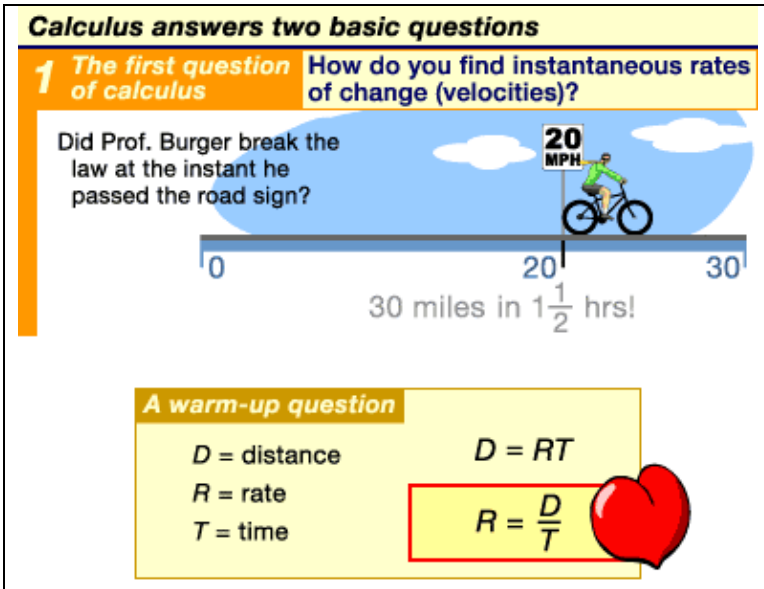
Unit: The Basics **Module:** Overview

The Two Questions of Calculus

key concepts:

- Use calculus to find **instantaneous rates of change** and areas of exotic shapes.
- **Average rate of change**: $R = \frac{D}{T}$.

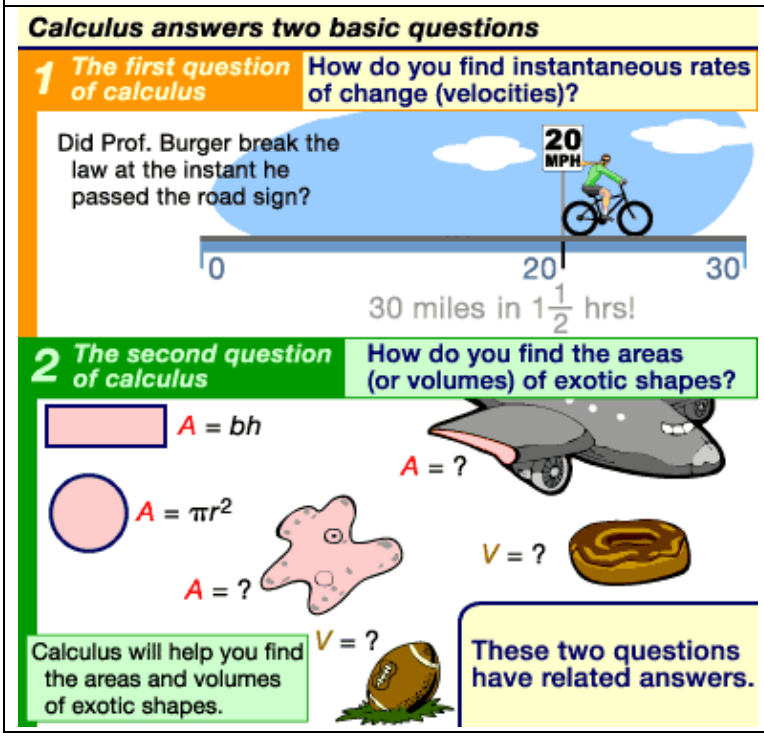


Calculus creates a connection between two very different problems.

The first problem deals with the **instantaneous rate of change** of an object in motion. An object's **average rate of change** (or velocity) is equal to the change in distance divided by the change in time.

But suppose you need to know the velocity of an object at an exact moment in time? Then the change in time would be 0. Division by 0 is not defined.

Differential calculus seeks to resolve this issue. In fact, the formula for average rate of change is the very heart of **differential calculus**.



Differential calculus is only one piece of this course.

The second piece is called **integral calculus**. In integral calculus you will learn how to find the area of different shapes, particularly exotic shapes that do not have simple area formulas.

It turns out that both of these applications involve calculus and that the two answers are related to each other! You will understand how by the end of this course.