Épreuve de section européenne

1 General knowledge

If A and B are two distinct points in the plane, name a few transformations mapping the point A to the point B.

2 Document

Calculus is a central branch of mathematics, developed from algebra and geometry, and built on two major complementary ideas.
One concept is called differential calculus. It studies rates of change, which are usually illustrated by the slope of a line. Differential calculus is based on the problem of finding the instantaneous rate of change of one quantity relative to another. Examples of typical differential calculus problems are finding the following quantities :

- The acceleration and speed of a free-falling body at a particular moment.
- The loss in speed and trajectory of a fired projectile, such as an artillery shell or bullet.

Another concept is called integral calculus. It studies the accumulation of quantities, such as areas under a curve, linear distance travel, or volume displaced. Integral calculus is the mirror image of differential calculus. Examples of integral calculus problems include finding the following quantities :

- The amount of water pumped by a pump with a set power input but varying conditions of pumping losses and pressure.
- The amount of money accumulated by a business under varying business conditions.

The two concepts, differentiation and integration, define inverse operations in a sense made precise by the fundamental theorem of calculus. In teaching calculus, either concept may be given priority. The usual educational approach is to introduce differential calculus first.

From *Wikipedia*, the free encyclopedia.

3 Questions

1. What is the field of differential calculus ?
2. What is the field of integral calculus ?
3. What notions did you encounter during your studies pertaining to differential calculus ? To integral calculus ?
4. What could this famous "fundamental theorem of calculus" that links differential and integral calculus be ?