SAMPLE EXAM 3

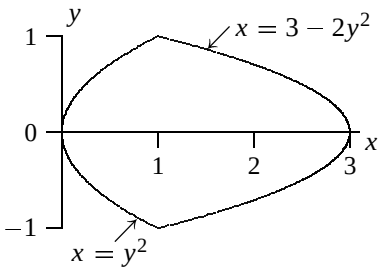
1. Compute: $\iint_R xe^{xy}\,dA$, $R = [0,1] \times [0,1]$.

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

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. Find the volume under $z = y^2 - x + 3$ and above the region shown.



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.