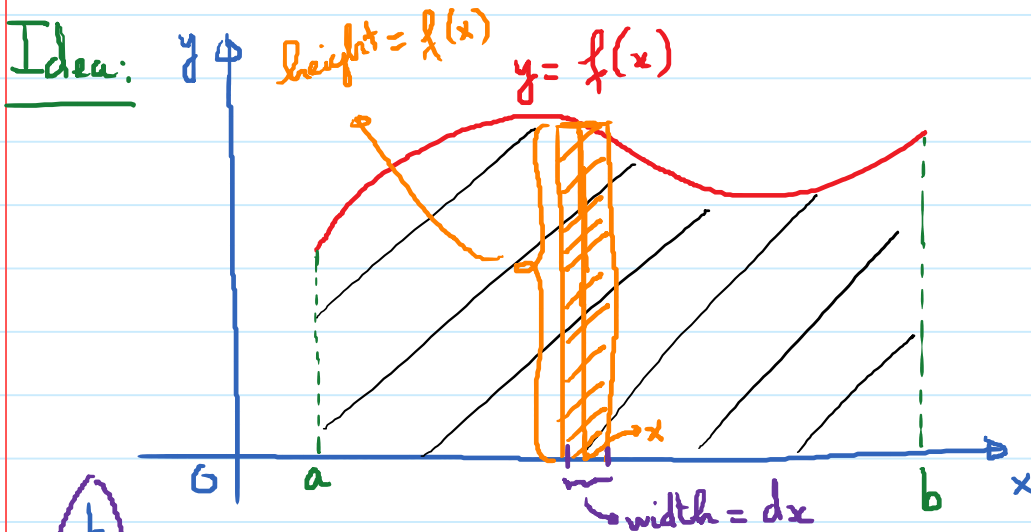


6.1. Areas between Curves

Monday, April 29, 2019

9:11 AM



$\int_a^b f(x) dx$ = Area under the graph of $y = f(x)$; $a \leq x \leq b$

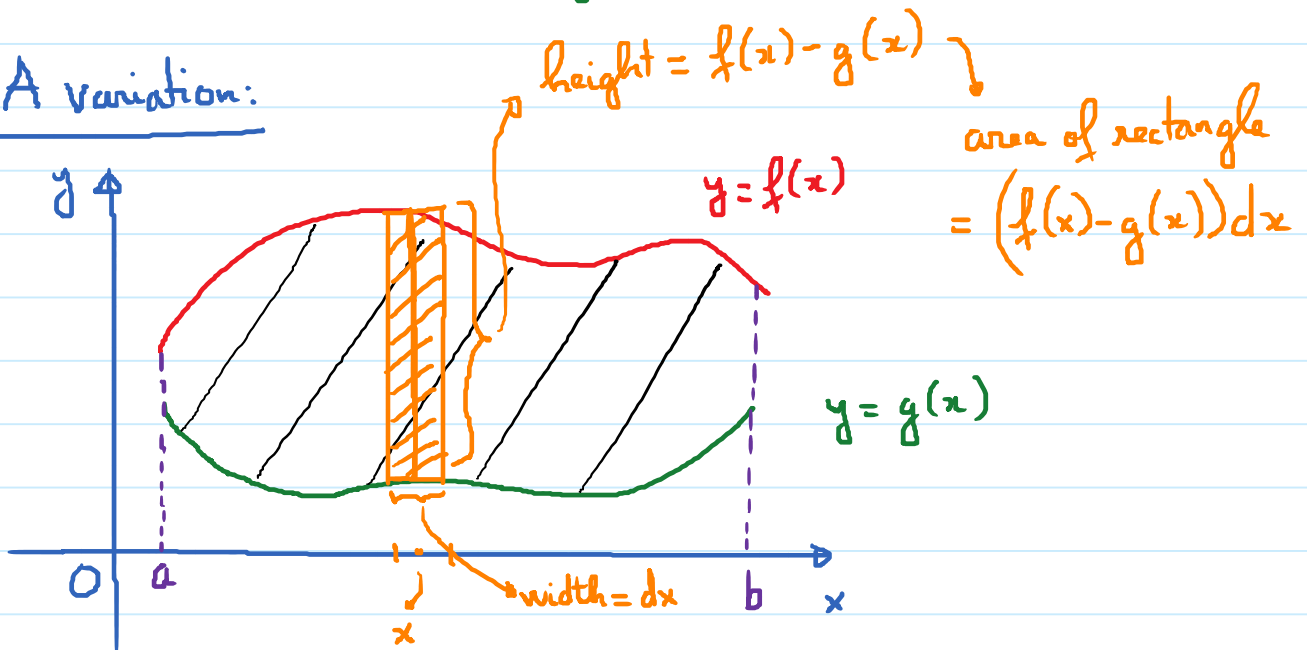
Sum

area of a "small" rectangle

width

height

A variation:

