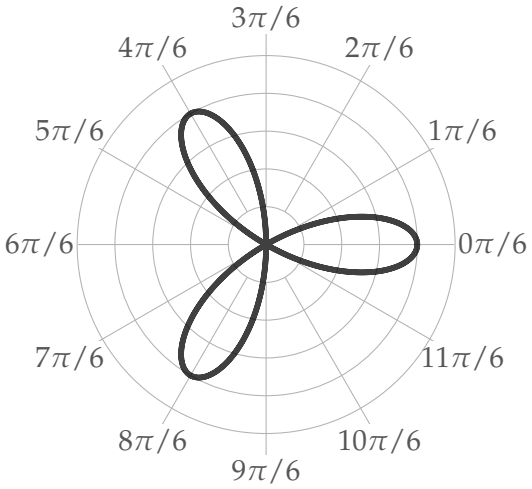
Math 241 Quiz 3

Names: _____

1. Let R be the region in enclosed by the rightmost petal of the polar graph of $r = \cos 3\vartheta$. Write a double integrals that give the center of mass of R. (No need to evaluate!)



2. Write integrals that give the volume of the solid bounded by $z = 0$, the plane containing the points $(1, 1, 0)$, $(-1, 0, 2)$, and $(0, -1, 3)$, and the cylinder $x^2 + y^2 = 1$. (No need to evaluate!)

3. The radius of Earth (assuming a sphere) is 6371 kilometers. The atmosphere at distance ρ from the center of Earth has a density of approximately $p_0 e^{-c\rho}$ kilograms per cubic kilometer for some constants p_0, c. Write a triple integral that gives the total mass of Earth's atmosphere. (No need to evaluate!)

4. Find the volume of the part of the unit sphere above the plane $z = 1/2$. (Evaluate it, silly!)