

INTERROGATION n°5
corrigé

Exercice 1:

a. $e^{\ln 5} + e^{\ln 3} = 5 + 3 = 8$

b. $e^{1 + \ln 2} = e^1 e^{\ln 2} = 2e$

c. $e^{-2 \ln 3} = e^{\ln 3^{-2}} = 3^{-2} = \frac{1}{3^2} = \frac{1}{9}$

$$\begin{aligned} \text{d. } (e^x + e^{-x})^2 - (e^x - e^{-x})^2 &= (e^x)^2 + 2e^x e^{-x} + (e^{-x})^2 - ((e^x)^2 - 2e^x e^{-x} + (e^{-x})^2) \\ &= e^{2x} + 2e^0 + e^{-2x} - (e^{2x} - 2e^0 + e^{-2x}) \\ &= 4 \end{aligned}$$

Exercice 2:

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

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

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

4. $f(x) = e^{2x^2 + 3x - 4}$ $f'(x) = e^{2x^2 + 3x - 4} (4x + 3)$

$$\lim_{x \rightarrow -\infty} e^x = 0 \quad \lim_{x \rightarrow +\infty} e^x = +\infty$$

Exercice 3:

a. $e^{2x} = e^{-3} \Leftrightarrow 2x = -3 \Leftrightarrow x = -\frac{3}{2}$ la solution est donc $-\frac{3}{2}$

b. $e^x = 0$ $S = \emptyset$

c. $e^x = 2 \Leftrightarrow x = \ln 2$ la solution est donc $\ln 2$

d. $e^x \geq 3 \Leftrightarrow x \geq \ln 3$ donc $S = [\ln 3; +\infty[$

e. $e^x \geq -1$ $S = \mathbb{R}$

f. $e^{2x} \geq 5 \Leftrightarrow 2x \geq \ln 5 \Leftrightarrow x \geq \frac{\ln 5}{2}$ donc $S = \left[\frac{\ln 5}{2}; +\infty \right[$