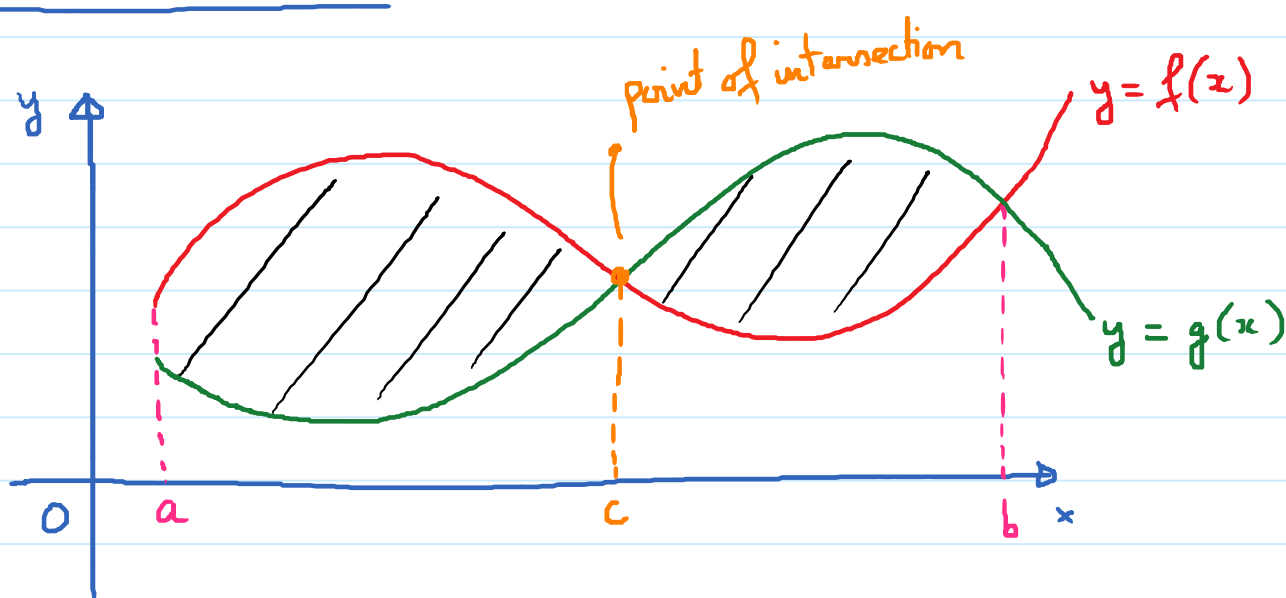


Find the area bounded by the graphs of $y = f(x)$ and $y = g(x)$; $a \leq x \leq b$. Call the area A .

$$A = \int_a^b (f(x) - g(x)) dx$$

Note: Area bounded by 2 functions = $\int (\text{top} - \text{bottom})$

Another variation:



