12.3 Double Integrals over General Regions

What if we want to know the area under $f(x, y)$ under a general closed and bounded region D?

Type I and Type II

Example 1

Evaluate $\iint_D (2x + y)\, dA$ where D is the region bounded by the parabolas $y = x^2$ and $y = 2x^2 - 4$.

Example 2

Find the volume under the paraboloid $z = x^2 + y^2$ and above the region D bounded by the line $y = 2x$ and the parabola $y = x^2$.

Example 3

Evaluate $\iint_D xy\ dA$ where D is the region bounded by $y = x - 1$ and $y^2 = 2x + 6$.

Example 4

Evaluate $\int_0^1 \int_x^1 \sin(y^2)\ dy\ dx$.

Properties of Double Integrals

HW # 1, 7, 9, 11, 15, 19, 21, 33, 35, 37, 39, 45