Differentiation: Definition and Fundamental Properties

AP Calculus BC · Vocabulary in context

Word	Example
derivative /dɪ'rɪvətɪv/	Use the **derivative** to find the curve's slope at this point.
difference quotient /'dɪfrəns 'kwəʊʃənt/	The **difference quotient** is $(f(x + h) - f(x))/h$. $(f(x + h) - f(x))/h$
instantaneous /ˌɪnstən'teɪnɪəs/	The speedometer shows the **instantaneous** speed.
first principles /fɜːst 'prɪnsɪplz/	Finding a derivative from **first principles** means using the limit definition.
notations /nəʊ'teɪʃnz/	$f'(x)$ and dy/dx are two **notations** for the derivative. $f'(x)$ dy/dx
slope /sləʊp/	A steeper line has a larger **slope**.
tangent line /'tændʒənt laɪn/	The **tangent line** touches the curve at one point and has the same slope there.
table /'teɪbl/	Make a **table** of $f(x)$ for $x = 1.9$, 1.99 and 1.999. $x = 1.9$、1.99 1.999 $f(x)$
units /'juːnɪts/	The **units** of velocity are metres per second.
differentiable /'dɪfərenʃɪəbl/	A function is **differentiable** at a point if it has a slope there.
continuous /kən'tɪnjuːəs/	The beta particles have a **continuous** range of energies. β
corner /'kɔːnə/	$\lvert x\rvert$ has a **corner** at $x = 0$, so it has no derivative there. $\lvert x\rvert$ $x = 0$

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↑ **vertical tangent** /ˈvɜːtɪkl ˈtændʒənt/	At a **vertical tangent**, the slope is undefined.
power rule /ˈpaʊə ruːl/	The **power rule** says the derivative of x^n is nx^{n-1}. x^n nx^{n-1}
∗ **Constant multiple** /ˈkɒnstənt ˈmʌltɪpl/	**Constant multiple**: the derivative of $5x^2$ is 5 times the derivative of x^2. $5x^2$ x^2 5
x^2 **polynomial** /ˌpɒlɪˈnəʊmɪəl/	$3x^2 + 2x - 1$ is a **polynomial**. $3x^2 + 2x - 1$
× **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 $\sin x / x$. $\sin x / x$
= **identities** /aɪˈdentɪtiz/	Trig **identities** such as $\sin^2 x + \cos^2 x = 1$ help simplify answers. $\sin^2 x + \cos^2 x = 1$
second derivative /ˈsekənd dɪˈrɪvətɪv/	The **second derivative** tells us how the gradient changes.

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