

12.4 Double Integrals in Polar Coordinates

What if the region we want to integrate over is more easily expressed in terms of polar coordinates?

Change to Polar Coordinates in a double integral

Example 1

Evaluate $\iint_D (2x + y) dA$ where D is the region in the upper half plane bounded by the circles $x^2 + y^2 = 1$ and $x^2 + y^2 = 4$.

Example 2

Find the volume of the solid bounded by the plane $z = 0$ and the paraboloid $z = 4 - x^2 - y^2$.

Example 3

Find the volume of the solid that lies under the paraboloid $z = x^2 + y^2$ above the xy -plane, and inside the cylinder $x^2 + y^2 = 2x$.

HW # 1, 3, 5, 7, 9, 11, 15, 19, 25, 27