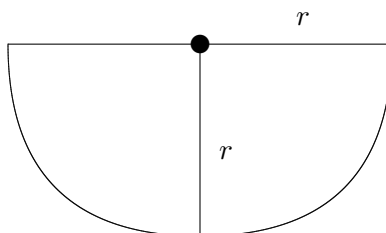


Applications of Double Integrals

Example. A trough has a semicircular cross section with radius r , as shown below.

(a) What is the force due to fluid pressure on one of the semicircular sides of the trough if it is completely filled with a fluid of constant density ρ ?

(b) What is the force due to fluid pressure on one of the semicircular sides of the trough if it is filled with the same fluid to an arbitrary depth H , $H < r$?



Example. Let R be the region in the xy -plane that is bounded by $y = x^2$ and $y = 1$. Assume that R contains a mass described by the density function $\rho(x, y) = x^2 + y$. Find the center of mass of R .

Example. Set up, but don't evaluate, an integral for the area of the surface $z = 4 - (x^2 + y^2)$ that lies above the plane $x + 3y + z = 3$.

Example. Set up and evaluate an integral for the area of that part of the surface $z = x^{3/2} + 2y^{3/2}$ that is cut off by the plane $x + 4y = 4$.