

# MA 242-005 Review Problems for Test 3

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1. Rewrite the iterated integral

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

as an iterated integral with the integration in the order  $\int_*^* \int_*^* f(x, y) dx dy$ .

2. Find the volume of the solid bounded by the planes  $x = 0$ ,  $y = 0$ ,  $z = 0$ , and  $2x + y + z = 2$ . You may use either a double integral or a triple integral.
3. Set up (*but do not evaluate*) the iterated integral in *polar coordinates* needed to evaluate the double integral of  $f(x, y) = 6x^2y$  over the region in the *upper half plane* that is bounded on the outside by the circle  $x^2 + y^2 = \pi^2$  and on the inside by the spiral  $r = \theta$ .
4. Find the volume of the solid bounded by the cylinders  $x^2 + y^2 = 4$  and  $x^2 + y^2 = 9$ , the plane  $z = 0$ , and the surface  $z = x^2 + y^2$ . Use either a double integral in polar coordinates or a triple integral in cylindrical coordinates.
5. The region in the  $xy$ -plane bounded by  $y = x^2$  and  $y = 2 - x^2$  has density  $\rho(x, y) = x^2$ . Find the mass.
6. Evaluate

$$\iiint_E \frac{z}{\sqrt{x^2 + y^2 + z^2}} dV$$

where  $E$  is the region that is inside the sphere  $x^2 + y^2 + z^2 = 4$ , inside the cone  $z = \sqrt{x^2 + y^2}$ , and in the half-space  $y \geq 0$ .