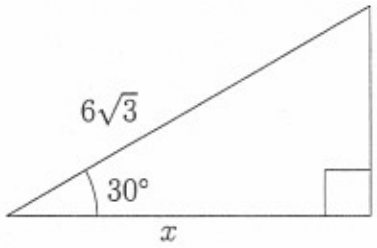
Find the **exact** values of all six trigonometric functions of θ.



Problem 8. Find the **exact** values of t, in the interval $[-\pi, 3\pi]$, which satisfy the equation

$$\sin t = \frac{\sqrt{2}}{2}.$$

Problem 9. Find the side labeled x in the right triangle:



Problem 10. Let θ be an angle in standard position, such that the point $P(1, -2)$ is on its terminal side. Find the **exact** values of all the six trigonometric functions of θ.