

Math 241 §BL1

Problem Set 20

- (1) Find the area in the xy -plane between the curves $y = x$ and $y = 2x^2 - x$. Write this both as a double and a single integral and explain why they are the same thing.

- (2) Suppose that D is the triangular region with vertices $(0, 0)$, $(2, 4)$ and $(6, 0)$. Find

$$\iint_D ye^x dA.$$

- (3) Evaluate the following integral by reversing the order of integration:

$$\int_0^1 \int_{\sqrt{y}}^1 \sqrt{x^3 + 1} dx dy.$$

- (4) Evaluate $\int_0^1 \int_0^1 e^{\max(x^2, y^2)} dx dy$, where $\max(x^2, y^2)$ means the larger of the two numbers x^2 and y^2 .

- (5) Switch the order of integration:

$$\int_{-1}^3 \int_{-x}^{x^2} f(x, y) dy dx.$$

- (6) Suppose that R is the region between the two curves $y = x^2 + 1$ and $y = 5x - 5$.

Evaluate

$$\iint_R x dA$$

- (7) Find the volume of the solid bounded by the surfaces $z = 10 + y - x^2$, $y = x^2$, and $x = y^2$.

- (8) Find the volume of the solid lying under $z = xy$ and above the triangle in the xy -plane with vertices $(1, 2)$, $(1, 4)$ and $(5, 2)$.

2

- (9) Find the mass of a triangular lamina with vertices $(0, 0)$, $(1, 0)$ and $(0, 2)$ if the density is given by $\rho(x, y) = 1 + 3x + y$.