



 AP Calculus Formula Mastery Tracker

Designed by Engin Savaş | Mathhigh.com

“You don’t master a formula by memorizing it — you master it when it becomes a reflex grounded in meaning.”
This tracker helps you recall, visualize, and *apply* every major formula across AB & BC topics using a 1–7–14–30 spaced repetition cycle.

 Section 1: Core Derivative Rules

Formula	Visual / Conceptual Hook	Application Link	Recall Status	Revisit (1–7–14–30)	Common Trap
$(x^n)' = nx^{n-1}$	“Exponent slides down, power drops by one.”	Building slope equations and tangent lines	☐ Know ☐ Practice ☐ Missed	☐ ☐ ☐ ☐	Forgetting constant factors
$(uv)' = u'v + uv'$	“Derivative shares work — like teamwork.”	Product-based motion problems	☐ ☐ ☐	☐ ☐ ☐ ☐	Dropping one term
$\left(\frac{u}{v}\right)' = \frac{u'v - uv'}{v^2}$	“Lo d Hi – Hi d Lo / Lo Lo”	Related rates and rational models	☐ ☐ ☐	☐ ☐ ☐ ☐	Mixing numerator order
$(f(g(x)))' = f'(g(x)) \cdot g'(x)$	“Outer × Inner — like a gear chain.”	Composite motion, exponential decay	☐ ☐ ☐	☐ ☐ ☐ ☐	Forgetting inner derivative
Implicit Derivative	“Differentiate everything; tag y’s with dy/dx.”	Circle, ellipse, and curve slope	☐ ☐ ☐	☐ ☐ ☐ ☐	Forgetting dy/dx on y terms



Section 2: Integration & FTC

Formula	Visual / Conceptual Hook	Application Link	Recall Status	Revisit	Common Trap
$\int x^n dx = \frac{x^{n+1}}{n+1} + C$	“Reverse of derivative; exponent rises.”	Area accumulation	☐ ☐ ☐	☐ ☐ ☐ ☐	Using $n = -1$
$\int \frac{1}{x} dx = \ln x + C$	x	+C)	“Integral of slope $1/x$ is log growth.”	Population/logarithmic growth	☐ ☐ ☐
Substitution	“Undo the chain rule.”	Composite integrals, motion	☐ ☐ ☐	☐ ☐ ☐ ☐	Wrong bounds
$\int_a^b f'(x) dx = f(b) - f(a)$	“Integral = total accumulated change.”	Position, cost, temperature change	☐ ☐ ☐	☐ ☐ ☐ ☐	Mixing up limits

Section 3: Trigonometric & Inverse Functions

Function	Derivative / Integral	Visual / Conceptual Hook	Application Link	Recall Trap
$\sin x$	$\cos x$	“Derivative shifts 90° forward.”	Oscillation slope	☐ ☐ ☐ Forgetting sign for $\cos x$
$\cos x$	$-\sin x$	“Derivative mirrors wave upside down.”	Harmonic motion	☐ ☐ ☐ Missing negative
$\tan x$	$\sec^2 x$	“Steepness grows fast — squares up.”	Incline/slope models	☐ ☐ ☐ Missing square
$\arcsin x$	$\frac{1}{\sqrt{1-x^2}}$	“Triangle: opposite = x , hyp = 1 .”	Inverse modeling	☐ ☐ ☐ Domain issue (



■ Section 4: BC Extension Formulas

Formula	Visual Hook	Application Link	Recall	Revisit	Trap
$A = \frac{1}{2} \int r^2 d\theta$	"Slice of a circle; radius squared builds area."	Polar regions	☐ ☐ ☐	☐ ☐ ☐ ☐	Squaring $r(\theta)$
$L = \int \sqrt{(dx/dt)^2 + (dy/dt)^2} dt$	"Distance = sum of motion components."	Curve length	☐ ☐ ☐	☐ ☐ ☐ ☐	Forgetting squares
Taylor Series	$f(x) = \sum \frac{f^{(n)}(c)}{n!} (x - c)^n$	"Function = infinite polynomial DNA."	Approximations	☐ ☐ ☐	☐ ☐ ☐ ☐
Ratio Test	$L = \lim \frac{a_{n+1}}{a_n}, L < 1 \rightarrow \text{conv.}$	"Growth shrink factor < 1 ."	Convergence	☐ ☐ ☐	☐ ☐ ☐ ☐

✿ How to Use This Tracker

1. **Mark Recall Status** after each study session.
2. Use the **1–7–14–30** boxes for spaced repetition (revisit after 1 day, 1 week, 2 weeks, 1 month).
3. Add **voice notes or mini-derivations** for "Missed" formulas (digital users can use comment tools).
4. After marking "Mastered," recheck all mastered formulas monthly.
5. Each month, review the "Common Trap" column — recurring mistakes reveal your personal *Calculus Blind Spots*.