Math 6, Exam III

Thursday, December 11, 1997

NAME_____

Instructor, time_____

Do not turn this page until told to do so.

You are free to use the formula sheet on the last page.

1. (14 points) By showing all possible solutions or explaining why there are none, solve the triangles with sides and angles as follows:

a) $A = 120°, a = 12, b = 15$.

b) $A = 35°, a = 7, b = 10$.

2. (12 points) Find the exact values of

a) $\cos \dfrac{\pi}{12}$.

b) $\csc(-75°)$.

3.   (10 points) Verify that $\sin(n\pi + \theta) = (-1)^n \sin\theta$ for all integers n.

4.   (10 points) Calculate the following and write your answer in standard form:

a) $$\frac{3\left(\cos\dfrac{5\pi}{12} + i\sin\dfrac{5\pi}{12}\right)}{6\left(\cos\dfrac{\pi}{12} + i\sin\dfrac{\pi}{12}\right)}$$

b) $$\left[2\left(\cos\dfrac{4\pi}{15} + i\sin\dfrac{4\pi}{15}\right)\right]^5$$

5. (12 points) Find the areas of the triangles with angles and sides as follows:

a) $a = 12, b = 15, c = 9$.

b) $A = 130°, b = 62, c = 20$.

6. (10 points) Find all solutions of $\cos 4x - 7\cos 2x = 8$ in $[0, 2\pi)$.

7. (5 points) Write $5 + 12i$ in trigonometric form.

8. (7 points) To get from University Center - East to Civil Engineering, you can walk 550 ft North to the library, turn to a bearing of N 50° E, and then walk 300 ft to Civil Engineering. (Assume these are all straight line paths). How far is it in a straight line between the two buildings?

9.   (10 points) Find all fourth roots of i.

10.   (10 points) Find <u>all</u> solutions of $\sin\dfrac{x}{2} + \cos x = 1$.