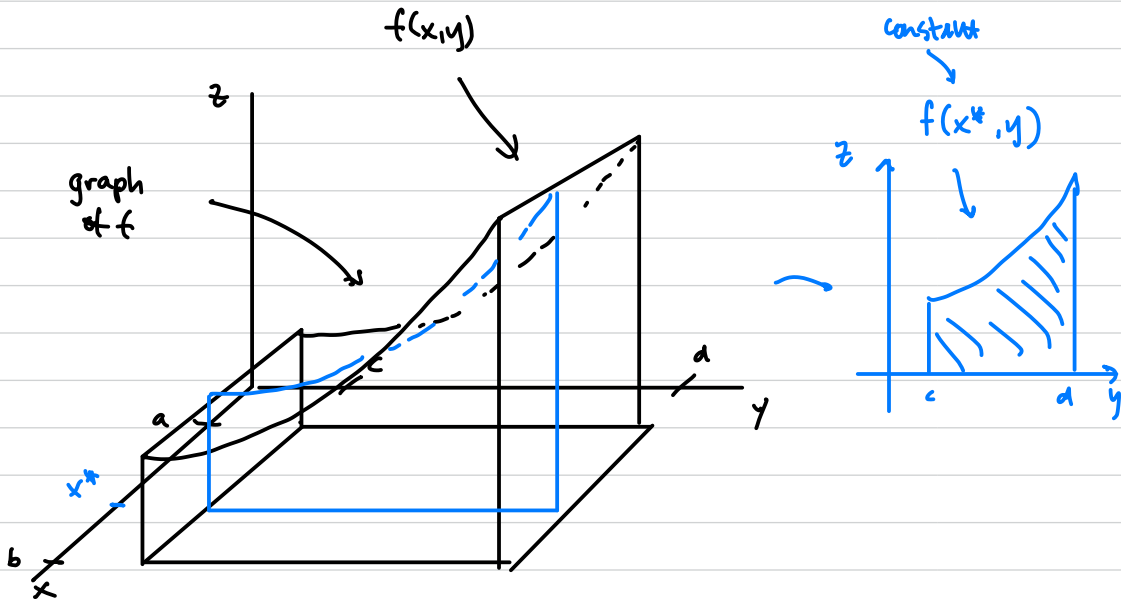


Q: How do you actually compute double integrals?

A: Iterated Integrals.



- find cross section at $x = x^*$

- then $A(x^*) = \int_c^d f(x^*, y) dy$
area cross section
↑
y-values

- total volume: $\int_a^b A(x) dx = \int_a^b \left[\underbrace{\int_c^d f(x,y) dy}_{A(x)} \right] dx$



 x-values

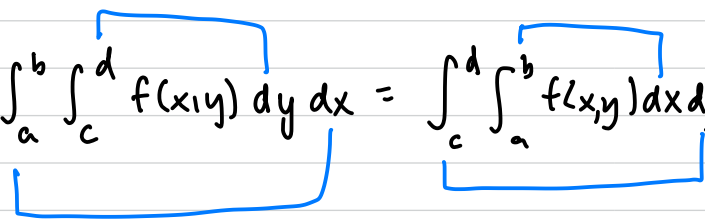
↖ This is an iterated integral.

Note: could have sliced along y-axis first instead.

Fubini's Thm: If f is continuous on $R = [a, b] \times [c, d]$

then

$$\iint_R f(x,y) dA = \int_a^b \int_c^d f(x,y) dy dx = \int_c^d \int_a^b f(x,y) dx dy.$$



defn --- limit
of Riemann
sums/

sums of volumes