

The University of Calgary
Department of Mathematics and Statistics
MATH 353 Handout #3

1. Find the volume of the solid S : below $z = \cos \sqrt{x^2 + y^2}$ and $z = 0$ (one part only).
2. Evaluate the integral $\iint_D e^{3(x^2+y^2)} dx dy$, where $D = \{(x, y); y \geq 0, 1 \leq x^2 + y^2 \leq 4\}$.
3. Find all k for which the integral $\iint_T \frac{1}{(y-2x)^k} dA$ is convergent,
where T is the triangle with vertices $(0, 0)$, $(0, 4)$ and $(2, 4)$.
4. Evaluate $\iint_D \frac{dx dy}{\sqrt{x^2 + y^2}}$ where $D = \{x^2 + y^2 \leq 2, x \geq 1, y \geq 0\}$.
5. Evaluate the integral $\iint_D \frac{x \sin \pi (x^2 + y^2)}{\sqrt{x^2 + y^2}} dx dy$, where $D = \{(x, y); y \geq x \geq 0, x^2 + y^2 \leq 1\}$.
6. Evaluate the integral $\iint_D e^{-x^2 y} dA$ if it is convergent, where $D = \{(x, y); x \geq 1; 0 \leq y \leq \frac{1}{x^2}\}$.
7. Set up the integral $\iint_D (x^2 + y^2) dx dy$ where $D = \{(x, y); y \geq 1, x^2 + y^2 \leq 2\}$
as iterated integrals in both
 - (a) cartesian coordinates,
 - (b) and polar coordinates, and then evaluate (only once).
8. Evaluate the integral $\iint_D e^{-x-y} dA$ if it is convergent, where $D = \{(x, y); x \geq 1; 0 \leq y \leq x\}$.
9. Set up the integral $\iint_D \frac{1}{(x^2 + y^2)^2} dx dy$ where $D = \{(x, y); x + y \geq 1, x^2 + y^2 \leq 1\}$
as iterated integrals in both
 - (a) cartesian coordinates,
 - (b) and polar coordinates,and then evaluate (only once).
10. Evaluate the integral $\iint_D \frac{1 + \ln x}{y} dA$ if it is convergent,
where $D = \{(x, y); 0 \leq x \leq e^y; 0 \leq y \leq 1\}$.