Net Area under the curve:

$$\boxed{A = \lim_{\substack{n \to \infty \\ (\Delta x \to 0)}} \sum_{k=1}^{n} f(x_k)\,\Delta x = \int_a^b f(x)\,dx = F(b) - F(a)}$$

Не забывай

Ch. 5.3.

Fundamental theorem of Calculus:

$f(x)$ - continuous on $[a, b]$

$A(x) = \int_a^x f(t)\,dt$ - area function

1) $\boxed{A'(x) = \frac{d}{dx}\int_a^x f(t)\,dt = f(x)}$

2) $\boxed{\int_a^b f(x)\,dx = F(b) - F(a)}$

Ch 5.4

$\boxed{\bar{f} = \frac{1}{b-a}\int_a^b f(x)\,dx}$ - average value of an integrable function

if f is continuous on $[a, b]$:

$\boxed{f(c) = \bar{f} = \frac{1}{b-a}\int_a^b f(t)\,dt}$ - Mean value theorem for integrals

5.5. Substitution rule (reverse chain rule)

If $u = g(x)$ - differentiable function, whose range is Interval I and f is continuous on I, then:

$$\boxed{\int f(g(x)) \cdot g'(x)\,dx = \int f(u)\,du}$$

Method:

1) identify inner function $u = g(x)$, such that a constant multiple of $g'(x)$ appears in the integrand
2) set $u = g(x)$, $du = g'(x)$
3) evaluate integral with respect to u
4) write results ~~in~~ using $u = g(x)$

definite integrals:

$$\boxed{\int_a^b f(g(x))\,g'(x)\,dx = \int_{g(a)}^{g(b)} f(u)\,du}$$

→ one-trip method

→ round-trip method

alloha

Hawaii !!