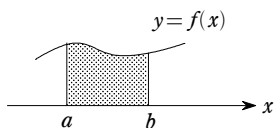


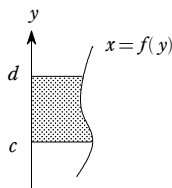
# 積分法 (公式)

## 面積

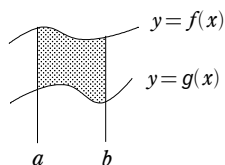
$$S = \int_a^b f(x) dx$$



$$S = \int_c^d f(y) dy$$



$$S = \int_a^b \{f(x) - g(x)\} dx$$



## 積分の性質

$$\int_{\bigcirc}^{\triangle} \text{数} \bullet dx = \text{数} \int_{\bigcirc}^{\triangle} \bullet dx$$

例

$$\int_0^1 2dx = 2 \int_0^1 dx = 2 \left[ x \right]_0^1 = 2$$

$$\int_{\bigcirc}^{\triangle} \bullet dx + \int_{\bigcirc}^{\triangle} \blacktriangle dx = \int_{\bigcirc}^{\triangle} (\bullet + \blacktriangle) dx$$

$$\int_{\bigcirc}^{\triangle} \bullet dx - \int_{\bigcirc}^{\triangle} \blacktriangle dx = \int_{\bigcirc}^{\triangle} (\bullet - \blacktriangle) dx$$

例

$$\begin{aligned} & \int_0^1 (-x^2 + 3x) dx - \int_0^1 (2x^2 - x) dx \\ &= \int_0^1 (-3x^2 + 4x) dx \\ &= \left[ -x^3 + 2x^2 \right]_0^1 \\ &= 1 \end{aligned}$$

$$\int_{\bigcirc}^{\bigcirc} \bullet dx = 0$$

例

$$\int_1^1 (x^2 + 3) dx = 0$$

$$\int_{\bigcirc}^{\triangle} \bullet dx = - \int_{\triangle}^{\bigcirc} \bullet dx$$

$$\int_{\bigcirc}^{\square} \bullet dx + \int_{\square}^{\triangle} \bullet dx = \int_{\bigcirc}^{\triangle} \bullet dx$$

例

$$\begin{aligned} & \int_0^1 (x^2 - x) dx - \int_2^1 (x^2 - x) dx \\ &= \int_0^1 (x^2 - x) dx + \int_1^2 (x^2 - x) dx \\ &= \int_0^2 (x^2 - x) dx \\ &= \left[ \frac{x^3}{3} - \frac{x^2}{2} \right]_0^2 \\ &= \frac{2}{3} \end{aligned}$$

## 偶関数と奇関数

$$\bullet \text{ が偶関数のとき} \quad \int_{-\triangle}^{\triangle} \bullet dx = 2 \int_0^{\triangle} \bullet dx$$

$$\bullet \text{ が奇関数のとき} \quad \int_{-\triangle}^{\triangle} \bullet dx = 0$$

例

$$\begin{aligned} & \int_{-1}^1 (x^3 + 3x^2 + 5x + 2) dx = 2 \int_0^1 (3x^2 + 2) dx \\ &= 2 \left[ x^3 + 2x \right]_0^1 \\ &= 6 \end{aligned}$$

## 定積分で表された関数

$$\int_{\text{数}}^x \text{tの式} dt \quad \Rightarrow \quad \text{xの式}$$

微分

例

$$\int_2^x (t^2 + t) dt \quad \Rightarrow \quad x^2 + x$$

微分

## $\frac{1}{6}$ 公式

$$\int_{\bigcirc}^{\triangle} -\square(x-\bigcirc)(x-\triangle) dx = \frac{\square(\triangle-\bigcirc)^3}{6}$$

例

$$\int_1^2 -2(x-2)(x-1) dx = \frac{2(2-1)^3}{6} = \frac{1}{3}$$