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 $\int\int_D e^{3(x^2+y^2)}dxdy$,where $D = \{(x,y); y \geq 0, 1 \leq x^2+y^2 \leq 4\}$.
3. Find all k for which the integral $\int\int_T \frac{1}{(y-2x)^k}\, dA$ is convergent, where T is the triangle with vertices $(0,0), (0,4)$ and $(2,4)$.
4. Evaluate $\int\int_D \frac{dxdy}{\sqrt{x^2+y^2}}$ where $D = \{x^2+y^2 \leq 2, x \geq 1, y \geq 0\}$.
5. Evaluate the integral $\int\int_D \frac{x\sin\pi\left(x^2+y^2\right)}{\sqrt{x^2+y^2}}dxdy$,where $D = \{(x,y); y \geq x \geq 0, x^2+y^2 \leq 1\}$.
6. Evaluate the integral $\int\int_D e^{-x^2y}\, dA$ if it is convergent,where $D = \{(x,y); x \geq 1; 0 \leq y \leq \frac{1}{x^2}\}$.
7. Set up the integral $\int\int_D (x^2+y^2)dxdy$ 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 $\int\int_D e^{-x-y}\, dA$ if it is convergent,where $D = \{(x,y); x \geq 1; 0 \leq y \leq x\}$.
9. Set up the integral $\int\int_D \frac{1}{(x^2+y^2)^2}dxdy$ 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 $\int\int_D \frac{1+\ln x}{y}\, dA$ if it is convergent, where $D = \{(x, y); 0 \leq x \leq e^y; 0 \leq y \leq 1\}$.