Exercise 1	Calc. : 🗡
To sterilise a petri dish before conducting an experiment, it is placed in an oven and the temper- ature is increased to destroy the bacteria. The population of bacteria, N , as a function of time, t, in hours is given by the function:	5 marks
$N(t) = 1 \ 000 \cdot e^{\ln(0.5) \cdot t}.$	
a) This formula could be written in an alternative form. Choose the equivalent formula from the following propositions (no justification required).	
$N_1(t) = 1\ 000 \cdot \ln(0,5)^t$ $N_2(t) = 0, 5 \cdot 1\ 000^t$ $N_3(t) = 1\ 000 \cdot (0,5)^t$ $N_4(t) = 0, 5 \cdot \ln(1\ 000)^t$	
b) What is the initial population of bacteria before starting the sterilisation?c) What is the quantity of bacteria after 2 hours?	
Exercise 2	Calc. : 🗡
A landlord puts up one of his properties for rent. He offers his future tenants two possibilities: Choix A: An initial rent of 1 000 with a fixed annual increase of 25 . Choix B : An initial rent of 1 000 with an annual increase of 2%.	5 marks
a) Calculate the monthly rate of rent to be payed in the second year and in the third year if model A is chosen.	
b) Calculate the monthly rate of rent to be payed in the second year and in the third year if model B is chosen.	
c) Write a function, $f(x)$, to model the rate at which model A increases over time, where x is the number of years after the signature of the contract.	
d) Write a function, $g(x)$, to model the rate at which model B increases over time, where x is the number of years after the signature of the contract.	

e) Discuss the most interesting offer over a long term, justifying your choice.







Exercise 6	Calc. : 🗡
The velocity v in $\mathbf{m} \cdot \mathbf{s}^{-1}$ of an object after t seconds, between $t = 0$ and $t = 6$, is given by the	5 marks
function: $v(t) = 4t$ (en metres per second)	
The acceleration of the object is given by the derivative of the velocity, $v'(t)$.	
The displacement of the object is given by a primitive, $V(t)$, of the velocity.	
a) What is the initial speed of the object? Which speed is the object travelling at after 3 seconds?	
b) Give the expression of the acceleration as a function of time.	
c) Knowing that the initial position of the object was $10 \text{ m} (V(0) = 10)$, give the exact expression of the displacement as a function of time.	
d) What distance has the object travelled after 6 seconds?	





b) Calculate the anti-derivative F(x) of $f(x) = -3x^2 + x + 7$ for which F(0) = 5.

Exercise 10

Exercise 10	Calc. : 🗡
Given the following integrals:	5 marks
$I = \int_{-2}^{2} f(x) \mathrm{d}x = 12 \qquad \qquad J = \int_{2}^{5} f(x) \mathrm{d}x = 3 \qquad \qquad K = \int_{5}^{-2} g(x) \mathrm{d}x = 14$	
a) Draw a sketch of the possible graphs of f and g showing the areas represented by the integrals.	
b) Calculate the following integrals using the information from integrals I, J and K .	
$A = \int_{-2}^{5} f(x) dx \qquad B = \int_{-2}^{5} (f(x) - g(x)) dx \qquad C = \int_{-2}^{5} 5f(x) dx$	