

Exercice 3.

Q1 rappels :

$$\begin{cases} e^2 \times e^3 = e^{2+3} = e^5 \\ (e^2)^3 = e^{2 \times 3} = e^6 \\ \frac{e^2}{e^3} = e^{2-3} = e^{-1} \end{cases}$$

$$\frac{\left(e^{-3x}\right)^2 \times \left(e^{2x}\right)^{-3}}{e^{5x} \times e^{6x}} = \frac{e^{-6x} \times e^{-6x}}{e^{11x}}$$

$$= \frac{e^{-12x}}{e^{11x}} = e^{-12x-11x} = \boxed{e^{-23x} = D}$$

Q2  $f(x) = e^{2x}(-3x+1)$

$\rightarrow (e^{2x})$  est de la forme  $e^u$  avec

$$u(x) = 2x$$

$$u'(x) = 2$$

$$(e^u)' = u' \times e^u$$

donc  $\boxed{(e^{2x})' = 2e^{2x}}$

$\rightarrow f$  est de la forme  $u \times v$  avec



$$\begin{array}{l|l} u(x) = e^{2x} & v(x) = -3x + 1 \\ u'(x) = 2e^{2x} & v'(x) = -3 \end{array}$$

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$$(u \times v)' = u'v + uv'$$

$$f'(x) = 2 \boxed{e^{2x}} \times (-3x + 1) + \boxed{e^{2x}} \times (-3)$$

$$f'(x) = e^{2x} (2(-3x + 1) - 3)$$

$$f'(x) = e^{2x} (-6x + 2 - 3)$$

$$\boxed{f'(x) = e^{2x} (-6x - 1)}$$

Q3.  $z = \sqrt{3} + i = r e^{i\theta}$

$$\rightarrow r = |z| = \sqrt{(\sqrt{3})^2 + (1)^2} = \sqrt{4} = \boxed{2 = |z|}$$

$$\left. \begin{array}{l} \rightarrow \cos \theta = \frac{\sqrt{3}}{2} \\ \sin \theta = \frac{1}{2} \end{array} \right\} \theta = \frac{\pi}{6} \text{ rad.}$$

$$\boxed{z = 2 e^{i \frac{\pi}{6}}}$$



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Q4.  $\frac{2}{3 \ln(10)} \ln x - 2,88 = 4.$

$$\frac{2}{3 \ln(10)} \times \ln x = 4 + 2,88$$

$$\frac{2}{3 \ln 10} \times \ln x = 6,88.$$

$$\ln x = \frac{6,88}{\frac{2}{3 \ln 10}}$$

$$\ln x = \frac{6,88 \times \ln 10 \times 3}{2}$$

$$\ln x = 10,32 \times \ln 10.$$

$$\ln x = \ln 10^{10,32}$$

$$\boxed{x = 10^{10,32}}$$