

Exo 1 2) $f(x) = \ln(2x-3)$

$$2x-3 > 0 \Leftrightarrow 2x > 3 \Leftrightarrow x > \frac{3}{2}$$

$$\Rightarrow \ln(2x-3) \text{ existe} \Leftrightarrow x \in]\frac{3}{2}; +\infty[$$

$$f'(x) = [\ln(2x-3)]' = \frac{1}{2x-3} \cdot (2x-3)'$$

$$= \frac{(2x-3)'}{2x-3} = \frac{2}{2x-3}$$

6) $f(x) = e^{\sqrt{1-x}}$

$$1-x \geq 0 \Leftrightarrow 1 \geq x \Leftrightarrow x \leq 1$$

$$\Rightarrow \sqrt{1-x} \text{ existe} \Leftrightarrow x \leq 1$$

$$\Rightarrow \text{ED}_f =]-\infty; 1]$$

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$$\begin{aligned}
 f'(x) &= \left(e^{\sqrt{1-x}} \right)' = e^{\sqrt{1-x}} \cdot (\sqrt{1-x})' \\
 &= e^{\sqrt{1-x}} \cdot \frac{(1-x)'}{2\sqrt{1-x}} \\
 &= e^{\sqrt{1-x}} \cdot \frac{-1}{2\sqrt{1-x}}
 \end{aligned}$$

EXO 2

$$2) \lim_{x \rightarrow 4} \frac{5x-20}{e^4 - e^x} = \ll \frac{5 \cdot 4 - 20}{e^4 - e^4} \gg = \ll \frac{0}{0} \gg$$

INDÉTERMINÉ

$$\lim_{x \rightarrow 4} \frac{(5x-20)'}{(e^4 - e^x)'} = \lim_{x \rightarrow 4} \frac{5}{-e^x} = \frac{5}{-e^4}$$

B.-H.

$$\Rightarrow \lim_{x \rightarrow 4} \frac{5x-20}{e^4 - e^x} = \frac{5}{-e^4}$$

$$b) \lim_{t \rightarrow +\infty} \frac{3t-1}{4 \ln(t)} = \ll \frac{+\infty}{+\infty} \gg \text{INDÉTERMINÉ}$$

$$\lim_{t \rightarrow +\infty} \frac{(3t-1)'}{(4 \ln(t))'} = \lim_{t \rightarrow +\infty} \frac{3}{4 \cdot \frac{1}{t}} = \lim_{t \rightarrow +\infty} \frac{3 \cdot t}{4} = +\infty$$

B.-H.

$$\Rightarrow \lim_{t \rightarrow +\infty} \frac{3t-1}{4 \ln(t)} = +\infty$$

$$c) \lim_{z \rightarrow +\infty} \frac{e^z}{3z^3} = \ll \frac{+\infty}{+\infty} \gg \text{INDÉTERMINÉ}$$

$$\lim_{z \rightarrow +\infty} \frac{(e^z)'}{(3z^3)'} = \lim_{z \rightarrow +\infty} \frac{e^z}{9z^2} = \ll \frac{+\infty}{+\infty} \gg \text{IND.}$$

$$\lim_{z \rightarrow +\infty} \frac{(e^z)'}{(9z^2)'} = \lim_{z \rightarrow +\infty} \frac{e^z}{18z} = \ll \frac{+\infty}{+\infty} \gg \text{IND.}$$

$$\lim_{z \rightarrow +\infty} \frac{(e^z)'}{(18z)'} = \lim_{z \rightarrow +\infty} \frac{e^z}{18} = \ll \frac{+\infty}{18} \gg = +\infty$$

B.-H.

$$\Rightarrow \lim_{z \rightarrow +\infty} \frac{e^z}{3z^3} = +\infty$$

$$d) \lim_{x \rightarrow 0} \frac{e^{2x} - e^{3x}}{x+1 - \cos(x)} = \ll \frac{e^0 - e^0}{0+1-1} \gg = \ll \frac{0}{0} \gg$$

