

AP Calculus exam tips

Show all work.

Remember that the grader is not really 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:

(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 can eliminate some incorrect answers in the multiple-choice section, it is advantageous to guess.

Otherwise it is not. 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.

Exam Format

	% of Grade	Number of Questions	Minutes Allotted	Calculator Use
Section I	50			
Part A		28	55	no calculator
Part B		17	50	graphing calculator required
Section II	50			
Part A		3 problems	45	graphing calculator required
Part B		3 problems	45	no calculator

AP Calculus Multiple choice Rules

- **Work does not have to be shown on any multiple choice problem.**
- **If you do not know the answer to a multiple choice problem, then guess the answer. You will not be deducted points for incorrect multiple choice answers.**
- **If you change an answer on your multiple choice scantron, erase the original bubble completely. If you do not erase completely, the scantron grading machine may think you are providing two answers in which case it will mark the entire problem incorrect.**

Other AP Tips

1. **Sometimes neater work can generate more points.**
2. **Avoid providing two solutions to a problem. If you do provide two solutions, both solutions will be graded and your score will be determined by the average of those grades.**
3. **Circle answers.**
4. **Write complete sentences. Writing complete sentences will sometimes force you to use words that are a part of the answer.**
5. **Label graphs and units.**
6. **Erasing incorrect work takes up too much time. Rather than erasing, "X" out your incorrect work. Graders disregard "X"ed out work.**
7. **Complete the problems you know how to do first. Of those, first complete the problems which have the most point value (differentials).**
8. **The AP exam is a timed test so work as fast as you can. Try all problems but do not spend too much time on one problem to the point where it prevents you from having a fair chance at others.**
9. **Go to bed early the night before the AP exam and try to get a least 8 hours of sleep.**
10. **Have a breakfast on the day of the AP test, but do not fill your belly to the point where it slows you down and causes you to be sleepy.**

**AP Calculus AB Cut-offs
Samples from Various Years**

1997 AB EXAM		
AP Grade	Range of Scores (out of 108)	Minimal Percentage
5	72-108	67%
4	56-71	52%
3	39-55	36%
2	25-38	23%
1	0-24	0%

1998 AB EXAM		
AP Grade	Range of Scores (out of 108)	Minimal Percentage
5	75-108	69%
4	58-74	54%
3	40-57	37%
2	25-39	23%
1	0-24	0%

SAMPLES

Following is a sample of the information provided in the Indiana Grade Report. Similar data is provided for each Indiana college and university. Grade point averages are on a scale from 0 to 4.

Freshmen	English	Math	Science	Social Studies
Purdue:	3.30	2.31	2.47	2.61
Central:	3.10	2.00	1.87	1.61
Concord:	3.18	2.09	2.70	2.33
Fairfield:	3.66	2.30	2.55	2.87
Goshen:	3.58	2.77	2.98	2.88
Jimtown:	3.44	1.83	1.88	1.62
Memorial:	3.88	2.76	2.56	2.00
Northridge:	3.71	2.90	2.90	2.83
NorthWood:	3.60	2.48	2.51	2.86
Penn:	3.51	2.64	2.65	2.91

All Colleges	English	Math	Science	Social Studies
Indiana:	2.80	2.48	2.63	2.60
Central:	2.62	2.17	2.50	2.25
Concord:	2.76	2.46	2.68	2.56
Fairfield:	3.00	2.46	2.59	2.80
Goshen:	2.92	2.49	2.59	2.44
Jimtown:	2.86	2.24	2.30	2.50
Memorial:	3.27	2.56	2.56	2.45
Northridge:	3.00	2.65	2.65	2.53
NorthWood:	3.21	2.51	2.53	2.71
Penn:	2.95	2.43	2.43	2.66

STUDENT GRADE REPORT BY SUBJECT

ROBBY GOODMAN
NORTHRIDGE HIGH SCHOOL
57697-1 NORTHRIDGE DRIVE
MIDDLEBURY

152295

IN 46540

*Powell AP Calculus
scores from a
previous year.*

CALCULUS AB SECTION -
NAME

REG NO GRADE

5
5
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CALCULUS AB - SECTION

GRADE 5 - 18
GRADE 4 - 7
GRADE 3 - 1
GRADE 2 - 0
GRADE 1 - 0

TOTAL FOR SECTION - 26
SECTION AVERAGE - 4.654

Good Habits for the AP Calculus Exams

The College Board does not advocate “teaching to the test,” nor do I. If your students learn to do good mathematics and present it clearly, they will do fine on the AP exam. The following suggestions are made in that spirit. If you instill these habits in the students early, then they won’t have to worry about changing their style right before the test.

