DEFINITE INTEGRAL

REGULAR PARTITION

REGULAR PARTITION

Regular Partition of [a, b]

$$\Delta x = \frac{b-a}{n}$$

$$x_i = a + i\Delta x$$

$$I_i = [x_{i-1}, x_i]$$

EXAMPLE

Let $[a, b] = [2, 5]$ and let $n = 3$

APPROXIMATING SUMS

MIN/MAX

$$m_i = \min\{f(x) : x \in I_i\}$$
$$M_i = \max\{f(x) : x \in I_i\}$$

EXAMPLE

| $f(x) = x + 4$ |
| $x \in [2, 5]$ |
| $n = 3$ |

MIN/MAX SUM

$$m_f(n) = (m_1 + \cdots + m_n)\Delta x$$
$$M_f(n) = (M_1 + \cdots + M_n)\Delta x$$

EXAMPLE

$$f(x) = x + 4$$

$$x \in [2, 5]$$

$$n = 3$$

DEFINITE INTEGRAL

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DEFINITION

For f continuous, the definite integral is

$$\int_a^b f(x)dx = \lim_{n \to \infty} m_f(n) = \lim_{n \to \infty} M_f(n)$$

EXAMPLE

$$\int_0^1 x dx = \frac{1}{2}$$