EXAMEN : BACCALAURÉAT GÉNÉRAL	SESSION 2022
ÉPREUVE : ÉVALUATION SPÉCIFIQUE DE LANGUE EN SECTION EUROPÉENNE	
MATHÉMATIQUES EN LANGUE ANGLAISE	SUJET N° 341

Bacterial growth is the asexual reproduction, or cell division, of a bacterium into two daughter cells, in a process called binary fission.
Providing no mutational event occurs, the resulting daughter cells are genetically identical to the original cell.
Hence, "local doubling" of the bacterial population occurs.
Both daughter cells from the division do not necessarily survive. And yet, scientists estimate that the bacterial population undergoes **exponential growth**.

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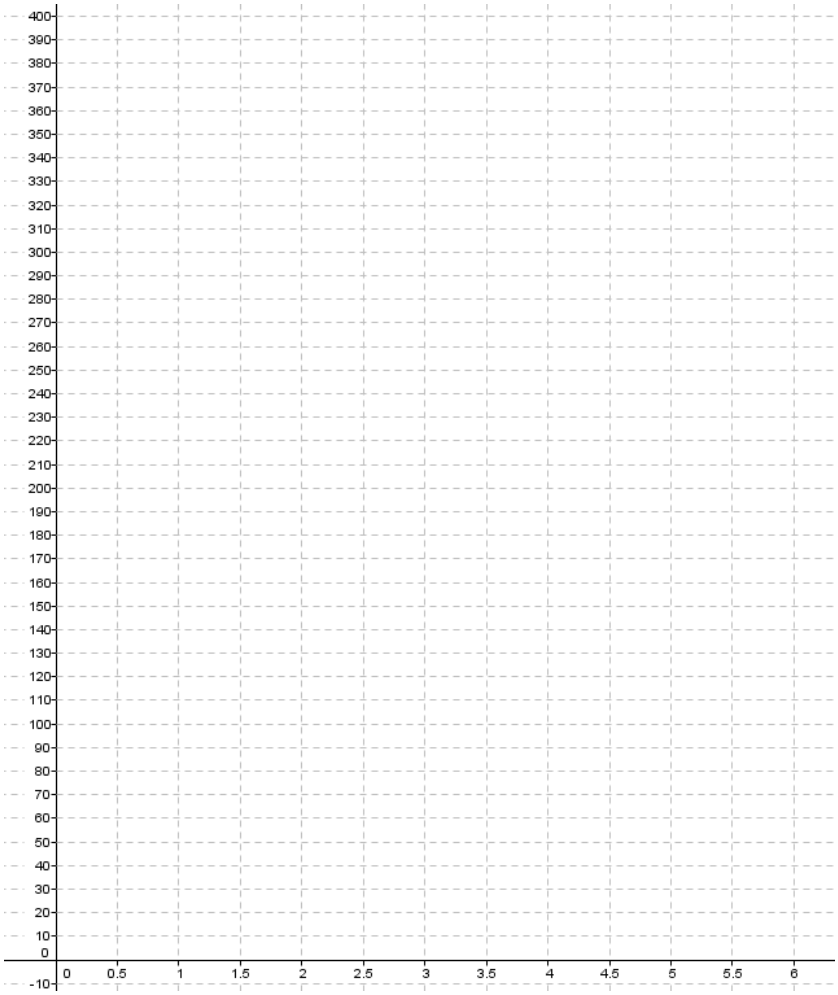
In a biology experiment, the growth of the population of bacteria is being investigated.
P represents the number of individuals in the population and t represents time in days ($t = 0$ being the day when the experiment begins).
The biologist gets the following results:

t	0	1	2	3
P	70	360	250	150

He wants to represent the values in a graph in order to model the evolution of the population.

1. Plot the points in the following graph:



2. a) Could the function P be a linear function? Why?
b) Could function P be the quadratic function defined by the following expression and why?

$$x \to -200x^2 + 490x + 70$$

3. Actually the evolution of the population is modelled by the following function:

$$F(x) = 500\frac{1}{x + \mathrm{e}^{2-3x}}$$

Study the variations of function F and give its maximal value.