Find the inclination of each of the following lines. Show your work. Your answer must be greater than or equal to 0° but less than 180°. Where appropriate, round to the nearest tenth of a degree.

1.
$$3x + 2y = 6$$
 2. $5x - 3y = 9$

3.
$$x = 5$$
 4. $y = -3$

Find an angle between the two given lines. Show your work. Your answer must be greater than 0° but less than or equal to 90°. Where appropriate, round to the nearest tenth of a degree.

5.	$5\mathbf{x} + \mathbf{y} = 4$	6.	$\mathbf{x} - 3\mathbf{y} = 3$
	$2\mathbf{x} - 5\mathbf{y} = 10$		$\mathbf{x} + 3\mathbf{y} = 0$

7.	-2x + y = 1	8.	$\mathbf{x} - 5\mathbf{y} = 10$
	$\mathbf{x} + 2\mathbf{y} = 6$		$\mathbf{x} - 6\mathbf{y} = 12$

Identify each equation as that of a circle, ellipse, hyperbola, or parabola. Express the equation in standard form and sketch its graph. Show your work neatly organized.

9.
$$x^2 - 6x + 3y + 15 = 0$$

10. $x^2 + y^2 - 2x - 24 = 0$



11.
$$x^2 + 2y^2 + 4x - 12y + 16 = 0$$



12.
$$9x^2 - 4y^2 - 18x - 8y - 31 = 0$$





Identify each equation as that of an ellipse, a hyperbola, or a parabola. Do not graph. Show how you got your answer.

13.
$$x^2 - 10xy + y^2 + 1 = 0$$

14. $5x^2 - 2xy + 5y^2 - 12 = 0$

15.
$$16x^2 - 24xy + 9y^2 - 60x - 80y + 100 = 0$$
 16. $xy - 12 = 0$

Find two set of polar coordinates (r, θ) for each of the following points. You are given the Cartesian (rectangular) coordinates of the point (x, y). Express θ in degrees where $0 \le \theta < 360^\circ$. Where appropriate, round to three significant digits. Show your work.

17. (5, 0)	18. (0, -3)
19. (2, 2)	20. (-3, 3)
21. (3, -4)	22. (-5, 12)
23. (-1, 3)	24. (4, 2)

You are given polar coordinates of the point (r, θ) . Find the Cartesian coordinates (x, y). Where necessary, round to three significant digits.

25. (3, 0°)	26. (-4, 45°)
27. (-6, 90°)	28. (5, 135°)
29. (4, 150°)	30. (-6, 240°)
31. (2.828, 315°)	32. (3, 340°)

Convert each of the following equations to polar form.

33.
$$x^2 + y^2 = 25$$
34. $y = x$

35. $y = 3$
36. $x = 0$

Convert each of the following polar equations to rectangular form.

37. $\theta = 3\pi/4$ **38.** r = 3

39. $r = 2\sin \theta$ **40.** $r = 2\sec \theta$

Graph each of the following equations.

41. r = 4





43. $r = 4\sin \theta$





44. $r = 2 - 4\sin \theta$



Graph each of the following equations.

45. $r = 4\cos 3\theta$

46. $r = 5 \sin 2\theta$





Find the eccentricity, e, of each of the following, and use it to identify each equation as that of an ellipse, a hyperbola, or a parabola. Show your work.

47.
$$r = \frac{3}{2-6\sin\theta}$$
 48. $r = \frac{4}{4+2\cos\theta}$

$$49. \quad r = \frac{3}{1 + \cos \theta}$$

Sketch the plane curves represented by each of the following parametric equations, showing the orientation (direction). Also, write an equation that gives the corresponding relationship between x and y (eliminate the parameter). Show your work neatly organized. Assume that $t \ge 0$.

$$y = 2t$$

51. $x = 4 \cos t$ $y = 4 \sin t$

50.

 $\mathbf{x} = \mathbf{t}$

