Math 110 Common Exam III

November 20, 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)

Problem(s)		Score

1. Find the solutions for the following in the interval [0 , 2π). Be sure to check for extraneous solutions: (8 pts each)

    a. $2cos(4x) = \sqrt{3}$

    b. $sinx + cosx = 1$

    c. $4sin^2 \frac{x}{2} = 2 - cos^2 x$

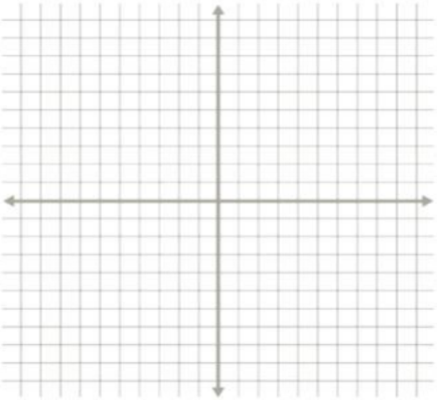
2. Convert the following polar equations into rectangular form, solving for y: (5 pts each)

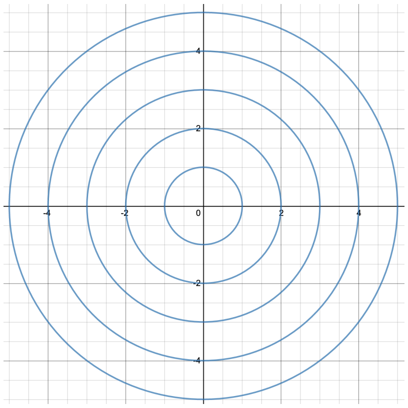
   a. $r = tan\theta$

   b. $r = \frac{2}{1+cos\theta}$

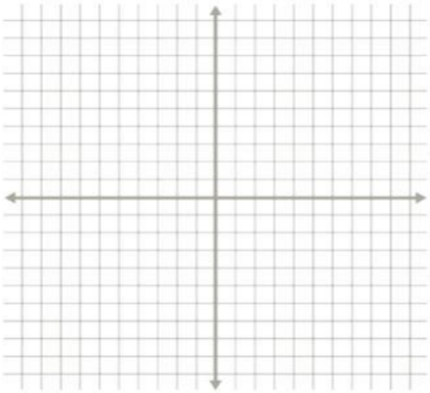
3. Graph the following polar functions on the rectangular or polar plane (5 pts each)

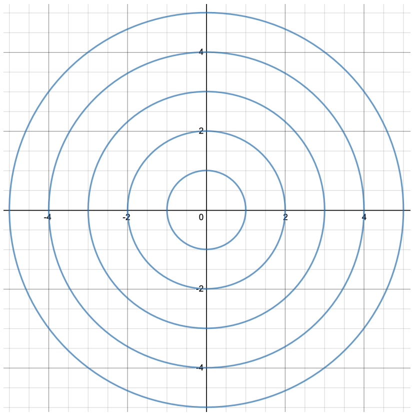
   a. $r = 3 + 2cos\theta$





   b. $r = \frac{\theta}{\pi}\ for\ \theta \geq 0$





4. Solve the following trigonometric equations for **all** possible solutions. (6 pts each)

   a. $(tan\ \theta - 1)(csc\ \theta - 2) = 0$

   b. $cos2\theta = cos\theta$

   c. $sin^2x - cos^2x = 1$

5. Consider the triangle with the following characteristics: $a = 2$, $b = 3$, $C = 60°$

   a. Find the area of the triangle. (4 pts)

   b. Solve the triangle for side c and angles A, B (your angle answers should be in inverse trigonometric notation), using the Law of Cosines. (12 pts)

6. A wheel of radius 12 inches rolls 3π inches to the left. The initial coordinates of a point on the rim of the wheel are Q $(9\ ,\ 3\sqrt{7})$. Find the final coordinates of the point after the rotation of the wheel. (12 pts)

7. Sketch the graph of the ellipse $x^2 + 2y^2 + 4x + 12y + 6 = 0$. (10 pts)