

Math 110 Common Exam #3

April 20, 2022

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 have abided by the NJIT Academic Integrity Code.”

_____ (Signature)

Problem	Score
1	
2	
3	
4	
5	
6	
7	
8	
9	

1. Evaluate the following: (5 pts each)

a. $\sin 75^\circ \cdot \sin 15^\circ$

b. $\sin 435^\circ - \sin 165^\circ$

2. Sketch a graph of the following: (5 pts)

$$-12y + y^2 - 2x = -28 - x^2$$

3. Solve the following trigonometric equations for solutions in the interval $[0, 2\pi)$ (6 pts each)

a. $-\sin\frac{\theta}{2} - \cos\theta = -1$

b. $2\sin\left(x - \frac{\pi}{4}\right) - 3 = -5$

c. $\sqrt{3}\sec(2x) + 2 = 0$

4. Solve the following trigonometric equations for all possible solutions (5 pts each)

a. $3\cos\theta = \sqrt{2}\tan\theta\cos\theta + \tan\theta + 3\cos\theta$

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

5. Given that $\sin\theta = -\frac{4}{5}$, $\pi \leq \theta < \frac{3\pi}{2}$, find the following: (5 pts each)

a. $\tan 2\theta$

b. $\cos^2\theta$

6. Convert the following: (3 pts each)

a. coordinates from Polar to rectangular

i. $\left(-4, \frac{3\pi}{2}\right)$

ii. $(-2, 150^\circ)$

iii. $(-2, \pi)$

b. coordinates from Rectangular to polar, where $r \geq 0$, θ is between $[0, 2\pi)$ (3 pts each)

i. $(\sqrt{3}, 1)$

ii. $(-2\sqrt{2}, -2\sqrt{2})$

- c. Equations from polar to rectangular, and identify the graph (shape) of the equation along with any intercepts, slopes, centers, radii, etc. (4 pts each)

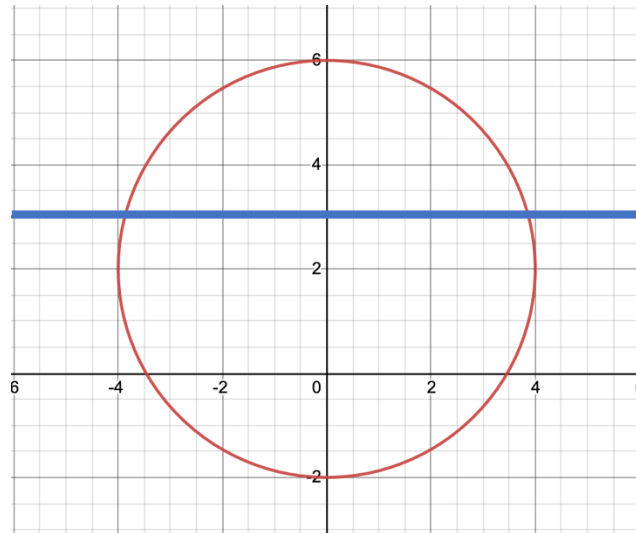
i. $\tan\theta = 2$

ii. $r = -4\cos\theta - 4\sin\theta$

7. Suppose a triangle has side lengths, 5 and 8, with the angle between them measuring 60° .
- a. Find the measure of the missing side. (5 pts)

- b. Find the area of the triangle (4 pts)

8. Find the coordinates of the intersection points for the circle and line pictured. (5 pts)



9. For each type of oblique triangle below identify which procedure is appropriate for solving the triangle: (write "Law of Sines" or "Law of Cosines" or "Both") (2 pts each)

a. SAS _____

b. AAS _____

c. SSS _____

d. ASA _____

e. SSA _____