Math 233 - Homework 5

April 29, 2021

Name _____

Score _____

The following problems are from the suggested homework. Show all work to receive full credit. Supply explanations when necessary. This assignment is due May 6.

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1. (2 points) Reverse the order of integration and evaluate.

$$\int_{-1}^{0} \int_{-\sqrt{y+1}}^{\sqrt{y+1}} y^2 \, dx \, dy$$

2. (2 points) Find the area of the upper half of the cardioid $r = 1 + \cos\theta$.

Turn over.

3. (2 points) Convert to polar coordinates and evaluate.

$$\int_0^2 \int_{-\sqrt{4-y^2}}^{\sqrt{4-y^2}} (x^2+y^2)^2 \, dx \, dy$$

4. (2 points) Set up the triple integral that gives the volume of the solid region E above the upper half of the cone $y^2 = x^2 + z^2$ and under the plane $y = a^2$, where $a > 0$.

5. (2 points) Find the mass of the thin triangular plate lying in the xy-plane with vertices $(0, 0)$, $(0, 3)$, and $(6, 0)$ if the density at (x, y) is given by $\rho(x, y) = xy$.