

Solutions

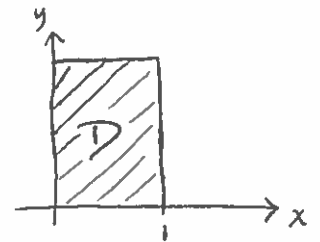
Quiz 6

Your Name (please PRINT): Caleb McWhorter
 Student ID Number: _____

1. Evaluate the integral

$$\iint_D (6xy^2 + 3x^2) dA, \quad D = \{0 \leq x \leq 1, 0 \leq y \leq 2\}$$

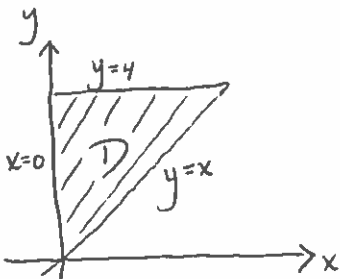
$$\begin{aligned} \iint_D (6xy^2 + 3x^2) dA &= \int_0^2 \int_0^1 (6xy^2 + 3x^2) dx dy \\ &= \int_0^2 (3x^2y^2 + x^3) \Big|_{x=0}^{x=1} dy \\ &= \int_0^2 (3y^2 + 1) dy \\ &= (y^3 + y) \Big|_0^2 \\ &= 2^3 + 2 \\ &= 10 \end{aligned}$$



*Could have also done
 $\int_0^1 \int_0^2 (6xy^2 + 3x^2) dy dx$

2. Evaluate the integral

$$\iint_D y^2 e^{xy} dA, \quad D \text{ is bounded by } y = x, y = 4, x = 0$$



$$\begin{aligned} \iint_D y^2 e^{xy} dA &= \int_0^4 \int_0^y y^2 e^{xy} dx dy \quad \left. \begin{array}{l} \text{Easier to} \\ \text{integrate} \end{array} \right\} \\ &= \int_0^4 \int_x^4 y^2 e^{xy} dy dx \end{aligned}$$

$$\int_0^4 \int_0^y y^2 e^{xy} dx dy$$

$$\int_0^4 y e^{xy} \Big|_0^y dy$$

$$\int_0^4 y e^{y^2} - y dy$$

$$\frac{e^{y^2}}{2} - \frac{y^2}{2} \Big|_0^4$$

$$\frac{e^{y^2} - y^2}{2} \Big|_0^4$$

$$\left(\frac{e^{16} - 16}{2} \right) - \left(\frac{1}{2} \right) = \frac{e^{16} - 17}{2}$$