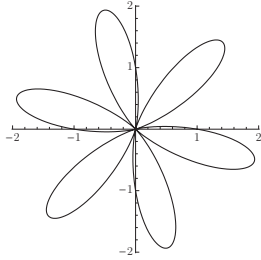


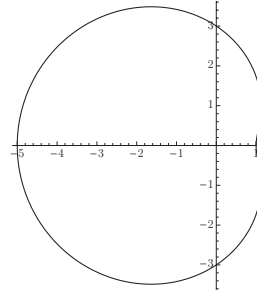
Show all relevant work!

1. Find a reasonable polar equation for each of the graphs below.

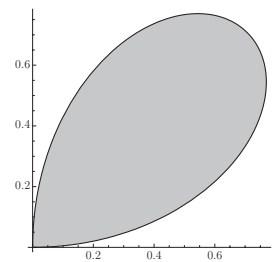
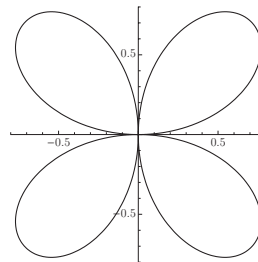
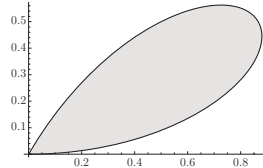
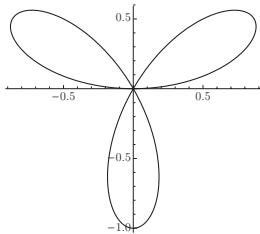
(a)



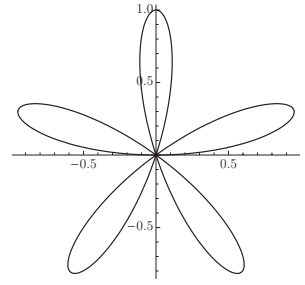
(b)



2. Which contains a greater area, one petal of $r = \sin(3\theta)$ or one petal of $r = \sin(2\theta)$? By what percent? Show your setups to support your assertion.



3. If James wanted to make the shape $r = \sin(5\theta)$ out of wire, how much wire would he need? Assume the grid is in centimeters.



4. Find the area enclosed by the spiral $r = \frac{2}{\theta}$ on the interval $[\frac{\pi}{2}, 2\pi]$.

