

月曜4.

$$f(x) = \int_0^x |t-2| dt$$

$$|t-2| = \begin{cases} t-2 & (t \geq 2) \\ -(t-2) & (t < 2) \end{cases}$$

・  $1 \leq x \leq 2$  のとき

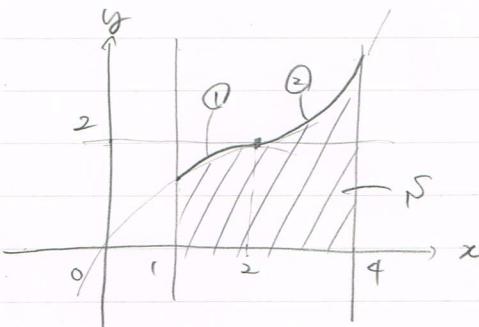
$$f(x) = - \int_0^x (t-2) dt$$

$$= \left[ -\frac{1}{2}t^2 + 2t \right]_0^x$$

$$= -\frac{1}{2}x^2 + 2x$$

$$= -\frac{1}{2}(x^2 - 4x)$$

$$= -\frac{1}{2}(x-2)^2 + 2 \quad \dots \textcircled{1}$$

・  $2 \leq x \leq 4$  のとき

$$f(x) = \int_0^2 (-t+2) dt + \int_2^x (t-2) dt$$

$$= \left[ -\frac{1}{2}t^2 + 2t \right]_0^2 + \left[ \frac{1}{2}t^2 - 2t \right]_2^x$$

$$= -\frac{1}{2} \cdot 4 + 2 \cdot 2 + \frac{1}{2}x^2 - 2x - \frac{1}{2} \cdot 4 + 2 \cdot 2$$

$$= \frac{1}{2}x^2 - 2x + 4$$

$$= \frac{1}{2}(x-2)^2 + 2 \quad \dots \textcircled{2}$$

求めた面積を S とすると、S は上図の余り部分の面積。

$$S = \int_1^2 \left( -\frac{1}{2}x^2 + 2x \right) dx + \int_2^4 \left( \frac{1}{2}x^2 - 2x + 4 \right) dx$$

$$= \left[ -\frac{1}{6}x^3 + x^2 \right]_1^2 + \left[ \frac{1}{6}x^3 - 2x^2 + 4x \right]_2^4$$

$$= -\frac{1}{6}(8-1) + (4-1) + \frac{1}{6}(64-8) - (16-4) + 4(\frac{4^2}{2})$$

$$= -\frac{7}{6} + 3 + \frac{56}{6} - 12 + 8$$

$$= \frac{49}{6} - 1 = \frac{43}{6}$$

$\underline{\hspace{1cm}}$  + (+) (=)

慶應早進学塾