

AP Calculus Test: Global Tips for Your Students

Show all work.

Remember that the grader is not only interested in finding out the answer to the problem. The grader is interested in seeing if you know how to solve the problem.

Do not round partial answers.

Store them in your calculator so that you can use them unrounded in further calculations.

Do not let the points at the beginning keep you from getting the points at the end.

If you can do part (c) without doing (a) and (b), do it. If you need to import an answer from part (a), make a credible attempt at part (a) so that you can import the (possibly wrong) answer and get your part (c) points.

If you use your calculator to solve an equation, write the equation first.

An answer without an equation might not get full credit, even if it is correct.

If you use your calculator to find a definite integral, write the integral first.

An answer without an integral will not get full credit, even if it is correct.

Do not waste time erasing bad solutions.

If you change your mind, simply cross out the bad solution after you have written the good one. *Crossed-out work will not be graded.* If you have no better solution, leave the old one there. It might be worth a point or two.

Do not use your calculator for anything except: (For Free Response Questions)

(a) graph functions, (b) compute numerical derivatives, (c) compute definite integrals, and (d) solve equations. In particular, do not use it to determine max/min points, concavity, inflection points, increasing/decreasing, domain, and range. (You can explore all these with your calculator, but your solution must stand alone.)

Be sure you have answered the problem.

For example, if it asks for the maximum value of a function, do not stop after finding the x at which the maximum value occurs. Be sure to express your answer in correct units if units are given.

If you need to guess on a multiple choice question, see if you can eliminate some incorrect answers first.

Wrong answers can often be eliminated by estimation, or by thinking graphically.

If they ask you to justify your answer, think about what needs justification.

They are asking you to say more. If you can figure out why, your chances are better of telling them what they want to hear. For example, if they ask you to justify a point of inflection, they are looking to see if you realize that a sign change of the second derivative must occur.

Be sure you know how to write a “candidates test” explanation for an extreme.

RADIAN MODE and NEW BATTERIES

Top Ten Student Errors

1. $f''(x) = 0 \Leftrightarrow (x, f(x))$ is a point of inflection. (You need a sign change.)
2. $f(x)$ is a maximum (minimum) $\Leftrightarrow f'(x) = 0$. (You need a sign change.)
3. Average rate of change of f on $[a, b]$ is $\frac{f'(a) + f'(b)}{2}$
4. Volume by washers is $\int_a^b \pi(R-r)^2 dx$
5. Separable differential equations can be solved without separating the variables.
6. Omitting the constant of integration, especially in initial value problems.
7. Graders will assume the correct antecedents for all pronouns used in justifications.
8. If the correct answer came from your calculator, the grader will assume your setup was correct.
9. Universal logarithmic antidifferentiation: $\int \frac{1}{f(x)} dx = \ln|f(x)| + C$.
10. $\frac{d}{dx} f(y) = f'(y)$ and other Chain Rule errors.

Disclaimer by Dan Kennedy

These are the opinions of Dan Kennedy and do not necessarily reflect the opinions of the College Board, the Educational Testing Service, the AP Calculus Test Development Committee, or even the results of sound statistical analysis. If you have taught AP Calculus for a while, however, you know in your heart that he is correct.

Tips by Ken Lindemann

Every question is about a derivative or an integral...if you can't figure out how to start a problem...decide if it is about d/dx or an integral.

Look for the Fundamental Theorem of Calculus f' after an integral.

Be Prepared for Average Acceleration... (Average Velocity in the past)

Know the difference between average value and average rate of change.

Write the following on your test:

$$\frac{d}{dx} \sin x = \cos(x)$$

$$\frac{d}{dx} \cos x = -\sin x$$

$$\int \sin(kx) dx = -\frac{\cos kx}{k} + c$$

$$\int \cos(kx) dx = \frac{\sin kx}{k} + c$$

$$\sin(2x) = 2 \sin x \cos x$$

Be Prepared to write Quantity/Integral Functions

Keep Justifications short and concise...write in mathematical symbols whenever possible. Involve Calculus in your explanations.

Be sure to understand the differences between Position, Displacement, and Total Distance.

Be sure to understand the difference between Average Value and Average Rate of Change.

Know the definition of Continuity.

Know what is happening when you are integrating something that is not a rate.

Be able to find inflection points by looking at the FIRST Derivative

KNOW THE FUNDAMENTAL THEOREM OF CALCULUS

"Don't worry about the horse being blind, just load the wagon."

John Madden