

Properties of Definite Integrals

$$1. \int_a^b f(x)dx = \int_a^b f(t)dt$$

$$2. \int_a^b f(x)dx = - \int_b^a f(x)dx \text{ in particular } \int_a^a f(x)dx = 0$$

$$3. \int_a^b f(x)dx = \int_a^c f(x)dx + \int_c^b f(x)dx$$

$$4. \int_a^b f(x)dx = \int_a^b f(a+b-x)dx$$

$$5. \int_0^a f(x)dx = \int_0^a f(a-x)dx$$

$$6. \int_0^{2a} f(x)dx = \int_0^a f(x)dx + \int_0^a f(2a-x)dx$$

$$7. \int_0^{2a} f(x)dx = \begin{cases} 2 \int_0^a f(x)dx & \text{if } f(2a-x) = f(x) \\ 0 & \text{if } f(2a-x) = -f(x) \end{cases}$$

$$8. \int_{-a}^a f(x)dx = \begin{cases} 2 \int_0^a f(x)dx & \text{if } f \text{ is even function} \\ 0 & \text{if } f \text{ is odd function} \end{cases}$$

Even function if $f(-x) = f(x)$ and odd function if $f(-x) = -f(x)$