INDÉTERMINÉ

$$\lim_{x \rightarrow 0} \frac{(e^{2x} - e^{3x})'}{(x+1 - \cos(x))'} = \lim_{x \rightarrow 0} \frac{2e^{2x} - 3e^{3x}}{1 + \sin(x)}$$

$$= \frac{2-3}{1} = -1$$

B.-H.

$$\Rightarrow \lim_{x \rightarrow 0} \frac{e^{2x} e^{3x}}{x+1 - \cos(x)} = -1$$

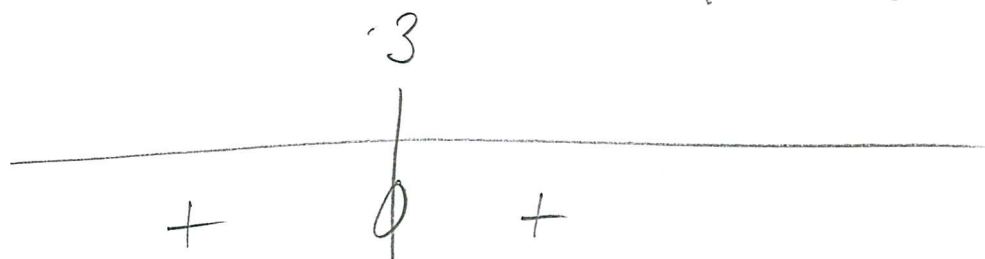
Exo 3

$$f(x) = \ln(x^2 - 6x + 9)$$

Signe de $x^2 - 6x + 9$: $x^2 - 6x + 9 = 0$

$$\Leftrightarrow (x-3)^2 = 0$$

$$\Leftrightarrow x = 3$$



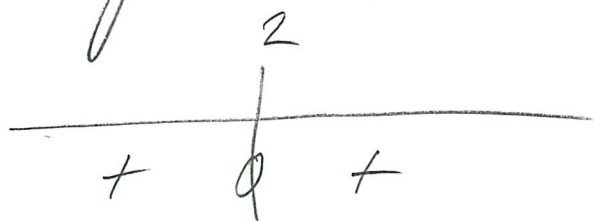
$$\Rightarrow \text{ED}_f = \mathbb{R} - \{3\}$$

$$g(x) = \sqrt{16 - 16x + 4x^2}$$

Signe de $16 - 16x + 4x^2$: $16 - 16x + 4x^2 = 0$

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

$$\Leftrightarrow 4(2 - x)^2$$



$$\Rightarrow \text{ED}_g = \mathbb{R}$$

Les fonctions n'ont pas
la même ED

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ED 4

$$ED_f = \mathbb{R} \quad \text{car} \quad ED(\text{polynôme}) = \mathbb{R}$$

$$ED(e^x) = \mathbb{R}$$

$$ED(-x) = \mathbb{R}$$

$\Rightarrow$ Bs d'A.V.

$$\lim_{x \rightarrow +\infty} f(x) = \lim_{x \rightarrow +\infty} \frac{2x^3 - x^2}{e^x} = 0$$

B.-H. (3 fois)

$\Rightarrow$ A.H. en $y=0$ à droite

$$\lim_{x \rightarrow -\infty} f(x) = \ll -\infty \cdot +\infty \gg = -\infty$$

$\Rightarrow$ Bs d'A.H. à gauche

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3MS

$$\lim_{x \rightarrow -\infty} \frac{1}{x} \cdot f(x) = \lim_{x \rightarrow -\infty} \frac{2x^3 - x^2}{x} \cdot e^{-x}$$

$$= \lim_{x \rightarrow -\infty} (2x^2 - x) \cdot e^{-x}$$

$$= \ll +\infty \cdot +\infty \gg = +\infty$$

$\Rightarrow$ Bs d'A.O. à gauche