

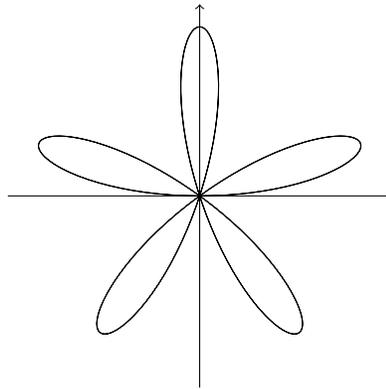
## Homework Set 9

DUE: APR 27, 2020 (1:00PM EDT VIA BLACKBOARD)

**To be handed in:**

*Please write your solution to Problems 1 and 2 on a single sheet of paper!*

1. Find the area inside **one petal** of the 5-petal rose curve  $r(\theta) = \sin(5\theta)$  below.



*Hint: Begin by parametrizing one petal of the above curve in polar coordinates as  $\alpha \leq \theta \leq \beta$ ,  $g_1(\theta) \leq r \leq g_2(\theta)$ . In order to find  $\alpha$  and  $\beta$ , look for the zeroes of  $r(\theta)$ .*

2. Find the volume of the region  $R$  in 3-dimensional space bounded between the paraboloid  $z = 8 - 2x^2 - 2y^2$  and the  $xy$ -plane.

*Hint: Begin by sketching the region  $R$  to set up a definite integral, and use polar coordinates to compute it.*

NOT to be handed in (but recommended for you to practice with):

3. Textbook (5th edition) Section 14.3, Exercises 9-12, 17-19, 29-31
4. Textbook (5th edition) Section 14.6, Exercises 13-17, 23-25, 27-31