# Differential Equations

AP Calculus BC · Vocabulary in context

| Word | Example |
|---|---|
| **differential equation** /ˌdɪfə'renʃl ɪ'kweɪʒn/ | A **differential equation** links a quantity and its rate of change. |
| **derivative** /dɪ'rɪvətɪv/ | Use the **derivative** to find the curve's slope at this point. |
| **proportional** /prə'pɔ:ʃənl/ | The growth rate is **proportional** to the size: double the size, double the rate. |
| **solution** /sə'lu:ʃn/ | y = Ce^(2x) is a **solution** of dy/dx = 2y.<br>y = Ce^(2x)  dy/dx = 2y |
| **verify** /'verɪfaɪ/ | **Verify** a solution by putting it back into the equation. |
| **general solution** /'dʒenərəl sə'lu:ʃn/ | The **general solution** includes the constant c.<br>c |
| **particular solution** /pə'tɪkjʊlə sə'lu:ʃn/ | Use the starting value to find c and get the **particular solution**.<br>c |
| **slope field** /sləʊp fi:ld/ | A **slope field** shows small line segments with the slope at each point. |
| **solution curve** /sə'lu:ʃn kɜ:v/ | 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** /'ɔɪlər 'meθəd/ | **Euler's method** estimates a solution by taking small straight steps. |
| **approximation** /əˌprɒksɪ'meɪʃn/ | The first three terms give a good **approximation** when x is small.<br>x |



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|---|---|
| **underestimate** /ˌʌndə'restɪmət/ | A tangent line on a concave-up curve gives an **underestimate**. |
| **overestimate** /ˌəʊvə'restɪmət/ | A tangent line on a concave-down curve gives an **overestimate**. |
| **separation of variables** /ˌsepə'reɪʃn ɒv 'veərɪəblz/ | Use **separation of variables**: put all y's on one side and x's on the other.<br>y  x |
| **separable** /'sepərəbl/ | dy/dx = xy is **separable**.<br>dy/dx = xy |
| **constant solution** | y = 3 is a **constant solution**: it never changes.<br>y = 3 |
| **initial condition** /ɪ'nɪʃl kən'dɪʃn/ | The **initial condition** y(0) = 5 gives the starting value.<br>y(0) = 5 |
| **domain** /də'meɪn/ | Leave zero out of the **domain** when x is on the bottom of a fraction.<br>x |
| **exponential growth or decay** /ˌekspə'nenʃl grəʊθ ɔ: dɪ'keɪ/ | dy/dt = ky gives **exponential growth or decay**.<br>dy/dt = ky |
| **radioactive decay** /ˌreɪdɪəʊ'æktɪv dɪ'keɪ/ | **Radioactive decay** changes one element into another. |
| **continuously compounded interest** | With **continuously compounded interest**, money grows like Pe^(rt).<br>Pe^(rt) |
| **logistic model** /lə'dʒɪstɪk 'mɒdl/ | In the **logistic model**, the population grows fast, then levels off. |
| **carrying capacity** /'kærɪŋ kə'pæsɪti/ | The island can feed 200 deer at most: this is its **carrying capacity**.<br>200 |