Math 119 Final Exam

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Student Name (print): _____

This exam contains 6 pages (including this cover page) and 10 questions. The total number of possible points is 50. Enter your answers in the space provided. Draw a box around your final answer.

- **Mysterious or unsupported answers will not receive full credit**. A correct answer, unsupported by calculations, explanation, or algebraic work will receive no credit; an incorrect answer supported by substantially correct calculations and explanations may still receive partial credit.
- **Clearly identify your answer for each problem.**
- **No calculators or outside help allowed, unless it is with your instructor.**

Do not write in the table to the right.

Question	Points	Score
1	5	
2	5	
3	5	
4	5	
5	5	
6	5	
7	5	
8	5	
9	5	
10	5	
Total:	50	

1. (5 points) If $k > 0$, the following equation represents an ellipse:

$$\frac{x^2}{k} + \frac{y^2}{4+k} = 1.$$

Find the foci of the ellipse in terms of k, the length of the major axis, and the length of the minor axis. Show your work.

2. (5 points) Using De Moivre's Theorem compute:

$$\left(\frac{-1}{2} + \frac{\sqrt{3}}{2}i\right)^3.$$

Show your work.

Points earned: _____ out of 10 points

3. (5 points) Find the asymptotes, foci, and vertices of the hyperbola given by:

$$x^2 - y^2 = 5.$$

Show your work.

4. (5 points) Find the rectangular coordinates of:

$$P(r, \theta) = \left(8, -\frac{3\pi}{4}\right).$$

Show your work.

Points earned: _____ out of 10 points

5. (5 points) Use the Law of Sines to solve for all possible triangles where:

$$a = 50, b = 100, \angle A = 30^o.$$

Show your work. You can use a calculator.

6. (5 points) Use the Law of Cosines to solve for the following triangle:

$$a = 125, b = 162, \angle B = 40^o.$$

Show your work. You can use a calculator.

Points earned: _____ out of 10 points

7. (5 points) Prove the following identity:

$$\frac{2\tan(x)}{1+\tan^2(x)} = \sin(2x).$$

Show your work.

8. (5 points) Solve the equation on $[0, 2\pi)$

$$\cos(2x)\csc^2(x) = 2\cos(2x),$$

show your work.

Points earned: _____ out of 10 points

9. (5 points) Convert the equation from rectangular coordinates to polar coordinates:

$$(x^2 + y^2)^2 = 2xy.$$

Show your work

10. (5 points) Convert the complex number: $z_1 = 2\sqrt{3} - 2i, z_2 = 1 + \sqrt{3}i$ to polar coordinates and calculate $z_1 z_2$. You can use a calculator here to calculate the angle. Show your work.

Points earned: _____ out of 10 points