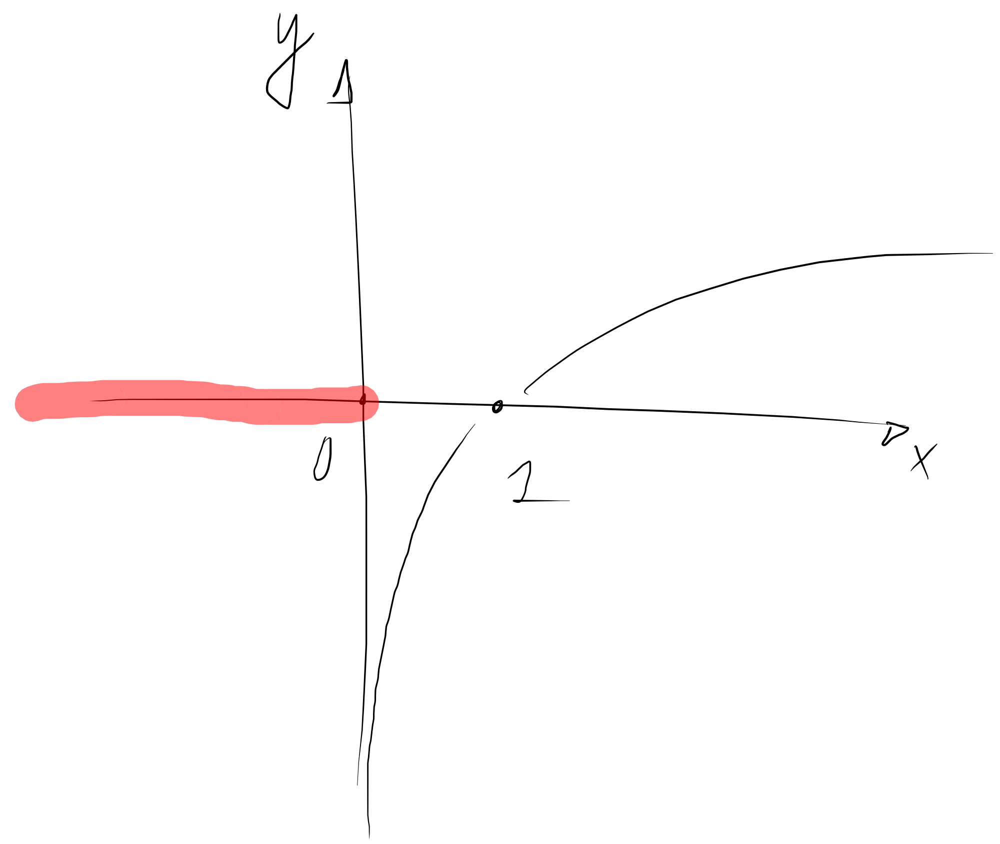
$\boxed{4.2.10}$

b) $\log_7\left(\boxed{\frac{x^2-1}{x+3}}\right)$




$\log_7 1 = 0$

$\log_7\left(\frac{x^2-1}{x+3}\right)$ existe $\iff \boxed{\frac{x^2-1}{x+3} > 0}$

