

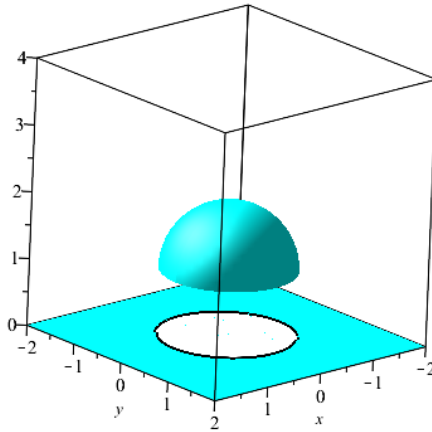
Today

- 15.3: Double Integrals over General Regions (Understand how to set up a double integral over a non-rectangular region.)
- WeBWorK

15.3: Double Integrals over General Regions

- For a function f over a non-rectangular domain R , we define a new function F by

$$F(x, y) = \begin{cases} f(x, y) & \text{if } (x, y) \in R \\ 0 & \text{if } (x, y) \notin R \end{cases}$$



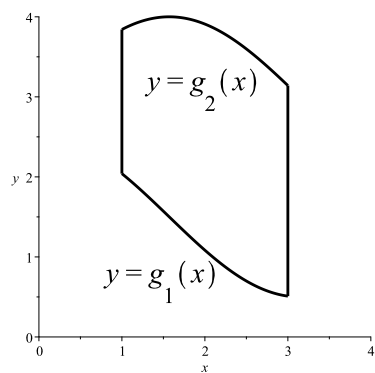
Although F is discontinuous, we can still apply Fubini's Theorem, so we get the following results:

- If f is continuous over the Type I region D lying between $y = g_1(x)$ and $y = g_2(x)$ on $[a, b]$, then

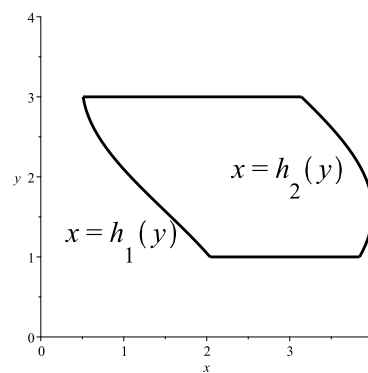
$$\iint_D f(x, y) dA = \int_a^b \int_{g_1(x)}^{g_2(x)} f(x, y) dy dx.$$

- If f is continuous over the Type II region D lying between $x = h_1(y)$ and $x = h_2(y)$ on $[c, d]$, then

$$\iint_D f(x, y) dA = \int_c^d \int_{h_1(y)}^{h_2(y)} f(x, y) dx dy.$$



Type I



Type II

4. Examples p. 972: #7, 8, 11, 14, 19, 20, 23, 31, 33, 34, 39-44[choose 2], 45-50[choose 2]

Next Time

1. Watch 15.4 [\sim 60 minutes. If you are already comfortable with polar coordinates, you can skip from 1:45 to 9:39.]
2. Homefun 9