1. While units aren’t always taken into account, they often are. Students should get in the habit of always including units when asked, and knowing what the correct units are even when not asked.
2. For some problems, the grader may be instructed *not* to look at any graphs or figures unless the student specifically directs the grader to look at them. Students should make a point of writing “see graph below” if they want to illustrate something using a graph, and be aware that a graph alone does not constitute a mathematical explanation.
3. Graphs and figures should always be labeled, or they may not receive full credit. If, for example, a student draws the graph of g' , it should be labeled g' so as not to be confused with g .
4. Students should write their solutions in the appropriate part of their booklets. If the worst happens, and the student has written the solution in the wrong place, s/he should alert the graders twice: once in the place where the solution was written, and once in the place where it should have been written.
5. Two words: RADIAN MODE
6. In a multipart problem, where the solution to part (a) is needed to complete part (b), it may be to a student’s advantage to assume an answer to part (a) and use that answer to demonstrate a knowledge of how to do part (b). Perhaps even state it explicitly: “I can’t do part (a) so I am assuming the answer is 0.5 for the purposes of part (b).” This isn’t guaranteed to receive credit, but it is worth a try, if there is time.
7. In problems where a descriptive answer is required, the student should make sure to answer the question asked. The graders are all very experienced teachers, and will not be fooled by a lot of words thrown on the paper in an attempt to obfuscate. Students’ explanations, like their mathematics, should be clear and precise.
8. Students should give numerical approximations to three-decimal-place precision. When plugging numbers into a function, for example, plugging $x = \sqrt{2}$ into $y = \tan(e^x)$, it is best to do all of the rounding at the end [$\tan e^{\sqrt{2}} \approx 1.464$] rather than rounding at intermediate steps [$\sqrt{2} \approx 1.414$, $e^{1.414} \approx 4.112$, $\tan(4.112) \approx 1.460$, which is less accurate].
9. Students should be weaned from overuse of the word “it”. Functions should be called by their names [$f(x)$, $g(x)$, velocity, dy/dt , etc.].
10. The College Board frowns on “calculatorese”. Statements such as “I entered NumInt($x^2, x, 0, 1$)” are not mathematical explanations.

One final thought: The AP exam is not graded on neatness, but the readers can’t fairly grade work that they cannot read. Even if you are used to an individual’s handwriting, you and the student should decide whether or not a stranger would be able to read it.

NOTES FROM AP GRADING

- Quit while you are ahead...don't simplify or rearrange symbols
- Don't erase large blocks of work...it takes extra time.
 - Line out work and put new work
 - Only cross out work if you have something better to put down in its place. Otherwise, leave it for partial credit.
- Avoid rounding off numeric values in intermediate steps.
 - Keep exact value on calculator.
 - If you give a decimal answer as your final result, give to 3 digits after the decimal point.
 - OK to leave exact values... do NOT do something like $\pi = 3.14$
- Label sign charts: specify which function is being referenced.
- For justification, be specific when making reference to a function; avoid ambiguous pronouns or statements about "the derivative"...the derivative of what?
- RADIANS, RADIANS, RADIANS
- Show set-up for work that will be done on the calculator
FOR EXAMPLE:
 - Write out the necessary equation – then you can solve on calculator
 - Write out the integral in proper notation – then use fnInt to evaluate on the calculator
- Record results from work done on calculator in proper mathematical notation to receive credit for analysis
FOR EXAMPLE: Slope of tangent line should indicate use of derivative as $f'(a)$ whether value is computed numerically using nDer or analytically using rules for differentiation
- Equations for TANGENT LINES ought to be linear!!
- For volume of revolution problems, at least set up integral with its limits and π or 2π as appropriate
- CARRY FORWARD
 - Create some reasonable result in part a to be carried forward for use in part c
 - Don't just tell how the problem could be solved; do the actual work with a made-up answer.
- For analysis, don't just quote standard "recipes" without showing how they apply to the given problem.
- Try each part of every problem
- Pace yourself ... you don't have to answer every part of every problem.
- When dealing only with given, discrete data, don't make assumptions about the overall behavior of the function which is represented numerically.
- Show units on answer when units are given in the problem. Make sure the units are reasonable...gallons are not gal^2 or gal^3 .