Differential Equations

AP Calculus BC · Vocabulary in context

Word	Example
differential equation /ˌdɪfəˈrenʃl ɪˈkweɪʒn/	A **differential equation** links a quantity and its rate of change.
derivative /dɪˈrɪvətɪv/	Use the **derivative** to find the curve's slope at this point.
proportional /prəˈpɔːʃənl/	The growth rate is **proportional** to the size: double the size, double the rate.
solution /səˈluːʃn/	y = Ce^(2x) is a **solution** of dy/dx = 2y. y = Ce^(2x) dy/dx = 2y
verify /ˈverɪfaɪ/	**Verify** a solution by putting it back into the equation.
general solution /ˈdʒenərəl səˈluːʃn/	The **general solution** includes the constant c. c
particular solution /pəˈtɪkjʊlə səˈluːʃn/	Use the starting value to find c and get the **particular solution**. c
slope field /sləʊp fiːld/	A **slope field** shows small line segments with the slope at each point.
solution curve /səˈluːʃn kɜːv/	A **solution curve** follows the slopes in the slope field.
equilibrium solution	An **equilibrium solution** is a constant value where the rate of change is zero.
Euler's method /ˈɔɪləz ˈmeθəd/	**Euler's method** estimates a solution by taking small straight steps.
approximation /əˌprɒksɪˈmeɪʃn/	The first three terms give a good **approximation** when x is small. x

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underestimate /ˌʌndəˈrestɪmət/	A tangent line on a concave-up curve gives an **underestimate**.
overestimate /ˌəʊvəˈrestɪmət/	A tangent line on a concave-down curve gives an **overestimate**.
separation of variables /ˌsepəˈreɪʃn ɒv ˈveərɪəblz/	Use **separation of variables**: put all y's on one side and x's on the other. $\frac{y}{}$ $\frac{}{x}$
separable /ˈsepərəbl/	$dy/dx = xy$ is **separable**. $dy/dx = xy$
constant solution	$y = 3$ is a **constant solution**: it never changes. $y = 3$
initial condition /ɪˈnɪʃl kənˈdɪʃn/	The **initial condition** $y(0) = 5$ gives the starting value. $y(0) = 5$
domain /dəˈmeɪn/	Leave zero out of the **domain** when x is on the bottom of a fraction. $\frac{}{x}$
exponential growth or decay /ˌekspəˈnenʃl grəʊθ ɔː dɪˈkeɪ/	$dy/dt = ky$ gives **exponential growth or decay**. $dy/dt = ky$
radioactive decay /ˌreɪdɪəʊˈæktɪv dɪˈkeɪ/	**Radioactive decay** changes one element into another.
continuously compounded interest	With **continuously compounded interest**, money grows like $Pe^(rt)$. $Pe^(rt)$
logistic model /ləˈdʒɪstɪk ˈmɒdl/	In the **logistic model**, the population grows fast, then levels off.
carrying capacity /ˈkærɪŋ kəˈpæsɪti/	The island can feed 200 deer at most: this is its **carrying capacity**. 200

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