13. hét gyak

$$f(x) = x^2 + 2x \qquad x^2 + 2x = 4 - x^2$$

$$g(x) = 4 - x^2 \qquad 2x^2 + 2x - 4 = 0$$

$$x^2 + x - 2 = 0 \quad \begin{cases} x_1 = 1 \\ x_2 = -2 \end{cases}$$

$$\left| \int_{-2}^{1} f(x) - g(x)\, dx \right| = \left| \int_{-2}^{1} 2x^2 + 2x - 4\, dx \right| =$$

$$= \left| \left[\frac{2}{3}x^3 + x^2 - 4x \right]_{-2}^{1} \right| = \left| \frac{2}{3} + 1 - 4 - \left(-\frac{16}{3} + 4 + 8 \right) \right| =$$

$$= \underline{\underline{9}}$$

$y = \ln x$

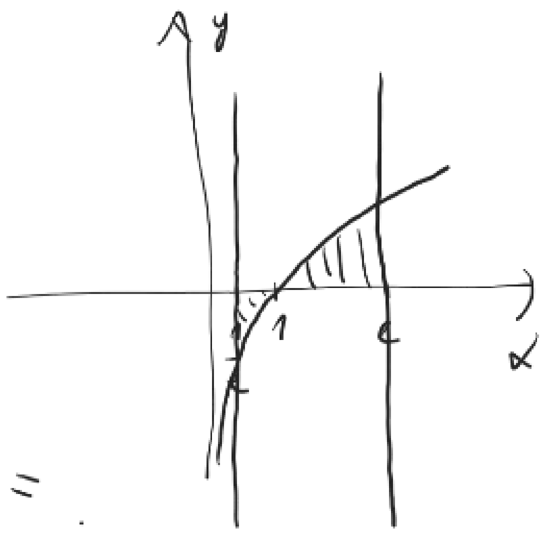
$y = 0$

$x = \frac{1}{e}$

$x = e$

$\ln x = 0$

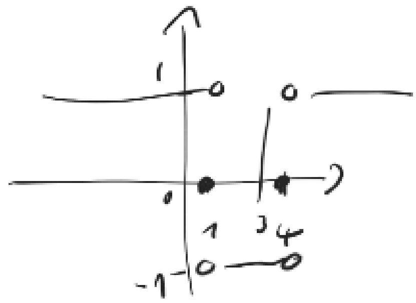
$x = 1$



$$T = -1 \cdot \int_{\frac{1}{e}}^{1} \ln x\, dx + \int_{1}^{e} \ln x\, dx = \ldots$$

$$F(x) = \int_{0}^{x} f(t)\, dt$$

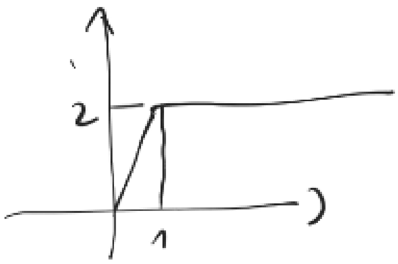
$$f(x) = sg(x^2 - 5x + 4) \longrightarrow (x-1)(x-4)$$



$$T = \left| \int_{0}^{3} f(x)\, dx \right| = \left| \int_{0}^{1} f(x)\, dx + \int_{1}^{3} f(x)\, dx \right| =$$

$$= |1+(-2)| = |-1| = \underline{1}$$

$$f(t) = \begin{cases} 2t & t \in [0;1] \\ 2 & t > 1 \end{cases}$$



$x \in [0;1]$ $\quad F(x) = \int_0^x 2t\,dt = [t^2]_0^x = x^2$

$x > 1$ $\quad F(x) = \int_0^1 2t\,dt + \int_0^x 2\,dt = [t^2]_0^1 + [2t]_1^x = 2x-1$

$$F(x) = \int_0^x \frac{1}{\sqrt{1+t^4}}\,dt$$

$\frac{1}{\sqrt{1+t^4}}$ folytonos $\Rightarrow F'(x) = \frac{1}{\sqrt{1+x^4}}$

$G(x) \int_0^{x^3} \frac{1}{\sqrt{1+t^4}}\,dt \qquad G(x) = F(x^3)$

$$G'(x) = F'(x^3)\cdot 3x^2 = \frac{3x^2}{\sqrt{1+(x^3)^4}}$$

$H(x) = \int_x^{x^3} \frac{1}{\sqrt{1+t^4}}\,dt \qquad H(x) = F(x^3) - F(x)$

$$H'(x) = \frac{3x^3}{\sqrt{1+(x^3)^4}} - \frac{1}{\sqrt{1+x^4}}$$