

## SAMPLE EXAM 3

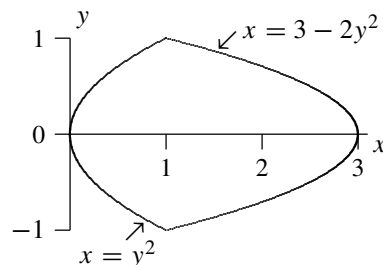
1. Compute:  $\iint_R x e^{xy} dA$ ,  $R = [0, 1] \times [0, 1]$ .

2. Compute:  $\iint_R 1/x dA$ ,  $R = \{(x, y) \mid 1 \leq y \leq e, y^2 \leq x \leq y^4\}$ .

3. Compute:  $\int_0^1 \int_{\sqrt{y}}^1 \sqrt{x^3 + 1} dx dy$ .

4. Find the volume under  $z = x^2 + y^2$  and above  $[-2, 2] \times [-3, 3]$ .

5. Set up an integral for the surface area of  $z = y^2 - x + 3$  above the region shown. Do not evaluate the integral.



6. Find the volume under  $z = xy$  and above the region inside  $r = 1 + \cos \theta$  in the first quadrant.

7. A flat plate has the shape bounded by the parabola  $y = 9 - x^2$  and the  $x$ -axis; the density is given by  $\rho(x, y) = x^2 y$ . Find the total mass and the  $y$  coordinate of the center of mass.

8. Compute:  $\int_0^2 \int_0^{\sqrt{9-x^2}} \int_0^{x^2} yz dy dz dx$ .

9. Compute:  $\iiint_R x^3 + xy^2 dV$ , where  $R$  is the three dimensional region in the first octant that is under  $z = 1 - x^2 - y^2$ .

10. Find the mass of a hemisphere of radius 1 if the density is  $\rho(x, y, z) = z$ , assuming that the sphere is centered at the origin and the hemisphere is the upper half.