AP Calculus BC – Unit 8 Part 2 Required Practice **Name: _____**

8.4 – Required Practice

#1. Sketch $r = 4\cos\theta$

Convert from rectangular to polar form and sketch:

#2. $x^2 + y^2 = 16$

#3. $x^2 - y^2 = 9$

Convert from rectangular to polar form and sketch:

#4. $x^2 + y^2 - 4x = 0$

#5. $x = 5$

Convert from polar to rectangular form and sketch:

#6. $r = 2$

#7. $r = 8\sin\theta$

Convert from polar to rectangular form and sketch:

#8. $\theta = \frac{5\pi}{6}$

#9. $r = 2\csc\theta$

#10. $r = \cot\theta\csc\theta$

Examples...Find the intersection points of the curves:

#11. $r = 3(1+\sin\theta)$

$r = 3(1-\sin\theta)$

#12. $r = 4\sin\theta$

$r = 2$

Plot the (r,θ) polar coordinate and find the corresponding rectangular (x,y) coordinate.

#13. $\left(8,\frac{\pi}{2}\right)$

#14. $\left(-2,\frac{5\pi}{3}\right)$

The rectangular (x,y) coordinate is given. Plot the coordinate, the find two sets of polar coordinates for the same location with $0\le\theta<2\pi$

#15. $(2,2)$

#16. $(-3,4)$

Convert the rectangular equation to polar form and sketch its graph.

#17. $x^2+y^2=9$

#18. $x^2-y^2=9$

#19. $y=8$

#20. $3x-y+2=0$

#21. $y^2=9x$

Convert the polar equation to rectangular form and sketch its graph.

#22. $r = 4$

#23. $r = 3\sin(\theta)$

#24. $r = \theta$

Find the points of intersection of the graphs of the equations

#25. $r = 1 + \cos(\theta)$
$r = 1 - \cos(\theta)$

#26. $r = 4 - 5\sin(\theta)$
$r = 3\sin(\theta)$

8.5 – Required Practice

#1. Find the points of horizontal and vertical tangency to the polar curve $r = 4\sin\theta$ and find the equation of the tangent line at $\theta = \frac{\pi}{3}$

#2. Find the arc length of the top half of the cardioid $r = 2 - 2\cos\theta$

#3. Find the arc length of the curve $r = 2\sin(3\theta)$

Find the points of vertical and horizontal tangency (if any) to the polar curve.

#4. $r = 1 - \sin(\theta)$

Find the arc length.

#5. $r = 2\theta, \quad 0 \le \theta \le 2\pi$

#6. One petal of $r = 4\cos(3\theta)$

8.6 – Required Practice

#1. Find the area in the interior of $r = 3\cos\theta$

#2. Find the area in the inner loop of $r = 1 + 2\sin\theta$

#3. Find the area inside $r = 3\sin\theta$ and outside $r = 1 + \sin\theta$

#4. Find the common interior area of $r = 2\cos\theta$ *and* $r = 2\sin\theta$

Write (and evaluate with calculator) an integral that represents the indicated area.

#5. *interior of* $r = 4\sin(\theta)$

#6. *interior of* $r = 3\cos(\theta)$

#7. *one petal of* $r = \sin(2\theta)$

#8. *inner loop of* $r = 1 + 2\cos(\theta)$

Write (and evaluate with calculator) an integral that represents the indicated area.

#9. *inside* $r = 2\cos(\theta)$ *and outside* $r = 1$

#10. *common interior of* $r = 4\sin(\theta)$ *and* $r = 2$

Unit 8 Part 2 Test Review

Convert the equation to polar form and sketch the curve:

#1. $9x^2 + 9y^2 = 18y$

#2. $y = 3$

#3. $y = x^2$

Convert the equation to rectangular form and sketch the curve:

#4. $r = 3$

#5. $r + 6\cos\theta - 2\sin\theta = \dfrac{6}{r}$

#6. $r = 8\sin\theta$

#7. $r = \cot\theta\csc\theta$

#8. $\theta = \dfrac{\pi}{3}$

Graph the polar equation curve and find an interval for which the graph is traced only once:

#9. $r = 4 - 3\cos\theta$

#10. $r = 5$

#11. $r = 4\cos(3\theta)$

For which values of θ do the following curves intersect?

#12. $r = 5 + 4\sin\theta, \quad r = 3$

#13. $r = 4\cos\theta, \quad r = 8\cos\theta$

#14. $r = 5(1 - \cos\theta), \quad r = 5(1 + \cos\theta)$

#15. $r = -4\sin\theta, \quad r = 2$

Find the area described (use calculator to evaluate):

#16. One petal of $r = 4\sin(2\theta)$

#17. The inner loop of $r = 2 - 4\cos\theta$

#18. The area within both polar curves: $r = 5 + 4\sin\theta, \quad r = 3$

Find the area described (use calculator to evaluate):

#19. The area between the polar curves: $r = 5 + 4\sin\theta, \quad r = 3$ (the area at top, with most positive y)

#20. The area between the polar curves and below the x-axis: $r = 4\cos\theta, \quad r = 8\cos\theta$

Find the arc length of the curve (evaluate the integrals by hand):

#21. The part of the cardioid $r = 3 - 3\cos\theta$ which is below the x-axis.

#22. The portion of $r = 4\sin(\theta)$ with positive x values.