Precalculus Worksheet #3 Unit 8 page 1 _____

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 $0 \leq \theta < 360°$. Where appropriate, round to three significant digits. Show your work.

1. (0, 5) _____ _____

2. (-2, 0) _____ _____

3. (3, 3) _____ _____

4. (-4, -4) _____ _____

5. (6, -8) _____ _____

6. (-12, 5) _____ _____

7. (3, 1) _____ _____

8. (2, -5) _____ _____

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

9. (2, 270°) _____

10. (8, 60°) _____

11. (6, 180°) _____

12. (3, 150°) _____

13. (-7, 45°) _____

14. (-8, 300°) _____

15. (1.414, 225°) _____

16. (10, 170°) _____

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Convert each of the following equations to polar form.

17. $x^2 + y^2 = 36$

18. $y = -x$

19. $x = 4$

20. $y = 2$

Convert each of the following polar equations to rectangular form.

21. $\theta = 2\pi/3$

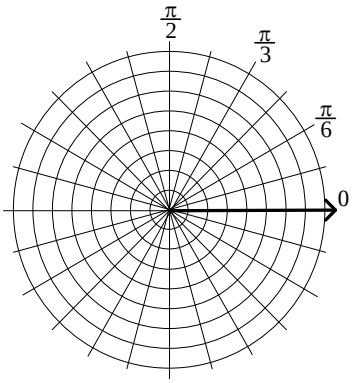
22. $r = 2$

23. $r = 4\cos\theta$

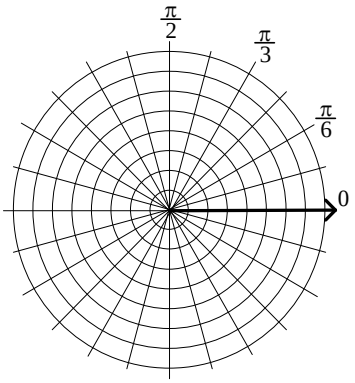
24. $r = 4\csc\theta$

Graph each of the following equations.

25. $r = 5$



26. $\theta = 2\pi/3$



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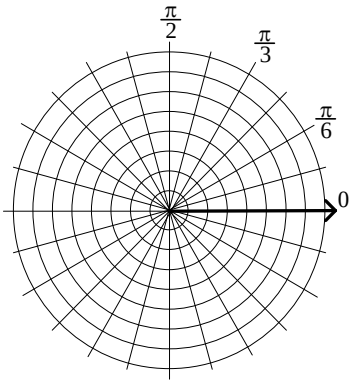
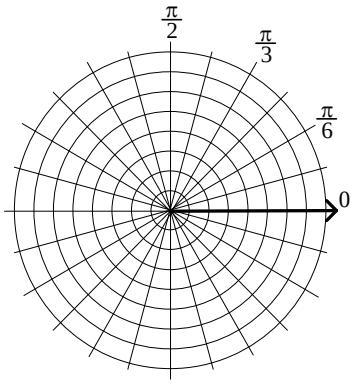
Graph each of the following equations.

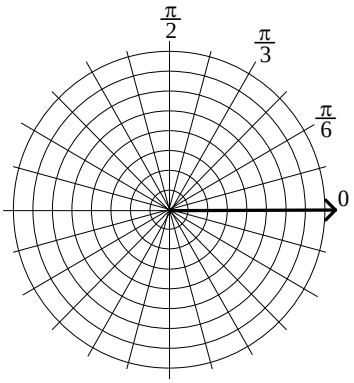
27. $r = 6\cos\theta$



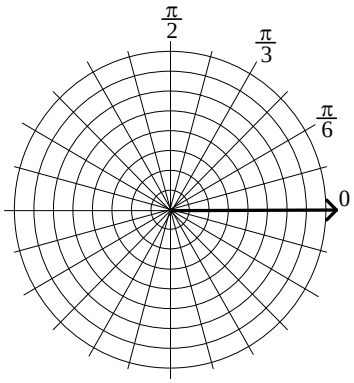
28. $r = 3 + 3\cos\theta$



29. $r = 3\cos 2\theta$



30. $r = 4\sin 3\theta$



Precalculus Worksheet #3 Unit 8 page 4

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.

31. $r = \dfrac{4}{1 - \cos\theta}$

32. $r = \dfrac{6}{3 + 2\sin\theta}$

33. $r = \dfrac{5}{2 + 4\cos\theta}$

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 $t \geq 0$.

34. $x = 2t$
$y = t + 1$

35. $x = 3\cos t$
$y = 5\sin t$