

15.5: Triple Integrals

Integration over a box

Given $f(x, y, z)$ continuous on box $B : a_x \leq x \leq b_x, a_y \leq y \leq b_y, a_z \leq z \leq b_z$

$$\iiint_B f(x, y, z) dV = \int_{a_z}^{b_z} \int_{a_y}^{b_y} \int_{a_x}^{b_x} f(x, y, z) dx dy dz$$

[Fubini's Theorem](#) applies here too.

Volume

$$V = \iiint_D dV$$

Average Value

The average value of a function F over region D in space is:

$$\text{Average Value of } F \text{ over } D = \frac{1}{\text{Volume of } D} \iiint_D F dV$$

[#module3](#) [#week8](#)