

# AP Calculus BC — cram chart

The key idea, the must-know tool, and the trap to dodge, for each of the ten units.

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## 1 Limits & continuity

### 5-10% of the exam

Idea: how a function behaves near a point.

Must-know: limit laws, one-sided limits, continuity, and the IVT.

Watch out: plugging in before simplifying a  $0/0$  form.

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## 2 Differentiation: definition & properties

### 5-10% of the exam

Idea: the derivative is a rate and a slope.

Must-know: the limit definition and the power, product, and quotient rules.

Watch out: reversing the order in the quotient rule.

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## 3 Composite, implicit & inverse

### 5-10% of the exam

Idea: differentiate complicated functions.

Must-know: the chain rule, implicit differentiation, and inverse derivatives.

Watch out: dropping the inside derivative in the chain rule.

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## 4 Contextual applications

### 5-10% of the exam

Idea: derivatives as rates in context.

Must-know: motion, related rates, and L'Hôpital's rule.

Watch out: mislabeling units or the sign of velocity.

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## 5 Analytical applications

### 10-15% of the exam

Idea: use derivatives to analyze a graph.

Must-know: increasing/decreasing, concavity, the first and second derivative tests, the Mean Value Theorem, and optimization.

Watch out: claiming an extremum without a sign analysis.

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## 6 Integration & accumulation

### 15-20% of the exam

Idea: antiderivatives and accumulated change.

Must-know: the Fundamental Theorem, Riemann sums and u-substitution, plus the BC-only techniques: integration by parts, partial fractions, and improper integrals.

Watch out: forgetting  $+C$ , or the new bounds after substituting.

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## 7 Differential equations

### 5-10% of the exam

Idea: equations that involve a derivative.

Must-know: slope fields, separation of variables, Euler's method, and logistic growth.

Watch out: forgetting the constant or the initial condition.

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## 8 Applications of integration

### 5-10% of the exam

Idea: integrals measure area, volume, and length.

Must-know: area between curves, volumes, and arc length.

Watch out: wrong orientation or mis-squaring the radius.

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## 9 Parametric, polar & vector

### 10-15% of the exam · BC only, not on AB

Idea: curves beyond  $y = f(x)$ .

Must-know: parametric  $dy/dx$ ; polar area; vector velocity and speed.

Watch out: dropping the  $\frac{1}{2}$  in the polar-area formula.

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## 10 Infinite sequences & series

### 15-20% of the exam · BC only, not on AB

Idea: sums of infinitely many terms.

Must-know: geometric and p-series; the  $n$ th-term, integral, comparison, ratio and alternating series tests; radius and interval of convergence; Taylor and Maclaurin series; and the Lagrange error bound.

Watch out: reaching for the ratio test when a faster test settles it.

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