

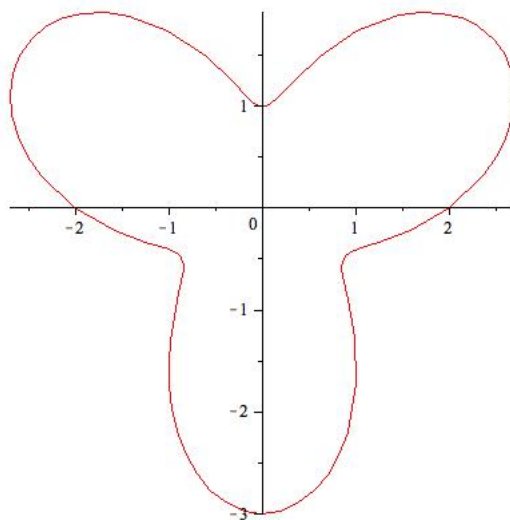
Using Green's Theorem to Find Area

This problem is too long to put on the exam (because of algebra), but it makes good practice.

The curve $\mathbf{r}(t)$, given by

$$\mathbf{r}(t) = [2 \cos t + \cos t \sin(3t)]\mathbf{i} + [2 \sin t + \sin t \sin(3t)]\mathbf{j}$$

with $0 \leq t \leq 2\pi$, gives the following graph:



(This is the polar equation $r = 2 + \sin(3\theta)$.)

Use Green's Theorem to find the area enclosed by the curve.