

### Assignment 9-3

Without using a calculator, graph the following polar curves and find the points of intersection.

1.  $r = 1 + \sin \theta$  and  $r = 1 - \sin \theta$

2.  $r = 1 + \sin \theta$  and  $r = 1 - \cos \theta$

3. Use a calculator to graph the following curves. Then find the points of intersection.

$r = 6 - 8 \sin \theta$  and  $r = 2$

Graph the following polar curves without using a calculator. Set up a definite integral for the area of the indicated region. Use a calculator to evaluate the integral.

4. the interior of  $r = 1 - \cos \theta$

5. one petal of  $r = 4 \sin(3\theta)$

6. one petal of  $r = 3 \cos(2\theta)$

7. the common interior of  $r = 3 - 2 \cos \theta$  and

$r = -3 + 2 \cos \theta$

Use a calculator to graph the following curves. Set up a definite integral for the area of the indicated region. Use a calculator to evaluate the integral.

8. between the loops of  $r = 1 + 2 \sin \theta$

9. inside  $r = 3 \cos \theta$  and outside  $r = 2 - \cos \theta$

10. common interior of  $r = 3$  and

11. region bounded by  $r = \theta + \sin(3\theta)$  and

$r = 6 \sin(2\theta)$

the  $x$ -axis for  $0 \leq \theta \leq \pi$

12. Given the parametric equations  $x = 4t - 1$  and  $y = 8t - 4$ , eliminate the parameter to write the corresponding rectangular equation. Sketch the curve indicating the orientation without using a calculator.

13. Without using a calculator given the parametric equations  $x = 3t + 5$  and  $y = 8t^2 + 4$ , find an equation of the line tangent to the curve when  $x = 2$ .

14. Without using a calculator given the parametric equations  $x = 4 \cos \theta$  and  $y = 8 \sin \theta$ , determine the concavity on an interval containing  $\theta = \frac{7\pi}{6}$ .

15. Given the parametric equations  $x = 2 + 2 \cos \theta$  and  $y = 1 + \sin \theta$ , show work to determine the points of horizontal and vertical tangency. Graph with a calculator to see if your answers appear correct.

16. Without a calculator convert the polar point  $\left(3, \frac{3\pi}{2}\right)$  to rectangular form.

17. Without a calculator convert the polar point  $\left(4, \frac{2\pi}{3}\right)$  to rectangular form.

18. Without a calculator convert the rectangular point  $(-5, -5)$  to polar form. Give two answers such that  $0 \leq \theta < 2\pi$ .

19. Using a calculator convert the rectangular point  $(-1.372, 5.164)$  to polar form. Give two answers such that  $0 \leq \theta < 2\pi$ .