

Calc 3 - Assignment # 19

Note Title

10/26/2011

- ① Estimate the volume below $f = xy$ and above the rectangle $D = [0, 6] \times [0, 4]$ by dividing the x -interval into 4 points, the y -interval into 3 points, and taking as height the value of $f(x, y)$ at each upper-right corner. Compare your answer

with

$$\iint_D xy \, dA$$

- ② Evaluate $\iint_R 5-x \, dA$, $R = [0, 5] \times [0, 3]$

both algebraically and geometrically.

- ③ Use Fubini's Theorem to compute:

a) $\int_0^3 \int_0^1 (1+4xy) \, dx \, dy$

b) $\int_0^1 \int_1^2 (4x^3 - 9x^2y^2) \, dy \, dx$

c) $\int_0^1 \int_0^1 xy \sqrt{x^2+y^2} \, dy \, dx$

d) $\int_0^1 \int_0^1 \sqrt{s+t} \, ds \, dt$

$$c) \iint_R \frac{1+x^2}{1+y^2} dA, \quad R = [0,1] \times [0,1]$$

$$c) \iint_R \frac{x}{x^2+y^2} dA, \quad R = [1,2] \times [0,1]$$

④ Find the volume under $z = 4 + x^2 - y^2$ and above $R = [-1,1] \times [0,2]$

⑤ Find the volume of the solid enclosed by $z = (1 + e^x \sin(y))$ and the planes $x = \pm 1$, $y = 0$, $y = \pi$, and $z = 0$.

⑥ Read Fubini's Theorem carefully. Then use Maple to compute

$$\int_0^1 \int_0^1 \frac{x-y}{(x+y)^3} dy dx \quad \text{and}$$

$$\int_0^1 \int_0^1 \frac{x-y}{(x+y)^3} dx dy.$$

Explain.