Math 110 Common Exam III April 24, 2019

Time: 1 hour and 25 minutes

Instructions: Show all work for full credit. No outside materials or calculators allowed.

Extra Space: Use the backs of each sheet for extra space. Clearly label when doing so.

Name: _____

ID #: _____

Instructor/Section:

"I pledge by my honor that I will abide by the NJIT Academic Integrity Code."

(Signature)

Score

1. Find <u>all</u> solutions of the equations: (6 pts each)

a.
$$2\cos\frac{x}{2} = \sqrt{2}$$

b.
$$sin2x = -\frac{\sqrt{3}}{2}$$

- 2. Find all solutions in the interval [0, 2π]: (6 pts each)
 - a. cotxcosx = cosx

b. $\cos^2 x - \sin^2 x + \sin x = 0$

c.
$$-4\cos^2 x + 9 - 12\sin x = 0$$

3. Find the standard equation and sketch the graph of the ellipse that has vertices at (0, ± 6) and foci at (0, $\pm 2\sqrt{6}$). (5 pts)

4. Solve triangle ABC with C = 30° , b = 16ft, and c = 8 ft. (6 pts)

5. Three circles of radii 5, 6, and 7 inches are tangent to each other externally (meaning, they only touch each other at one point). Find the angles of the triangle formed by joining the center of the circles. *You can leave your answer in trig function form(10 pts)



6. Find the area of the triangle with side lengths a = 4, b = 6, and c = 4 (5 pts)

7. Find the center and radius of the of the circle with equation (10 pts) $x^2 + y^2 + 4x - 6y - 12 = 0$

8. A wheel of radius 4" rolls 30π " to the left. The initial coordinates of a point on the rime of the wheel are P($\sqrt{6}$, $-\sqrt{10}$). Find the final coordinates of the point after the rotation of the wheel. (12 pt)

9. Convert the following polar equations into rectangular form: (5 pts)

a.
$$\theta = \frac{5\pi}{6}$$

b.
$$r = 4\cos\theta$$

10. Graph the following polar equations on the rectangular OR polar planes (6 pts each)





