



# Corrigé de l'interrogation écrite du 2-10-2009

I.  $e^{-\ln 2} = \frac{1}{2}$  ;  $e^{3\ln 5} = 125$  ;  $e^{-2\ln 3} = \frac{1}{9}$  ;  $e^{\frac{\ln 3}{2}} = \sqrt{3}$

## II. Équations et inéquations

$e^{x^2} = (e^2)^3 e^{-x}$ (1)	$S_1 = \{-3; 2\}$	$3e^{2x} + e^x - 4 = 0$ (3)	$S_3 = \{0\}$
$(e^x)^3 \leq e^{x+6}$ (2)	$S_2 = ]-\infty; 3]$	$\frac{3e^x - 4}{e^x + 1} = 1$ (4)	$S_4 = \left\{ \ln \frac{5}{2} \right\}$

## III.

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

## IV.

$f: x \mapsto \frac{1}{e^x - 1}$	$\mathcal{D} = \mathbb{R}^*$	$f: x \mapsto e^{2\ln(x+1)}$	$\mathcal{D} = ]-1; +\infty[$
$f: x \mapsto \sqrt{2 - e^x}$	$\mathcal{D} = ]-\infty; \ln 2]$	$f: x \mapsto \ln(e^x - e^{-x})$	$\mathcal{D} = \mathbb{R}_+$

## V.

1°) Question de cours

$$\lim_{x \rightarrow +\infty} \frac{e^x}{x} = +\infty$$

$$\lim_{x \rightarrow -\infty} (xe^x) = 0$$

$$\lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1$$

2°)  $\lim_{x \rightarrow -\infty} f(x) = +\infty$  et  $\lim_{x \rightarrow +\infty} f(x) = +\infty$