

Math 142 Fall 2009 Practice Analytic Geometry Exam

1. Identify and sketch the graph of the following equations:

(a) $y^2 - 12y - 8x + 20 = 0$

(b) $4x^2 + y^2 - 16x + 15 = 0$

(c) $4x^2 - 4y^2 - 4x + 8y - 11 = 0$

2. Find the equation for the following conic sections:

(a) (Hyperbola) Vertices $(0, \pm 1)$, Foci $(0, \pm 3)$

(b) (Ellipse) Vertices $(0, 1), (4, 1)$, Minor axis end-points $(2, 0), (2, 2)$

(c) (Parabola) Vertex $(2, 2)$, Directrix $y = 0$

3. Change these cartesian coordinates into polar coordinates.

(a) $(0, 1)$ (b) $(-1, -1)$ (c) $(\sqrt{3}, 1)$

4. Change these polar coordinates into cartesian coordinates.

(a) $(1, \pi)$ (b) $(3, \frac{\pi}{2})$ (c) $(\sqrt{2}, \frac{\pi}{4})$

5. Graph these equations: (a) $r = \frac{8}{2 - \cos \theta}$ (b) $r = 3 + 3 \sin \theta$

6. Change $2 - 2i$ into polar form $z = rcis\theta$ ($cis\theta = \cos \theta + i \sin \theta$).

7. Convert $3cis0$ into the form $z = a + bi$.

8. Find the cube roots of $-27i$.

9. Use polar trigonometric form to find $(2 - 2i)^6$.

10. Graph the conic with $e = \frac{4}{5}$ and directrix perpendicular to the polar axis 3 units to the left.

11. Graph the object traced by the parametrization:

$$\begin{cases} x = 3t - 4 \\ y = t \end{cases}$$

12. Parametrize the curve: $\left(\frac{x}{2}\right)^2 + \left(\frac{y}{9}\right)^2 = 1$.