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| **Year 1 pure unit 7: Differentiation** | **Road Map** |
| In this unit you will learn about pure mathematics. The aims are as follows:**LG1**: Knowledge**LG2**: Application**LG3**: Skills | Assessment Grades |  |  |
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| **Themes** | **Learning Goals/Outcomes/Content** |  |  |  |
| **7a. Definition, differentiating polynomials, second derivatives** | understand and be able to use the derivative of f(*x*) as the gradient of the tangent to the graph of *y* = f(*x*) at a general point (*x*, *y*); |  |  |  |
| understand the gradient of the tangent as a limit and its interpretation as a rate of change; |  |  |  |
| be able to sketch the gradient function for a given curve; |  |  |  |
| be able to find second derivatives; |  |  |  |
| understand differentiation from first principles for small positive integer powers of *x*; |  |  |  |
| be able to differentiate $x^{n}$, for rational values of *n*, and related constant multiples, sums and differences. |  |  |  |
| **7b. Gradients, tangents, normals, maxima and minima** | be able to apply differentiation to find gradients, tangents and normals, maxima and minima and stationary points; |  |  |  |
| be able to identify where functions are increasing or decreasing. |  |  |  |

**Links:**

LG1: You should know how to differentiate a function and know how to use the 2nd derivative to find stationary points.

LG2: You should be able to apply your knowledge of differentiation to find gradients, tangents and normal, maxima and mini and stationary points. You should be able to find the values of x for which a function is increasing or decreasing.

LG3: You will show mastery of this topic by being able to differentiate from first principles, interpret gradient in a variety of contexts and sketch a gradient function.