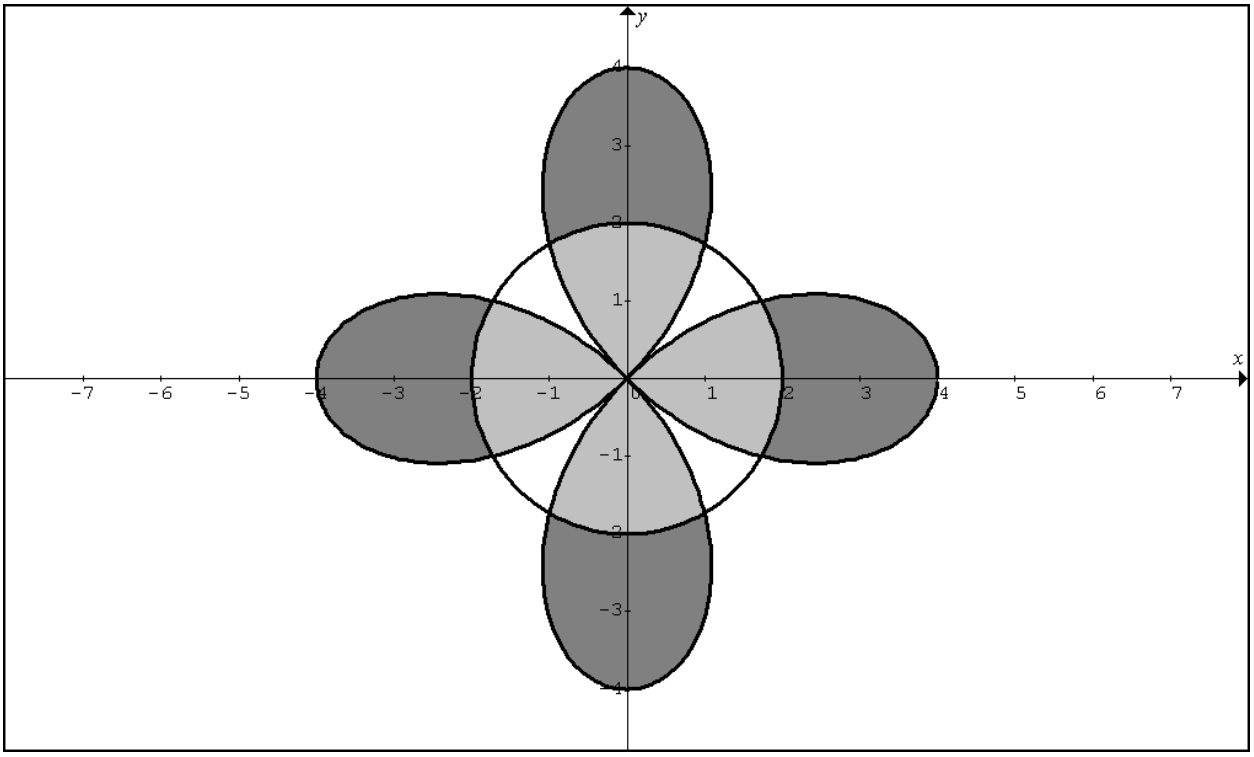
BC: Q403 CHAPTER 10 – LESSON 4 (REVIEW)

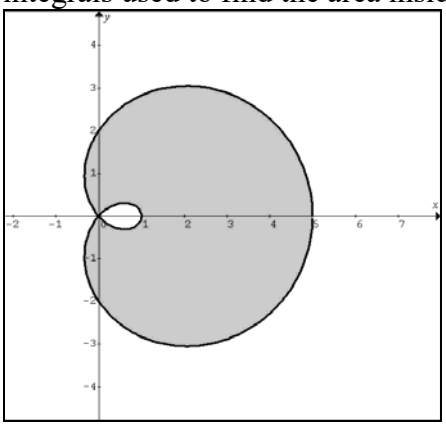


1. The diagram above shows the graphs of $r = 4\cos(2\theta)$ and $r = 2$. Set up, but do not evaluate, an expression involving one or more integrals, used to find the area of the light shaded region.

2. Revisit HW #47 Find the area within one loop of $r^2 = 4\cos(2\theta)$ (special case problem)

3. Text Problem #48. Find the area inside the curve $r^2 = 2\sin(3\theta)$. (special case problem)

4. Consider $r = 3\cos(\theta) + 2$. Set up, but do not evaluate, an expression involving one or more integrals used to find the area inside the large loop but outside the small loop. (Special case problem)



CHAPTER 10 [THE BASICS] REVIEW

1(NC). A curve is parametrized by $x = t^2 + 5$ and $y = e^{2t}$.

A. Find $\frac{dy}{dx}$ B. Find $\frac{d^2y}{dx^2}$

2(NC). Find the length of the curve parametrized by $x = \frac{1}{6}(4t+1)^{3/2}$ and $y = t^2$ on $1 \le t \le 5$.

3(Calc). A curve is generated by $x = 12t$ and $y = \frac{t^2}{2} + 4$ on $5 \le t \le 9$. Find the area of the surface generated by revolving the curve about the *y*-axis.

7. The position vector of a particle in the plane is given by $\vec{\mathbf{r}}(t) = [\ln(t+2)]\mathbf{i} + [t^2 - 2]\mathbf{j}$ on $-2 < t \le 2$

A(Calc). Draw the graph of the particle.
B(NC). Find the velocity and acceleration vectors.

8(NC). Solve the initial value problem for **r** as a vector function of *t*.
$\frac{dr}{dt} = \langle 3e^{3t}, 2t \rangle, \vec{\mathbf{r}}(0) = \langle 1, -4 \rangle$.

9(Calc). At time *t* = 1, a particle starts has the position (1,2) and continues to moves along a curve C. The velocity of a particle moving along the curve C is given by:
$\vec{v}(t) = \langle \ln\sqrt{t}, -\cos(e^t) \rangle$. Find the position of the particle at time *t* = 3.1.

12(Calc). Graph the polar curve given by $r = 1 + 2\cos(2\theta)$.

13(NC). Suppose a polar graph is symmetric about the x-axis and contains the point $\left(4, \frac{\pi}{6}\right)$.
Which of the following identifies another point that must be on the graph?
I. $\left(4, -\frac{\pi}{6}\right)$ II. $\left(4, \frac{5\pi}{6}\right)$ III. $\left(-4, \frac{5\pi}{6}\right)$
(A)I only (B)II only (C)III only (D) I and II (E) I and III

14(NC). Replace the polar equation $r = \sec^2(\theta)$ by an equivalent Cartesian equation.

15(NC). Find the slope of the polar curve $r = -2\cos(3\theta)$ at $\theta = \frac{\pi}{6}$

16(Calc). Find the area of the region enclosed by the oval limacon $r = 5 - 2\cos\theta$.

17(NC … check with Calc). Find the length of the polar curve given by $r = 5\sin^2\frac{\theta}{2}$ for $0 \le \theta \le \frac{\pi}{3}$.