AP Calculus AB/BC Summer Assignment

Alright guys, here's the Summer assignment. Write your answers on separate paper and staple it all together if there's more than one sheet. Make sure your name is on it. You can use any resources you want to complete this assignment and you can work with whoever you want. This will be graded on completion and count as a homework grade for the first quarter.

1. In your own words, describe what it means for the limit of a function to exist at a point.
2. In your own words, explain what it means for a function to be continuous.
3. Give an example of a function that is not continuous and explain why it isn't continuous.
4. Write down the limit definition of a derivative.
5. What is the geometric interpretation of the derivative of a function at a point?
6. Write down all of the basic derivatives that you can think of.
7. Write down the product rule for differentiation.
8. Write down the quotient rule for differentiation.
9. Describe the process of computing the derivative of a composite function using the chain rule.
10. What is a critical point? How do we determine the locations of the critical points of a function?
11. Outline the first derivative test for determining extrema.
12. Outline the second derivative test for determining extrema.
13. In your own words, outline the general process of completing an optimization problem.
14. What is the volume of the largest right cylindrical cone that can be inscribed in a sphere of radius 3?
15. Why do we need to add +C at the end of the evaluation of an indefinite integral?
16. What is the geometric interpretation of a definite integral?
17. Write down all of the basic integrals that you can think of.
18. Describe the process of u-substitution.
19. Explain the process of computing the area of a bounded region.
20. Write down and explain the formula for computing the volume of a solid of revolution using the washer method.
21. Write down and explain the formula for computing the volume of a solid of revolution using the shell method.
22. What is a differential equation?
23. Explain how to draw a slope field.
24. What does a slope field represent?
25. Outline the method of solving a differential equation using separation of variables.