Real Life Applications of Integration

- 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) In Junior Cycle, we learned how to find the area of certain regular 2D shapes. Integration allows us to calculate the area of irregular shapes and particularly ones with curved edges. For example, if a search is being carried out at sea for plane wreckage, Integration can be used to establish the area being covered. This would allow authorities to plan how many vessels are needed. We can also use Integration to find the volume of irregular shapes, like a wine barrel, for example.

2) Integration is used to evaluate the Head Injury Criterion, which is used by car manufacturers to measure the damage to the head during impacts and collisions. The evaluation of this value allowed car makers like Mercedes Benz, for example, to design safer cars with air bags and crumple zones as well as other features.

3) Integration is useful in situations where we need to optimise certain things. For example, Google uses a speed index, to measure how quickly web pages load. In order to make the Internet as quick as possible, they use the speed index to try and minimise page loading times. The speed index is calculated using Integration. You can read more by clicking the link below:

http://www.intmath.com/blog/mathematics/google-uses-integration-to-speed-up-the-web-8849

4) Integration is also useful in designing digital filters that allow, or exclude, certain radio frequencies. This would be useful for creating secure two way communication in the military, for example.