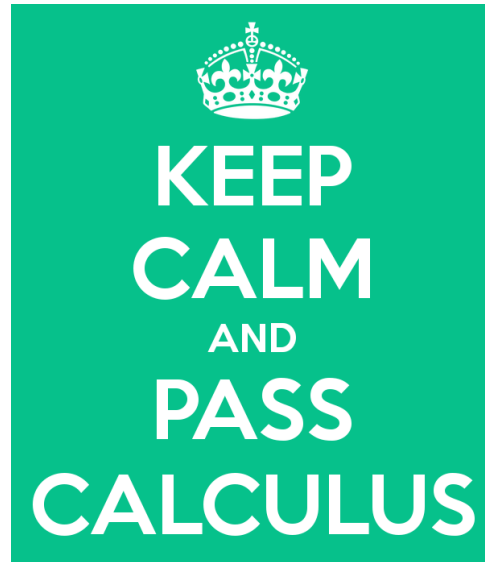


# AP Calculus Exam Prep Video Assignment Sheet

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## Assignment #1-

1. How long is the entire exam? What is the time breakdown for the test and when are you allowed to use a calculator?
2. Do you lose points for guessing?
3. If you want to go back to Part A on the FRQ's during the time for Part B, what's different?
4. What word should you never use in a free response? Why do you think that is important mathematically?
5. In the first example, what would have been wrong if the teacher said "There is a relative maximum because  $f'$  changes from increasing to decreasing"?
6. Explain how you can find the value of the function at a particular point if you are only given an initial value and a graph of  $f'$ .
7. What are good uses for your calculator on the exam?
8. What are you not allowed to use your calculator for on the exam?

**STOP! This Assignment Ends at 9:36**

**Assignment #2-** Start at 22 minutes

1. What notation is not acceptable on the test?
2. What do you always need to make sure you show to receive credit for a calculator active setup?
3. Why are the units to part (a)  $\text{miles}/\text{minutes}^2$ ?
4. What does  $\int_0^{12} |v(t)| dt$  represent and why?
5. In part (c), what word is important to specify?
6. What is part (d) in the FRQ asking for? How do you know? How can your calculator help you?

**STOP! This Assignment Ends at 29:35**

**Assignment #3-** Start at 29:35 minutes

1. How does the teacher find P and Q?
2. How could you store these values if you wanted to do so?
3. How did the teacher find the area of S? How did the calculator help her do that?
4. Which function will *always* give you the area under the curve to 3 decimal places correctly?
5. If you get the correct answer with no supporting work, what happens?

Note:

Our calculators are updated so the “fnint” setup that she uses is obsolete! Ours will just show up with a blank interval that you fill in, as it has in class all year!

6. Where should all your work be done if you want the AP reader to see it?
7. What should you never assume on a graph?
8. Why is there a point of inflection at  $x=-2$  and  $x=0$  on this FRQ?
9. Why do you subtract out the area under the curve in part (b)?
10. How do you find the area of the region under the curve in part (b)?

**STOP! This Assignment Ends at 45:45 (end of part b)**

**Assignment #4-** Start at 45:45 minutes (Part c)

1. What do you test to find an absolute maximum?
2. How do we know there is an absolute maximum without actually knowing the values? What is the key word to make sure we've proven it?
3. How could you find the derivative on your calculator?
4. How do you find the total distance run by the runners? Why does this work?
5. What do you get a whole point for? Because of this, what should you make sure you do?

**STOP! This Assignment Ends at 53:55**

**Assignment #5-** Start at 53:55 minutes

1. How do you find all local max/min?
2. When a question asks that you find a “maximum value” or a “minimum value,” what is it asking for specifically?
3. How do you find all absolute max/min? How is it different if you have an interval vs if you do not?
4. What idea is extremely important to include when discussing absolute extrema?
5. How do you calculate profit, generally?
6. Why do you need to take the integral of the cost function in part (a)?
7. How can part (a) help you answer part (b) and part (c) in the FRQ?
8. Where did the equation for  $P'(k)$  come from?

**STOP! This Assignment Ends at 1:04:00**

**Assignment #6-** Start at 1:03:59

1. Where did the 3 candidates come from in part (b)?

2. How did the teacher find the values at the end points? Why did she do this?
3. What does average rate of change mean? What is the difference between part (c) and (d)?
4. What requirements does MVT have in order to work?
5. Why is do we take an antiderivative in part (a) of the storm problem?
6. What description does the teacher give for the units in part (b)? Label where she got the information on the picture below:

$$f'(4) = 1.007$$

7. What does “decreasing most rapidly” mean?
8. What is going on in part (d) of this problem? Explain in your own words!

**STOP! This Assignment Ends at 1:17:00**

**Assignment #7-** Start at 1:17:00

1. What important theorems do you need to know? Summarize them in the box. Be sure to note which require differentiability and which only require continuity:

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2. Our favorite 2007 questions!! 😊 How much do you love it?
3. What about part (a) makes you think IVT? What do you need to make sure you say in your answer?
4. What about part (b) makes you think to you MVT? What do you need to make sure you say in your answer?
5. When you take the derivative of an antiderivative, what is required? Write in proper notation what this looks like:
6. How do you find the derivative of the inverse function?

