

Correction de l'interno

exo 1

$$1. \begin{aligned} A &= e^{5-3+4} & B &= e^{2+x-x-1} & C &= \frac{e^{6x} \times e^{4x}}{e^{-6x}} \\ A &= e^6 & B &= e^1 & C &= e^{6x+4x+2x} \\ & & B &= C & C &= e^{12x} \end{aligned}$$

$$2. (e^x + e^{-x})^2 - (e^{2x} + e^{-2x}) = e^{2x} + 2e^x \times e^{-x} + e^{-2x} - e^{2x} - e^{-2x} = 2e^0 = 2$$

exo 2

$$1. \begin{aligned} f'(x) &= 1 \times e^x + e^x(x+2) \\ &= e^x(1+x+2) \\ &= e^x(x+3) \end{aligned}$$

2. $e^x > 0$ donc $f'(x)$ est du signe de $x+3$.

Posons $x+3=0$
 $x=-3$

| | | | |
|---------|-----------|------|-----------|
| x | $-\infty$ | -3 | $+\infty$ |
| $f'(x)$ | | $-$ | $+$ |
| f | | | $-e^{-3}$ |

$$3. y = f'(-2)(x+2) + f(-2)$$

$$f(-2) = 0$$

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

$$\text{Dmc } y = e^{-2}(x+2) \quad \text{Dmc } y = e^{-2}x + 2e^{-2}$$

exo 3

$$1. \begin{aligned} f'(x) &= \frac{e^x(e^{2x}+1) - e^x(e^x-1)}{(e^x+1)^2} \\ &= \frac{e^{2x} + e^x - e^{2x} + e^x}{(e^x+1)^2} \\ &= \frac{2e^x}{(e^x+1)^2} \end{aligned}$$

2. $2 > 0$
 $e^x > 0$ Dmc $f'(x) > 0$
 $(e^x+1)^2 > 0$

| | | |
|---------|-----------|-----------|
| x | $-\infty$ | $+\infty$ |
| $f'(x)$ | | $+$ |
| f | | |

$$3. y = f'(0)(x-0) + f(0)$$

$$f(0) = \frac{e^0-1}{e^0+1} = \frac{1-1}{1+1} = 0$$

$$f'(0) = \frac{2e^0}{(e^0+1)^2} = \frac{2 \times 1}{2^2} = \frac{1}{2}$$

$$\text{Dmc } y = \frac{1}{2}x$$