Cuyamaca College
Math 280

Name:_____
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Practice Exam 2

6. Find the volume of the solid obtained by rotating the region bounded by the given curves about the y-axis.

$$y = \ln x,\ y = 1,\ y = 2,\ x = 0$$

7. Find the volume of the solid generated by rotating the region bounded by the given curves about the y-axis.

$$y = e^{-x^2},\ y = 0,\ x = 0,\ x = 1$$

8. a) Find the points on the curve where the tangent line is horizontal or vertical.

$r = 1 - \cos(\theta)$

9. Find the area inside one leaf of the curve.

$r = \cos(3\theta)$

10. Find the slope of the tangent line.

$$r = \cos 3\theta, \qquad \theta = \frac{\pi}{4}$$

11. a) Setup the integral for the arc length of the curve $y = \sin x$ between the points (0, 0) and (π, 0). Use your calculator to evaluate the integral.

b) Setup the integral for the arc length of the parametric curve. Use your calculator to evaluate it.

$x = e^t \qquad y = t^3 \qquad 0 \le t \le 4$

c) Setup the integral for the arc length of the polar curve. Use your calculator to evaluate it.

$r = 1 + \cos\theta, \quad 0 \le \theta \le 2\pi$

12) Find the area inside the region bounded by the parametric curve and the y-axis.

$$x = t^2 - 4$$

$$y = 2t + 5$$

14. Sketch the parametric curve and eliminate the parameter to find the Cartesian equation of the curve.

$x = \cos t \qquad y = \sec t \qquad 0 \le t \le \pi / 2$

15. Find the points on the curve where the tangent is horizontal.

$x = 13(\cos t - \cos^2 t) \qquad y = 13(\sin t - \sin t \cos t)$

16. Find an equation of the line tangent to the curve at the point corresponding to the value of the parameter.

$x = e^t$ $\quad y = 9 - 8t^2$ $\quad t = 1$

Solutions:

6. $\frac{\pi e^4}{2} - \frac{\pi e^2}{2}$

7. $\pi - \frac{\pi}{e}$

8. Horizontal: $\theta = 2\pi/3,\ 4\pi/3$
   Vertical: $\theta = \pi,\ \pi/3,\ 5\pi/3$
   Undefined slope: $\theta = 0$

9. $\pi/12$

10. m=2

11. $a) \int_0^{\pi} \sqrt{1+\cos^2 x}\, dx = 3.81941$

b) $\int_0^4 \sqrt{\left(e^t\right)^2 + \left(3t^2\right)^2}\, dt = 84.03$

c) $\int_0^{2\pi} \sqrt{\sin^2\theta + (1+\cos\theta)^2}\, d\theta = 8.89$

12. 64/3

14. $y = 1/x$

15. $t = 2\pi/3, 4\pi/3$, giving the points $\left(-\frac{39}{4}, -\frac{39\sqrt{3}}{4}\right)$ and $\left(-\frac{39}{4}, \frac{39\sqrt{3}}{4}\right)$

16. $y = \frac{-16}{e}(x-e)+1$