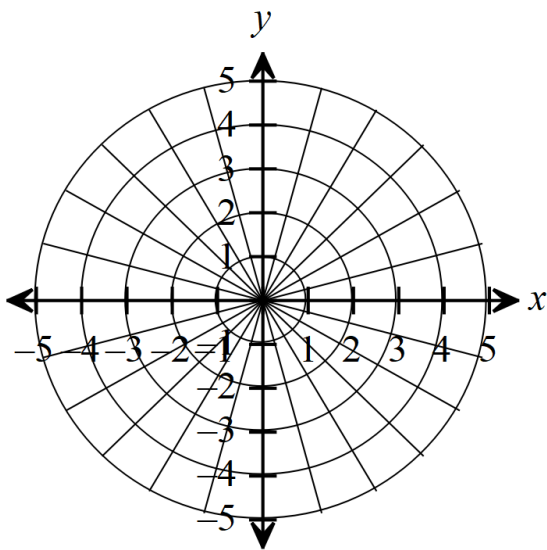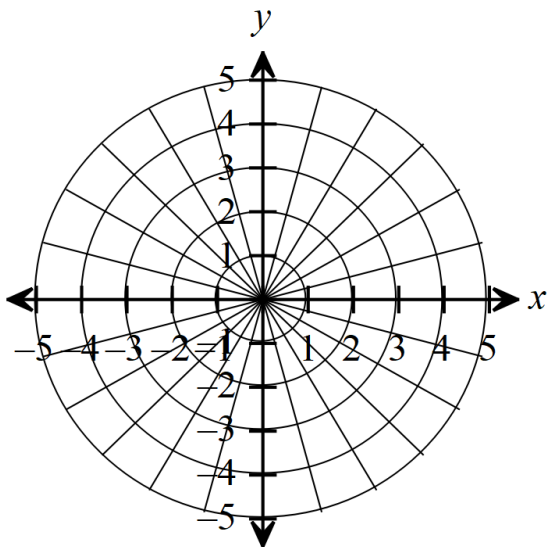**Precalculus**

Name_____ Date_____ Per_____

Plot the points whose polar coordinates are given.

1. $(3, \pi/6)$
2. $(-2, 2\pi/3)$
3. $(-3, 3\pi/4)$
4. $(3, -225°)$

5. $(2, -180°)$
6. $(-2, 45°)$
7. $(4, 420°)$
8. $(-4, -\pi/3)$

Convert the polar coordinates of each point to rectangular coordinates.

9. $(1, \pi/6)$

10. $(2, \pi/4)$

11. $(-3, 3\pi/2)$

12. $\left(\sqrt{2}, 135°\right)$

13. $\left(\sqrt{3}, 150°\right)$

14. $\left(-\sqrt{6}, -60°\right)$

Convert the rectangular coordinates of each point to polar coordinates. Use degrees for θ.

15. $(-2, 2)$

16. $\left(\sqrt{3}, 3\right)$

17. $(0, 2)$

Convert the rectangular coordinates of each point to polar coordinates. Use radians for θ.

18. $(-3, -3)$

19. $\left(-2, 2\sqrt{3}\right)$

20. $(-5, 0)$

For each polar equation, write an equivalent rectangular equation. Identify the shape of the graph.

21. $r = -3$

22. $r = 4\cos\theta$

23. $r = 2\csc\theta$

24. $r = \dfrac{2}{1 - \sin\theta}$

25. $\theta = \dfrac{\pi}{4}$

For each rectangular equation, write an equivalent polar equation. Solve each equation for *r*.

26. $x = 4$

27. $y = -6$

28. $x^2 + y^2 = 49$

29. $(x+2)^2 + y^2 = 4$

For each polar equation do the following (use a graphing calculator):
- **Sketch the graph, making sure that important points (tips of petals or loops, intercepts, etc.) are graphed accurately.**
- **Identify the shape of the graph (rose, circle, line, limacon, etc).**

30. $r = -4$

31. $r = 2 + 5\sin\theta$

32. $r = 8\sin(3\theta)$

33. $r^2 = 16\cos(2\theta)$

For each polar equation do the following (use a graphing calculator):
- **Sketch the graph, making sure that important points (tips of petals or loops, intercepts, etc.) are graphed accurately.**
- **Identify the shape of the graph (rose, circle, line, limacon, etc).**

34. $r = 3 - 3\sin\theta$

35. $r = -5\cos\theta$

36. $r = 6\cos(2\theta)$

37. $r = 3 - 2\cos\theta$

38. $\theta = 3\pi/4$