

Properties of Definite Integrals

$$\int_a^a f(x) dx = 0 \quad (\text{by definition})$$

$$\int_b^a f(x) dx = - \int_a^b f(x) dx \quad (\text{by definition})$$

$$\int_a^b kf(x) dx = k \int_a^b f(x) dx$$

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

$$\int_a^b f(x) dx = \int_a^c f(x) dx + \int_c^b f(x) dx$$

$$\int_a^b f(x) dx \geq 0, \text{ if } f(x) \geq 0 \text{ for all } x \in [a, b]$$

$$\int_a^b f(x) dx \leq \int_a^b g(x) dx, \text{ if } f(x) \leq g(x) \text{ for all } x \in [a, b]$$