

Exercice 1 Calc. : ✗

4 marks	Soit f la fonction définie par $f(x) = \ln(3x - 2)$. Déterminer l'équation réduite de la tangente à la courbe représentative de f en $x = 1$.
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Exercice 2 Calc. : ✗

3 marks	Soit f la fonction définie par $f(x) = \frac{2x-1}{x-1}$ et f^{-1} la fonction réciproque de f . Résoudre l'équation $f^{-1}(x) = 2$.
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Exercice 3 Calc. : ✗

	<p>Le graphique ci-dessous est celui de la dérivée seconde f'' d'une fonction. Indiquer lesquels des énoncés suivants sont vrais et lesquels sont faux. Justifier votre réponse.</p>
2 marks	1. Le graphique de f est concave pour $-0,5 < x < 2$.
2 marks	2. Le graphique de f a un point d'inflexion en $x = 0$.
2 marks	3. Si $f'(0) = 0$, alors le graphique de f a un point d'inflexion avec une tangente horizontale en $x = 0$.

Exercice 4 Calc. : ✗

	<p>Let f and g be two functions defined by:</p> $f(x) = a + e^{-x+1} \quad g(x) = \frac{b \cdot x + 2}{x - 1}$ <p>where a and b are real numbers.</p>
5 marks	<p>Find the values of a and b such that f and g have the following properties:</p> <ul style="list-style-type: none"> • f and g have the same limit in $+\infty$. • The graphs of functions f and g intercept in a point with abscissa 2.

Exercise 5

Calc. : ✗

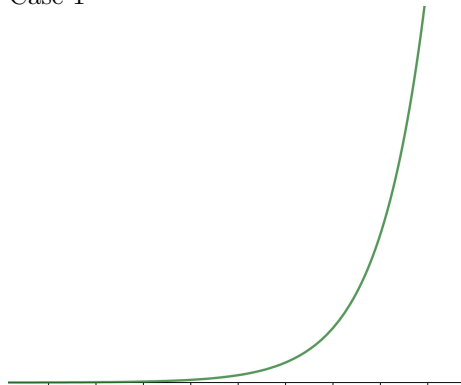
Let a and b be two non-zero real numbers and f be the function defined over \mathbb{R} by:

$$f(x) = a \cdot e^{b \cdot x}$$

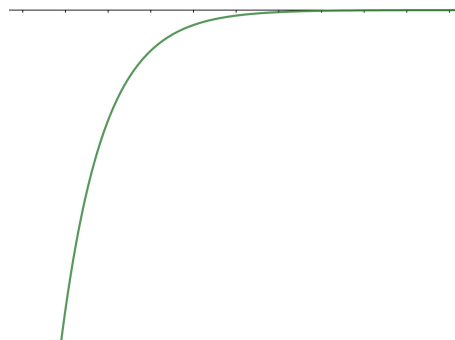
Here are two possible shapes for the curve of this function.

In each case, give the possible values for a and b .

Case 1



Case 2

**Exercise 6**

Calc. : ✗

Let f and g be two functions defined by

$$f(x) = -\frac{1}{2}(e^{2x} + e^{-2x}) \quad g(x) = x^n \cdot \ln(x)$$

where n is a positive integer.

7 marks

Prove that the graphs of these two functions never intersect, whatever the value of n .

Exercise 7

Calc. : ✗

Let f be the function defined on $(0, +\infty)$ by $f(x) = a + b \frac{\ln(x)}{x}$.

The representative curve of the function f admits an asymptote horizontal with equation $y = 1$ and a tangent at the point of abscissa 1 with equation $y = -x + 2$.

5 marks

Determine the values of a and b .

Exercise 8

Calc. : ✗

A metal chain hangs between two walls.

Its height above the ground level can be described by the equation:

$$h(x) = e^{-x} + e^{x-1} + 2,$$

where x is the distance in meters along the ground from the left wall.

5 marks

Calculate how many meters from the left wall this chain is closest to the ground.