

BACCALAURÉAT GÉNÉRAL
ÉPREUVE SPÉCIFIQUE DES SECTIONS EUROPÉENNES
MATHÉMATIQUES – ANGLAIS

SUJET 4

Evolution of a population
Sequences

Ce sujet comporte une page. L'usage de tout modèle de calculatrice, avec ou sans mode examen, est autorisé.

Thomas Robert Malthus (1766-1834) was a key figure to analyze population statistics.

He generalized the relationship between population factors and social change. In his Essay on the Principle of Population (1798), Malthus contended that the world's population was growing more rapidly than the available food supply. He argued that the food supply increases in an arithmetic progression, whereas the population expands following a geometric progression. According to him, the population doubles every 25 years. He said the gap between the food supply and population will continue to grow over time. Even though food supply will increase, it would be insufficient to meet the needs of expanding population. Moreover, famine and other natural calamities cause widespread sufferings and increase the death rate.

Malthus's views have been widely criticized. The validity of his two evolutions (geometric and arithmetic) has been questioned. Malthus did not visualize the role of 'preventive' checks like contraceptives and family planning. He was also criticized for ignoring the role of changing technology and the evolution of society. He did not fully appreciate the improvement of agricultural technologies.

*Extract from the document "Malthus's Theory" by Sheikh Mustafa (Assistant Professor) Institute of Advanced Studies
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I. Explain what the text deals with and comment on it.

II. Exercise.

The population in the UK in 1850 was 27,369,000 inhabitants. This population increased by 6.67 % on average every ten years. U_n is the number of inhabitants (in millions) in the year $1850+10n$. $U_0 = 27.37$.

1. Calculate U_1 and U_2 . What do these numbers represent?
2. Let $n > 0$. Explain why $U_n = 27.37 \times 1.0667^n$.
3. Calculate the number of inhabitants in 1900, in 1950 and in 2000.
4. The following table shows the total population in the UK from 1850 to 2000 in millions.

Year	1850	1900	1950	2000
Population	27.37	38.24	50.23	59.11

- a. Compare these numbers with the results obtained with the sequence (U_n) .
- b. Was Malthus's theory about the increase of population correct?

Vous devez restituer le sujet à la fin de l'épreuve