**STOP! This Assignment Ends at 1:28:30**

**Assignment #8-** Start at 1:28:30

1. What are the 2 different limit definitions of the derivative? Include at a point and the general derivative.
2. How does the teacher prove that the function is not differentiable without actually knowing the values?
3. How do you choose a value for  $a$  in part (c) so that MVT will apply? What's your reasoning?
4. What is saying  $g''(x)=0$  the same as saying and why?

**STOP! This Assignment Ends at 1:35:15**

**Assignment #9-** Start at 1:35:15

1. Explain the expression  $R(t) = 6 + \int_0^t \frac{1}{16} (3 + \sin x^2) dx$  in your own words. Why do you need to do use a different variable in the integral?
2. How does the FTC relate to part (c) of the FRQ?
3. Why does  $A(0)$  not equal 0? Explain in terms of the problem!
4. If we go from a rate to an amount, how do the units change?
5. What should you be sure to include when explaining the meaning of a definite integral?
6. What should you be careful to pay attention to if you are given a differential equation?
7. How do you know which points to draw in on your slope field? (Which 8?)
8. What does “find a particular solution” mean? What would prevent you from getting any points on a problem like this?

**STOP! This Assignment Ends at 1:42:29**

**Assignment #10-** Starts at 1:45:00

1. How do you know which 9 points at which they want you to evaluate the slope field?
2. What do you need to make sure you do to earn *any* points?
3. Don't assume you're always using  $\ln$ ! In what case do you use  $\ln$ ?
4. Where does the "k" come from in front of the e?
5. Describe how we find the limit in part (c) in the FRQ in your own words.
6. What 2 elements do we need to be able to find a tangent line to a graph?
7. Why is the numerator negative when  $x > e$  (think without a calculator!)?
8. What do you need to say in your answer to actually demonstrate there is a point of inflection? Why is it okay to make a conclusion here without making a sign chart?
9. Explain the limit in part (d) in your own words!

**STOP! This Assignment Ends at 1:55:50**



**Assignment #11-** Start at 1:55:50

1. What should you start doing before beginning the FRQ's? What does this allow you to do?
2. No credit is given for anything written where?
3. Why is it important to show all work?
4. What should you do if you think you've done incorrect work to save time?
5. What should you do if you aren't sure of a previous answer, but know how to do latter parts of an FRQ?
6. When do you not need to simplify?
7. Why are units so important?!?!?!?
8. What do we mean by "scattershot" approach and why wouldn't you want to use it?
9. When is the only time you should round?
10. If you need an answer to part (a) or (b) for a later question, what should you do?
11. If you use your calculator to solve a problem, what is the only way you'll get full credit?

12. Should you leave any questions blank? Why or why not?

13. Your calculator should only be used to \_\_\_\_\_ maximums/minimums/increasing/decreasing/etc.

14. What example does the teacher give of making sure you've answered the question asked?

15. UNITS UNITS UNITS!! (Not a question, just a statement ☺ )

16. Most common errors! What's wrong with each?

Error	What's the problem?
1. $f''(x) = 0 \Leftrightarrow (x, f(x))$ is a point of inflection.	
2. $f(x)$ is a maximum (minimum) $\Leftrightarrow f'(x) = 0$ .	
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.	

17. Top 10 Algebra mistakes. Describe what's wrong with each:

It's not that you don't know...however, these mistakes tend to show up:

1. Sometimes students fail to distribute correctly:

$$4(3x^2 - x) \neq 12x^2 - x$$

or

$$-2(5x + 3) \neq -10x + 6$$

2. Sometimes students try to factor sums of squares:

$$x^2 + 9 \neq x + 3$$

A variation of this error is:

$$\sqrt{x^2 + 16} \neq x + 4$$

similarly:

$$\sqrt{x^2 - 16} \neq x - 4$$

3. A common mistake occurs when students incorrectly simplify rational expressions:

$$\frac{2x^2 - 5}{x} \neq 2x - 5$$

or

$$\frac{7}{7+x} \neq \frac{1}{1+x}$$

4. Mistakes are made determining when a radical leads to positive or negative value.

$$\sqrt{25} \neq \pm 5$$

or

$$\sqrt{x^2} \neq x$$

5. Errors are made with exponents:

$$(3x)^2 \neq 3x^2$$

and

$$(x^3)^2 \neq x^6$$

6. Sometimes a coefficient gets raised to a power, even when there isn't one:

$$2x^{-1} \neq \frac{1}{2x}$$

7. Failing to get all the solutions to an equation:

$$x^2 = 4$$

$x = 2$  is not the only solution.

8. Rational expressions with sums or differences in the denominator are split into two fractions that are not equivalent:

$$\frac{5}{x^2 + 6} \neq \frac{5}{x^2} + \frac{5}{6} \quad \text{and} \quad \frac{5}{x^2 + 6} \neq \frac{5}{x^2} + \frac{1}{6}$$

9. Trigonometric identities are ignored:

$$\sin(x + y) \neq \sin x + \sin y$$

10. Failing to multiply polynomials correctly is a problem:

$$(3x - 2)(4x + 5) \neq 12x^2 - 10$$

Try to learn from these common errors so that you can avoid them!

18. What mode should your calculator be in?

19. What should you ALWAYS remember on an indefinite integral?

20. What should you try to do before you taking a derivative or antiderivative?

21. What should you always do to graphs and figures?

22. How many decimal places and when should you round??

23. What can you do to emphasize key things when you're reading in a problem?

24. What's the difference between increasing and positive?

**STOP! You're done 😊**