Real Life Applications of Differentiation

- Calculus is a branch of Mathematics, that started in the 17th century, made up of Differentiation and Integration.
- Calculus is used for comparing and analysing quantities that vary in a non-linear way.
- There are two Mathematicians who were the first to begin using and developing calculus and they are both credited with its development.
- Some uses of Differentiation are outlined below:

Sir Isaac Newton 1642-1727
Gottfried Leibniz 1646-1716

1) Differentiation is used in any place where we need to maximise or minimise a particular quantity, or function. For example, a solar power plant receiver captures the thermal energy of the sun, and stores it in tanks of molten salt. Differentiation is used to maximise the efficiency of the process. Similarly, Differentiation is used to maximise the efficiency of computer hard drives and other components.

2) Differentiation is used in Biology to analyse the rate at which a bacteria population is growing. Differentiation is used to predict whether the population is growing fast and if counter measures should be taken to slow down the growth. The rate of growth of a virus could be measured in a similar way, to see how quickly it would spread through an area, or a city.

3) The speed of a moving object can be changing in a non-linear way. Differentiation is used in the design of radar guns that An Garda Siochána use for catching speeding drivers. The design and construction of the cruise control feature of modern cars would require an understanding of differentiation. In a car, the electronic gauges that measure speed and distance travelled, use Differentiation to transform data from the moving wheels.

4) Differentiation is used in Forensic Science in a number of different ways. For example, being able to estimate the time of death of the victim at a crime scene, can be estimated, once scientists know the rate at which temperature of a body changes after death. To find the concentration of a poison in a victim's blood, also requires an use of Differentiation.