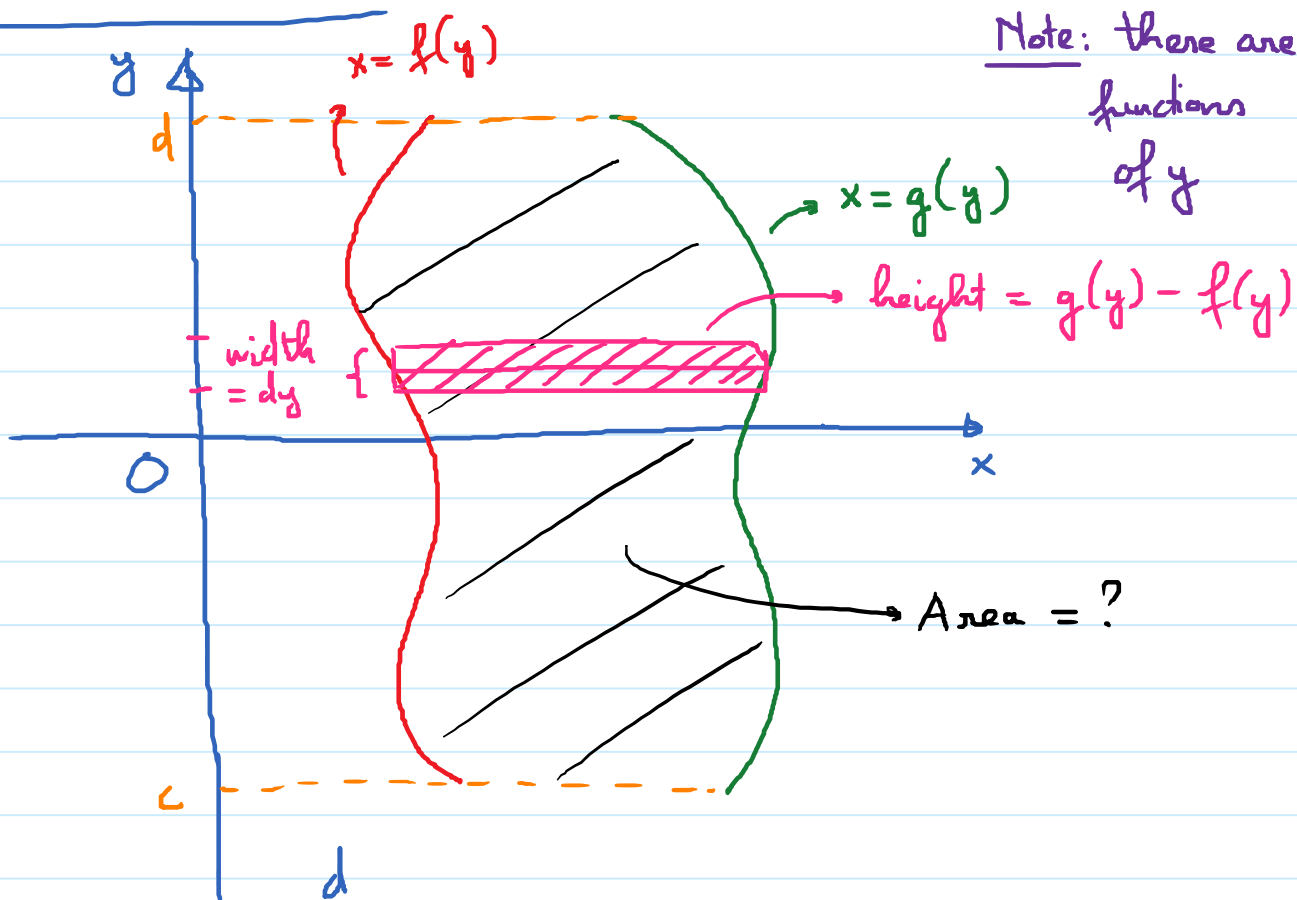
Find area bounded by $y = f(x)$ and $y = g(x)$; $a \leq x \leq b$

Step 1: Find point(s) of intersection between $y = f(x)$ and $y = g(x)$ by setting $f(x) = g(x)$ and solve for x .

Step 2: Find the area by splitting it up into integrals:

$$A = \int_a^c \underbrace{(f(x) - g(x))}_{\substack{\text{top} \\ \text{bottom} \\ \text{on } [a, c]}} dx + \int_c^b \underbrace{(g(x) - f(x))}_{\substack{\text{top} \\ \text{bottom} \\ \text{on } [c, b]}} dx$$

Another variation:



$$\text{Area} = \int_c^d \underbrace{(g(y) - f(y))}_{\substack{\text{right} \\ \text{left}}} dy$$