GAC016 Mathematics III: Calculus & Advanced Applications

GAC Mathematics · Vocabulary in context

Word	Example
differentiation /ˌdɪfəˌrenʃiˈeɪʃn/	**Differentiation** finds how a function changes at each input.
integration /ˌɪntɪˈgreɪʃn/	**Integration** finds the area under a curve.
derivative /dɪˈrɪvətɪv/	Use the **derivative** to find the curve's slope at this point.
gradient of the tangent /ˈgreɪdɪənt ɒvðə ˈtændʒənt/	The derivative gives the **gradient of the tangent**.
differentiation from first principles /ˌdɪfəˌrenʃiˈeɪʃn frɒm fɜːst ˈprɪnsɪplz/	**Differentiation from first principles** uses the limit of a gradient.
power rule /ˈpaʊə ruːl/	The **power rule** says the derivative of x^n is nx^{n-1}. x^n nx^{n-1}
product rule /ˈprɒdʌkt ruːl/	Use the **product rule** to differentiate $x \cdot \sin x$. $x \cdot \sin x$
quotient rule /ˈkwəʊʃənt ruːl/	Use the **quotient rule** to differentiate $\sin x / x$. $\sin x / x$
chain rule /tʃeɪn ruːl/	Use the **chain rule** for a function inside another function.
stationary points /ˈsteɪʃənəri pɔɪnts/	At **stationary points**, the gradient is zero.
second derivative /ˈsekənd dɪˈrɪvətɪv/	The **second derivative** tells us how the gradient changes.

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Word	Example
maximum /ˈmæksɪməm/	A **maximum** point is the top of a hill on the graph.
minimum /ˈmɪnɪməm/	A **minimum** point is the bottom of a valley.
fundamental theorem of calculus /ˌfʌndəˈmentl ˈθɪərəm ɒv ˈkælkjʊləs/	The **fundamental theorem of calculus** links differentiation and integration.
indefinite integral /ɪnˈdefɪnət ˈɪntɪgrəl/	An **indefinite integral** always includes a constant of integration, + c. $+ c$
constant of integration /ˈkɒnstənt ɒv ˌɪntɪˈgreɪʃn/	The **constant of integration** c is there because every curve $y = x^2 + c$ has the same gradient 2x. $y = x^2 + c$ $2x$ c
definite integral /ˈdefɪnət ˈɪntɪgrəl/	A **definite integral** has limits and gives a number, such as an area.
integration by substitution /ˌɪntɪˈgreɪʃn baɪ ˌsʌbstɪˈtjuːʃn/	**Integration by substitution** replaces an inner function by a new letter u. u
optimisation /ˌɒptɪmaɪˈzeɪʃn/	**Optimisation** finds the largest or smallest value, such as the most profit.
rates of change /reɪts ɒv tʃeɪndʒ/	Derivatives measure **rates of change**, such as speed.
area between two curves /ˈeərɪə bɪˈtwiːn tuː kɜːvz/	Integrate to find the **area between two curves**.
marginal cost and revenue /ˈmɑːdʒɪnl kɒst ænd ˈrevənjuː/	The firm makes the most profit where **marginal cost and revenue** are equal.

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