



## Exploring mathematics: a powerful tool

*Who invented Calculus?*

### **Anna Southgate:**

The calculus is arguably the most powerful technique in mathematics. Its two central problems are easy to state. First, the gradient problem - to find the gradient of a curve, at any point on the curve. The second problem is the area problem - to find the area under the curve.

A solution to both these problems was invented in Europe in the seventeenth century, but the process of invention was far from simple. It involved mathematicians from several countries, notably France, England and Germany, and resulted in a huge controversy about who got there first.

### **Jeanne Peiffer:**

Pierre Fermat was a magistrate in southern France, and an amateur mathematician.

### **Jeremy Gray:**

Isaac Newton is the English inventor of the calculus.

### **Niels Jahnke:**

Leibniz was a multifaceted person, but above all, I'm impressed by the fact that he exchanged letters with more than a thousand correspondents.

### **Anna Southgate:**

Pierre Fermat, Isaac Newton, Gottfried Leibniz. Each has at some time been credited with the invention of calculus, none of them saw calculus in quite the way it's seen today but each played a key role in its birth. Our story starts in the early seventeenth century, when France was the centre of the mathematical world. Jeanne Peiffer is an historian from the Centre Alexandre Koyré in Paris.

### **Jeanne:**

can you tell me about the French mathematicians at this time?

### **Jeanne Peiffer:**

Yeah first, René Descartes who was an important mathematician and philosopher, who was trained by the Jesuits in LaFleche. He had a private income, so he could travel around Europe, he served in the army in Holland and in Germany, and from 1628 on, he settled in Holland, where he invented analytic geometry. For Descartes mathematics was only part of a larger programme. The task to put together a body of reliable knowledge, and one way, to have reliable knowledge, is to have reliable means to solve problems. For instance, in mathematics, if you have to solve problems, you should use coordinates, algebra, equations, and so on.

### **Anna Southgate:**

So did Descartes actually solve the gradient and area problems?

### **Jeanne Peiffer**

No, he did not really solve it, but he contributed a lot to it. He paved the way by creating his analytic geometry. But there was another man waiting in the wings, the lawyer Pierre de Fermat, down in Toulouse, who had a great passion for mathematics, and made huge contributions to it.

In 1629, at the same time as Descartes, he began to apply analytic geometry to the problem of finding maximum and minimum points on curves.