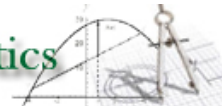


**MAC2311 Calculus I**  
**Final Exam Topic Outline**

1. Determine the limit of a given function [as  $x \rightarrow a$ ,  $x \rightarrow a^-$ ,  $x \rightarrow a^+$ ,  $x \rightarrow \infty$ , the function may be a polynomial, rational, piecewise, or trigonometric]
2. Apply the  $\epsilon$ - $\delta$  definition of the limit [to find  $\delta$  given  $\epsilon$  or to prove a given limit], this includes limits as  $x \rightarrow a$  and  $x \rightarrow \infty$ .
3. Determine the continuity of a given function [removable or essential]; be able to re-define a function to make it continuous.
4. Determine a constant  $k$  that will make a piecewise function continuous.
5. Find the derivative by the limit definition.
6. Sketch the graph of a function given information about the function & derivative [but not the function itself].
7. Find the derivative of a given function utilizing the basic differentiation techniques [3.2 – 3.5].
8. Find the slopes of tangent lines of given functions.
9. Find equations of tangent & normal lines of given functions.
10. Find implicit derivatives.
11. Determine if a function is 1 to 1.
12. Find  $f^{-1}$  of a given function.
13. Simplify logarithmic/exponential expression.
14. Solve logarithmic equations and associated applications.
15. Solve exponential equations and associated applications.
16. Find the derivative of logarithmic and exponential functions [this may require use of all previous differentiation techniques, implicit differentiation, and/or logarithmic differentiation].
17. Evaluate a given inverse trigonometric function or expression.
18. Find the derivative of inverse trigonometric functions.
19. Solve given related rate applications.
20. Solve associated applications of the derivatives found thus far.
  
21. Calculate Differentials of a given function [ $dy \approx f'(x) dx$ ].
22. Determine local linear approximations and errors.
23. Solve associated applications of the derivatives found thus far.
  
24. Determine critical numbers & critical values of a function
25. Determine intervals of increasing, decreasing, constant, concave up, and concave down for a given function
26. Determine all relative extrema of a function
27. Sketch the graph of a given function, labeling all information of the graph



**MAC2311 Calculus I**  
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28. Sketch the graph of a function given information about the derivatives
29. Determine the absolute maximum/minimum of a given function  
[whether the interval is opened or closed]
30. Solve applications utilizing concepts of absolute maximums/minimums  
[this includes but is not limited to area, surface area, volume, revenue, cost, and profit]
31. Determine velocity, acceleration, speed, distance covered, etc. from a given position function
32. Determine if Rolle's/MVT applies in a given situation; if so, find the value  $c \in (a, b)$  guaranteed by the theorem
33. Evaluate definite and indefinite integrals utilizing basic techniques [this includes the trigonometric, logarithmic, and exponential functions]
34. Evaluate definite and indefinite integrals utilizing  $u$ -substitution [this includes the trigonometric, logarithmic, and exponential functions]
35. Simplify series expressions in  $\Sigma$  notation
36. Calculate the area under a curve utilizing  $\Sigma$  notation
37. Find the area under a curve by integration
38. Apply the Fundamental Theorem of Calculus Parts I & II to evaluate a given problem
39. Calculate the mean value of an integral
40. Solve applications of the above type of problems including basic initial condition problems, position &/or velocity functions

Chapter Practice Exercises

- Ch. 2 p. 111      5 – 33, 41 – 56
- Ch. 3 p. 206      1 – 92 eoo, 99 – 116 eoo, 119, 120, 125 – 149
- Ch. 4 p. 282      7 – 12, 15 – 20, 27 – 84 eoo, 91 – 93, 97 – 124
- Ch. 5 p. 345      3 – 26 eoo, 30 – 112 eoo, 119 – 128

*And study your Take-home and In-class/On-line quizzes*

\*eoo every other odd