

BACCALAURÉAT GÉNÉRAL
ÉPREUVE SPÉCIFIQUE DES SECTIONS EUROPÉENNES
MATHÉMATIQUES – ANGLAIS

SUJET 1

Purchasing land
Theme : Algorithms

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

Al-Khwarizmi (780-850) gave us the word 'algebra' but it was his ninth-century book on arithmetic that gave us the word 'algorithm'. It is a concept useful to mathematicians and computer scientists alike. Firstly, an algorithm is a routine. It is a list of instructions such as 'you do this and then you do that'. We can see why computers like algorithms because they are very good at following instructions and never wander off track ⁽¹⁾. Some mathematicians think algorithms are boring because they are repetitious, but to write an algorithm and then translate it into hundreds of lines of computer code containing mathematical instructions is no mean feat ⁽²⁾. There is a considerable risk of it all going horribly wrong. Writing an algorithm is a creative challenge. There are often several methods available to do the same task and the best one must be chosen. Some may be quick but produce the wrong answer.

It's a bit like cooking. There must be hundreds of recipes (algorithms) for cooking roast turkey with stuffing. We just need the ingredients and the instructions.

In mathematics we have ingredients too – these are the numbers.

Extract adapted from "50 mathematical ideas you really need to know"

by Tony Crilly (2007)

¹ never wander off track : ne s'égarer jamais

² (1) it is no mean feat : ce n'est pas un exercice facile

I. Explain what the text deals with and comment on it.

II. Exercise

William is going to buy a plot of land. He remembers its shape but he has forgotten one of its measures (*labelled x on the drawing*).

He knows that : $AB = BC = GH = 10$ metres ; $CD = EF = 10$ metres, and $DE = HA = x$ metres.

He also knows that the area of this parcel of land is equal to nine times its perimeter.

1.

- a. Calculate the perimeter of this plot of land, in terms of x .
- b. Calculate the area of this plot of land, in terms of x .

2.

- a. Using the information in the text, what is the missing length x ?
- b. If he wants to enclose his whole property, what is the length of fencing materials he has to buy?

3. He is going to purchase this piece of land for € 138,600.

- a. What is the price per square metre?
- b. Last year, the same land was worth € 142,000. What was the decrease in price during that year? Give your answer as a percentage, with one decimal place

