MATH 353 Handout #3 - Winter 2010

1. Find the volume of the solid S which is below $z = \cos(\sqrt{x^2+y^2})$ and above $z = 0$, where also $x^2 + y^2 \leq (\pi/2)^2$.

2. Evaluate the integral $\iint\limits_D e^{3(x^2+y^2)}\, dx\, dy$, where $D = \{(x, y) : y \geq 0,\ 1 \leq x^2 + y^2 \leq 4\}$.

3. Find all k for which the integral $\iint\limits_T \frac{1}{(y-2x)^k}\, dx\, dy$ is convergent, where T is the triangle with vertices $(0, 0), (0, 4)$ and $(2, 4)$.

4. Evaluate $\iint\limits_D \frac{1}{\sqrt{x^2+y^2}}\, dx\, dy$, where $D = \{x^2 + y^2 \leq 2,\ x \geq 1,\ y \geq 0\}$.

5. Evaluate the integral $\iint\limits_D e^{-x^2 y}\, dA$ if it is convergent, where $D = \{(x, y) : x \geq 1,\ 0 \leq y \leq \frac{1}{x^2}\}$.

6. Evaluate the integral $\iint\limits_D \frac{1 + \ln x}{y}\, dA$ if it is convergent, where $D = \{(x, y) : 0 \leq x \leq e^y,\ 0 \leq y \leq 1\}$.

7. (14.5-8) Evaluate the triple integral $\iiint\limits_R yz^2 e^{-xyz}\, dV$ over the cube $0 \leq x, y, z \leq 1$.

8. (14.5-15) Find $\iiint\limits_T x\, dV$ where T is the tetrahedron bounded by the planes $x = 1, y = 1, z = 1$ and $x + y + z = 2$.

9. (14.5-27) Evaluate the iterated integral by reiterating it in a different order: $\int_0^1 dz \int_z^1 dx \int_0^x e^{x^3}\, dy$.