



DIFFERENTIATION METHODS

CALCULUS

LEVEL 3

Study Checklist

If you've picked up this checklist, congrats! You've begun the first step in a system of resources designed to help you through the Differentiation Methods external. To make the most of this, we suggest you sit down, grab a pen, and mark any points that you're feeling a little unsure of. Then, create a subject audit using our template, or refer to the page numbers to find the section in our walkthrough guide to help you out!

BASIC DIFFERENTIATION

- | | | | |
|--|-------|---|-------|
| <input type="checkbox"/> I can explain what a function is | [TBC] | <input type="checkbox"/> I can differentiate more complicated functions by differentiating each term separately | [TBC] |
| <input type="checkbox"/> I can explain what differentiation is | [TBC] | <input type="checkbox"/> I can simplify/expand/divide an expression before I differentiate | [TBC] |
| <input type="checkbox"/> I can explain what 'the function of x' means | [TBC] | <input type="checkbox"/> I can differentiate positive and negative powers | [TBC] |
| <input type="checkbox"/> I can differentiate a simple function | [TBC] | <input type="checkbox"/> I can differentiate surds and fractional powers | [TBC] |
| <input type="checkbox"/> I can differentiate with coefficients | [TBC] | <input type="checkbox"/> I can find the gradient at a point by substituting into a function | [TBC] |
| <input type="checkbox"/> I can differentiate when there is no power associated to a variable | [TBC] | <input type="checkbox"/> I can find the tangent to a curve | [TBC] |
| <input type="checkbox"/> I can differentiate when there is only constants in an equation | [TBC] | <input type="checkbox"/> I can find the normal to a curve | [TBC] |

DIFFERENTIATION RULES

- | | | | |
|---|-------|---|-------|
| <input type="checkbox"/> I can use the product rule to differentiate a function | [TBC] | <input type="checkbox"/> I can convert exponential functions to logarithmic functions | [TBC] |
| <input type="checkbox"/> I can use the quotient rule to differentiate a function | [TBC] | <input type="checkbox"/> I can differentiate log functions | [TBC] |
| <input type="checkbox"/> I can use the chain rule to differentiate a function | [TBC] | <input type="checkbox"/> I can remember the three trigonometry functions, cosecant, secant, and cotangent | [TBC] |
| <input type="checkbox"/> I can differentiate an exponential function | [TBC] | <input type="checkbox"/> I can differentiate trigonometry functions | [TBC] |
| <input type="checkbox"/> I can differentiate an exponential function using the chain rule | [TBC] | <input type="checkbox"/> I can explain the difference between parametric functions and normal functions | [TBC] |
| <input type="checkbox"/> I can explain the difference between natural logs and other logs | [TBC] | <input type="checkbox"/> I can differentiate parametric functions | [TBC] |

LIMITS

- I can identify and explain what a continuous function is [TBC]
- I can identify and explain the three different types of discontinuities [TBC]
- I can identify where a function can't be differentiated [TBC]
- I can explain what a limit is [TBC]
- I can identify the two ways in which a limit exists [TBC]
- I can identify the three ways in which a limit does not exist or is 'undefined' [TBC]

FEATURES OF FUNCTIONS

- I can explain what stationary points are [TBC]
- I can identify stationary points as maximums, minimums, turning points, and points of inflection [TBC]
- I can identify when a function is concave up or concave down [TBC]
- I can use the second derivative to find the type of stationary point [TBC]
- I can use differentiation to find whether a function is increasing or decreasing [TBC]
- I can use the second derivative to find whether the function is concave up or concave down [TBC]
- I can find the coordinates of any stationary points [TBC]
- I can sketch the graph of a function based on its stationary points [TBC]

RATES OF CHANGE AND OPTIMISATION

- I can explain what rate of change velocity measures [TBC]
- I can explain what rate of change acceleration measures [TBC]
- I can use the function to tell if an object is moving at a constant speed [TBC]
- I can use the function to tell if an object is stationary [TBC]
- I can use the function to tell if an object is at the origin [TBC]
- I can use parametric equations to find related rates of change [TBC]
- I can use differentiation to find the maximum and minimum of a function in context [TBC]
- I can solve an optimisation problem [TBC]

