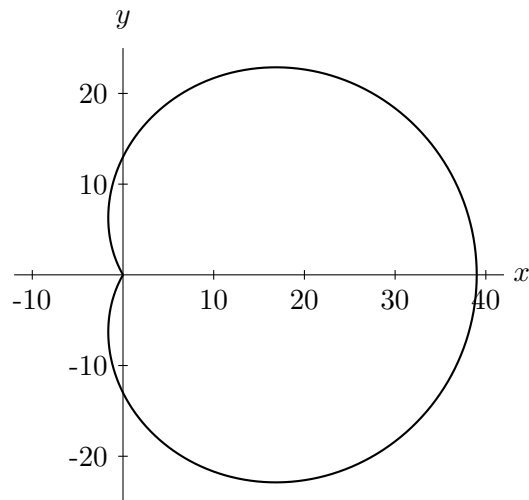


2. [6 points] Your friend the goliath frog is going to decorate the boundary of his lily pad with a string of tiny flowers. The boundary of the lily pad is given by a portion of the curve $r = 13 + 26 \cos(\theta)$ where r is measured in inches and θ is measured in radians. The part of the curve that traces out the lily pad is shown below in the xy -plane.



If the goliath frog is going to decorate only the part of the boundary of the lily pad for which $x \leq 0$, write an expression involving integrals for the length of the string of flowers required. Do not evaluate your integral.

3. [4 points] We can approximate the value of $\ln(1.5)$ by using the fact that $y = \ln(x)$ solves the differential equation

$$\frac{dy}{dx} = \frac{1}{x}$$

Approximate $\ln(1.5)$ by using Euler's method for the differential equation above with initial condition $y(1) = 0$ and with $\Delta x = 0.25$. Fill in the table with the y -values obtained at each step.

x	y
1.00	
1.25	
1.50	

Thus, $\ln(1.5) \approx$ _____