

Section 29.4: Double Integrals

Wednesday, January 25, 2017 2:10 PM

So, what about integration of functions of two variables?

double integral:

$$\int_a^b \int_{g(x)}^{G(x)} f(x, y) dy dx$$

y runs from $g(x)$ to $G(x)$

x runs from a to b

how to deal? do inside integral first!

example: evaluate

$$\int_0^5 \int_0^{x^3} (x+y) dy dx$$

$$= \int_0^5 \left[xy + \frac{y^2}{2} \right]_0^{x^3} dx$$

$$= \int_0^5 \left[x \cdot x^3 + \frac{x^6}{2} - 0 \right] dx$$

$$= \int_0^5 \left[x \cdot x^3 + \frac{x^6}{2} - 0 \right] dx$$

$$= \int_0^5 \left(x^4 + \frac{x^6}{2} \right) dx$$

$$= \left(\frac{x^5}{5} + \frac{x^7}{14} \right) \Big|_0^5$$

$$= \frac{5^5}{5} + \frac{5^7}{14} - 0$$

$$\approx 6205,36$$