

Homework 8

Due March 25th by 12:30pm by email to kdatchev@purdue.edu. Justify your answers. Please let me know if you have a question or find a mistake.

1. Evaluate

$$\iint_D e^y dx dy,$$

over the region $2|x| - 1 \leq y \leq 3 - 2|x|$ by using the change of variables $u = 2x + y$ and $v = 2x - y$.

2. Evaluate

$$\iint_D \sin(4x^2 + 9y^2) dx dy,$$

where D is the region given by $1 \leq 4x^2 + 9y^2 \leq 2$ and $y \geq 0$.

Hint: It may be helpful to first use a change of variables to convert the integrand to $\sin(u^2 + v^2)$ and then use polar coordinates for u and v .

3. Use cylindrical coordinates to find

$$\iiint_D x dx dy dz$$

where D is the region given by $x^2 + y^2 \leq z^2 \leq 1$ and $0 \leq y \leq x$.