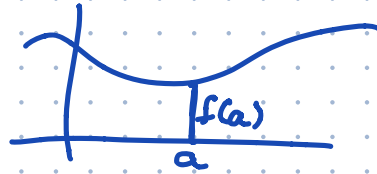


Integration Theorems

$$\int_a^a f(x) dx = 0$$



$$A = f(a) \cdot (a-a) \\ = f(a) \cdot 0 \\ = 0$$

$$\int_a^b f(x) dx = - \int_b^a f(x) dx$$



$b-a \Rightarrow +ve$
widths

$a-b \Rightarrow -ve$
widths

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

$$\int_2^5 (x^2 + 3) dx = \int_2^5 x^2 dx + \int_2^5 3 dx$$

$$= \left[\frac{x^3}{3} \right]_2^5 + \left[3x \right]_2^5$$

$$= \underbrace{\frac{F(b) - F(a)}{3}}_{\frac{5^3}{3} - \frac{2^3}{3}} + \underbrace{(F(b) - F(a))}_{(3 \cdot 5 - 3 \cdot 2)}$$

$$= \frac{117}{3} + 9 = \frac{117+27}{3} = \frac{144}{3} = 48$$

$$\int_a^b f(x) g(x) dx \neq \int_a^b f(x) dx \int_a^b g(x) dx$$

$$(fg)' = fg' + gf'$$

$$\int \frac{f(x)}{g(x)} dx \neq \frac{\int f(x) dx}{\int g(x) dx}$$

Fallacies!