

Math 213, Spring 2018, Exam 3
Read Carefully, Write Neatly, Sketch Accurately

1. Evaluate $\iint_R ye^{xy} dA$, where R is the region bounded by $x = 0$, $x = \frac{1}{y}$, $y = 1$, $y = 10$.
2. Sketch the region of integration, reverse the order of integration, and evaluate the integrals.
 - a. $\int_0^8 \int_{\frac{1}{x^3}}^2 \frac{1}{y^4 + 1} dy dx$
 - b. $\int_0^{2\sqrt{\ln 3}} \int_{\frac{y}{2}}^{\sqrt{\ln 3}} e^{x^2} dx dy$
3. Sketch the region described, and find its area by evaluating an appropriate double integral.
 - a. Region bounded by $y = 1 - x$, $y = 2$, $y = e^x$.
 - b. Region bounded by $y = x - 2$, $y = -x$, $y = \sqrt{x}$.
4. Evaluate $\iint_R \frac{\ln(x^2 + y^2)}{x^2 + y^2} dA$, where R is the region between two origin-centered circles, one of radius 1, the other of radius e .
5. Sketch the solid below $z = \sqrt{x^2 + y^2}$ and above the xy -plane in the first octant, inside the cylinder $x^2 + y^2 = 1$. Compute the volume of the solid with an appropriate double integral.
6. Setup and evaluate a triple integral to find the volume of the region in the first octant bounded by the coordinate planes and the planes $x + z = 1$ and $y + 2z = 2$.
7. Sketch the region and find its volume by evaluating a triple integral in the appropriate coordinate system.
 - a. Region cut from the solid $x^2 + y^2 \leq 1$ by the sphere $x^2 + y^2 + z^2 = 4$.
 - b. The smaller region cut from the solid sphere $\rho \leq 2$ by the plane $z = 1$.