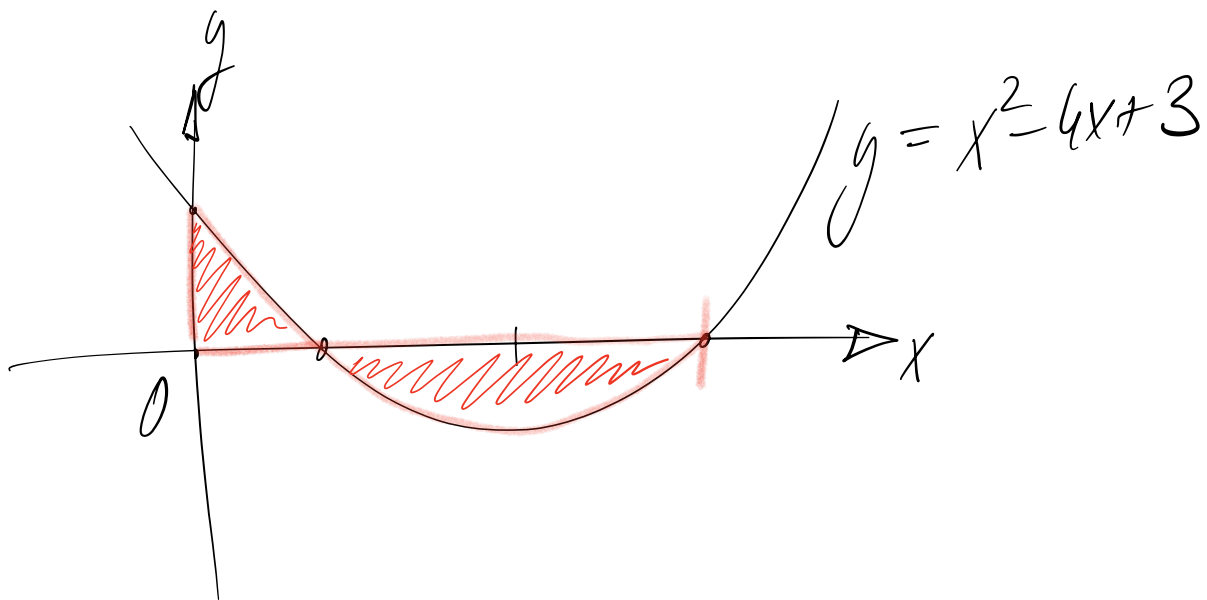




$$(x-1)(x-3) = x^2 - 4x + 3$$

$$\int_0^k (x^2 - 4x + 3) dx = 0$$

$$\left. \frac{1}{3}x^3 - 2x^2 + 3x \right|_0^k = 0$$

$$\frac{1}{3}k^3 - 2k^2 + 3k = 0$$

$$k \left(\frac{1}{3} k^2 - 2k + 3 \right) = 0$$

$$k^2 - 6k + 9 = 0 \quad (k-3)^2 = 0$$

$$k = \frac{6 \pm \sqrt{36 - 4 \cdot 9}}{2} = 3$$

$$\int_0^3 (x^2 - 4x + 3) dx$$

$$\left. \frac{1}{3} x^3 - 2x^2 + 3x \right|_0^1 = \frac{1}{3} - 2 + 3 = \frac{4}{3}$$

$$\begin{aligned} \left. \frac{1}{3} x^3 - 2x^2 + 3x \right|_1^3 &= 9 - 18 + 9 - \frac{4}{3} \\ &= -\frac{4}{3} \end{aligned}$$

Skinner

$$\int_0^3 (x^2 - 4x + 3) dx$$

$$\int_a^b f(x) dx = F(x) \Big|_a^b = F(b) - F(a)$$

$$\text{also } F(x) = \int f(x) dx$$

$$(F'(x) = f(x))$$

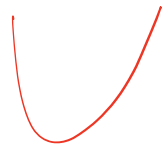
$$\begin{aligned} \int_0^3 (x^2 - 4x + 3) dx &= \frac{1}{3}x^3 - 2x^2 + 3x \Big|_0^3 = F(x) \Big|_0^3 \\ &= \overset{=0}{F(3)} - F(0) \end{aligned}$$

$$= \frac{1}{3}(3)^3 - 2 \cdot 3^2 + 3 \cdot 3 - \left(\frac{1}{3}(0)^3 - 2 \cdot 0^2 + 3 \cdot 0 \right)$$

$$= \frac{1}{3} \cdot 27 - 18 + 9 - 0$$

$$= \overbrace{9 - 18 + 9}^0 = 0$$

$$1 \cdot x^2 - 4x + 3 = (x-1) \cdot (x-3)$$



$$\int_0^3 (x^2 - 4x + 3) dx = 0$$

«aire algébrique»

$$\underbrace{\left| \int_0^1 f(x) dx \right| + \left| \int_1^3 f(x) dx \right|}_{\text{surface}}$$

$$\int_0^1 f(x) dx = \left. \frac{1}{3}x^3 - 2x^2 + 3x \right|_0^1 = \frac{1}{3} - 2 + 3 = \frac{1}{3} + 1 = \frac{4}{3}$$

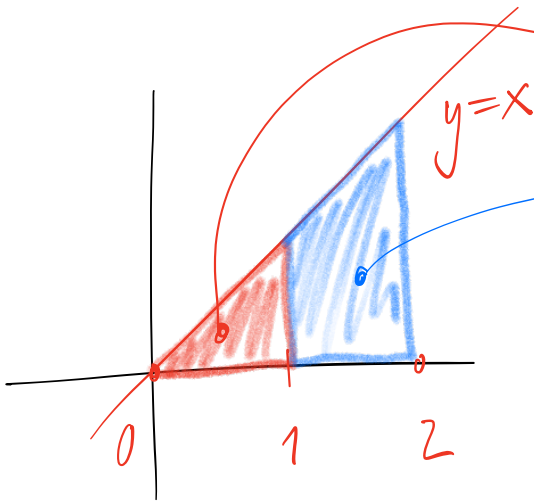
$$\int_1^3 f(x) dx = \left. \frac{1}{3}x^3 - 2x^2 + 3x \right|_1^3$$

$$= 0 - \left(\frac{1}{3} - 2 + 3 \right) = -\frac{4}{3}$$

$$\int_a^b f(x) dx = - \int_b^a f(x) dx$$

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

Example: $\int_0^2 x dx = \int_0^1 x dx + \int_1^2 x dx$



$$\frac{1}{2} x^2 \Big|_0^2 = \frac{1}{2} x^2 \Big|_0^1 + \frac{1}{2} x^2 \Big|_1^2$$

$$\int_0^1 f(x) dx = -3 \quad \int_1^2 f(x) dx = +5$$

$$\Rightarrow \int_0^2 f(x) dx = -3 + 5 = 2$$