* $e^{2x} + 1 = 2e^{x}$; $D_f = \mathbb{R}$ 0,5

$e^{2x} - 2e^{x} + 1 = 0 \iff (e^{x} - 1)^2 = 0$

$\Rightarrow e^{x} - 1 = 0 \Rightarrow e^{x} = 1$

$\Rightarrow \ln e^{x} = \ln 1$

$\Rightarrow \boxed{x = 0} \Rightarrow \boxed{S = \{0\}}$ 1

* $\ln(x^2 - 1) = 7$; $D_f = \{x \mid x^2 - 1 > 0\}$

$x^2 - 1 > 0 \Rightarrow (x-1)(x+1) > 0$

$\Rightarrow \boxed{D_f =]-\infty, -1[\cup]1, +\infty[}$ 0,5

$\ln(x^2 - 1) = 7 \Rightarrow x^2 - 1 = e^{7}$

$\Rightarrow \boxed{x^2 = e^{7} + 1}$

$\Rightarrow \boxed{x = \mp\sqrt{e^{7} + 1}}$ car $e^{x} > 0$ $\forall x$

$x \in D_f$; $S = \{-\sqrt{e^{7} + 1}, +\sqrt{e^{7} + 1}\}$. 1

II / Calculer les intégrales

$I_1 = \int_0^1 (4x^3 - 2x + 3)\,dx$

$= \int_0^1 4x^3\,dx - \int_0^1 2x\,dx + \int 3\,dx$

$= 4\int_0^1 x^3\,dx - 2\int_0^1 x\,dx + 3\int dx$

$= 4\left[\frac{1}{4}x^4\right]_0^1 - 2\left[\frac{1}{2}x^2\right]_0^1 + 3(x)_0^1 + C$ 2

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

$= \cancel{1} - \cancel{1} + 3 + C$

$\boxed{I_1 = 3 + C_{st}}$ $C \in \mathbb{R}$