Signe de $h(x) = \frac{x^2-1}{x+3}$

$h(x) = 0$ : $\quad x^2 - 1 = 0 \iff \boxed{x = \pm 1}$ ✓

$x \neq -3$

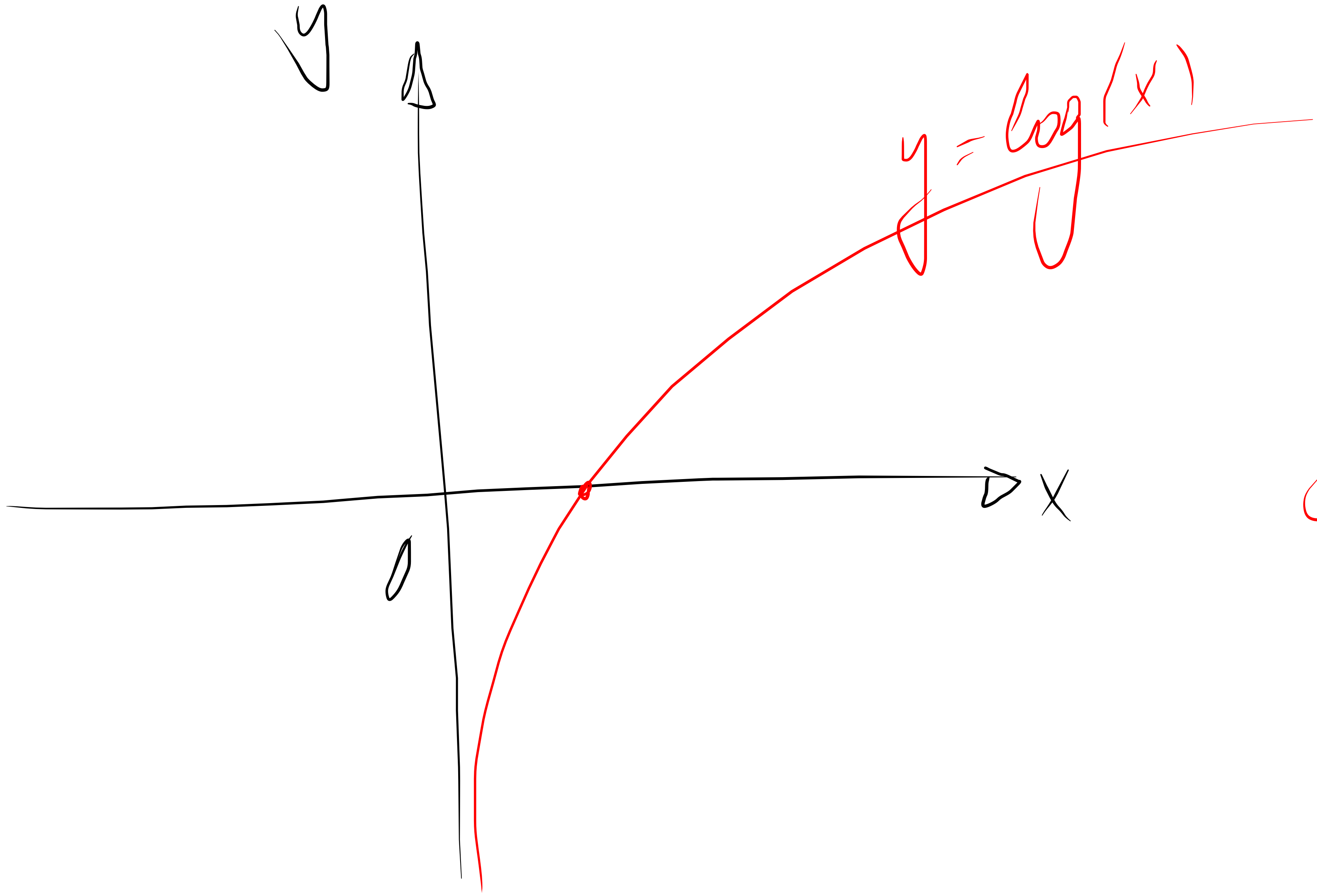
Si $x = -3$, $h(x)$ non déf.

$\frac{(x+1)(x-1)}{(x+3)}$

$D_h = \mathbb{R} - \{-3\}$

| $x$ | | $-3$ | | $-1$ | | $1$ | |
|---|---|---|---|---|---|---|---|
| $h(x)$ | $-$ | $\Vert$ | $+$ | $0$ | $-$ | $0$ | $+$ |

Ans: $\boxed{D_f = ]-3;-1[ \cup ]1;+\infty[}$




$$D_{log} = \mathbb{R}_+^* = ]0;+\infty[$$

$$f(x) = \log\left(\boxed{x^3 + 2x^2 - 3}\right)$$

$$h(x) = x^3 + 2x^2 - 3 > 0$$

Signe de $h$ :

$$x^3 - x^2 + 3x^2 - 3 =$$

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

$$(x-1)(\underbrace{x^2 + 3x + 3}_{>0})$$

$1$

$-$ $0$ $+$

$$\Rightarrow \mathcal{D}_f = \left]1 ; +\infty\right[$$

$x^3 + 2x^2 - 3$

$D_3 = \{\pm 1; \pm 3\}$

$$\begin{array}{c|cccc} & 1 & 2 & 0 & -3 \\ 1 & & 1 & 3 & 3 \\ \hline & 1 & 3 & 3 & 0 \end{array}$$

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

$\Delta = 3^2 - 4 \cdot 1 \cdot 3 = 9 - 12 < 0$