MATH 2130 – Tutorial Problems, Thu Mar 15

Double Integrals

Example. Let $f(x, y) = x(2 - y)^{1/3}$, and let R be the region in the xy-plane that is bounded by $y = x^2$ and $y = 2 - x$. Evaluate

$$\iint_R f(x, y)\, dA.$$

Example. Evaluate the integral

$$\int_0^1 \int_0^1 \sin(e^x)\, dx\, dy + \int_1^e \int_{\ln y}^1 \sin(e^x)\, dx\, dy$$

by first reversing the order of integration.

Example. Let $f(x, y) = x^3 y^2 \sin(xy)$, and let R be the disk $(x - 2)^2 + y^2 \leq 4$. Evaluate

$$\iint_R f(x, y)\, dA$$

by considering symmetry.

Applications of Double Integrals

Example. Let R be the region in the xy-plane that is bounded by $y = x^2$ and $y = 2 - x$. Find the volume of revolution obtained by revolving R about the line $y = 9 - 3x$.