

M215 REVIEW

1. Evaluate two-sided and one-sided limits. Problems: p. 74, 84.
2. State the formal (epsilon-delta) definition of the limit and use this definition to prove a given limit. Problems: p. 95.
3. Determine where a function is continuous or discontinuous and classify the discontinuities. Problems: p. 105.
4. Find and simplify derivatives by use of definition, product rule, quotient rule, power rule, chain rule, and implicit differentiation. Sketch the graph of the derivative of a function. Find equations for tangent lines. Use the derivative to determine the rate of change of one variable with respect to another. Problems: p. 119, 131, 144, 154, 161, 169, 179.
5. Solve related rate problems. Problems: p. 186.
6. Given the graph of a function, find and classify any maximum and minimum values of the function. Find the absolute maximum and absolute minimum for a function defined on a closed interval. Find the critical numbers for a function. Problems: p. 211.
7. State, illustrate, and verify Rolle's Theorem and the Mean Value Theorem (for derivatives). Determine if a function satisfies the hypothesis of the Mean Value Theorem or Rolle's Theorem. Problems: p. 219.
8. Sketch and analyze the graph of a function by use of the first and second derivatives. Find the intervals over which the function is increasing/decreasing and those over which it is concave upward/concave downward and find critical points, points of inflection, and maximum or minimum values. Problems: p. 227.
9. Evaluate limits at infinity. Problems: p. 240
10. Solve optimization problems. Problems: p. 262.
11. Compute antiderivatives. Find a function when given its first or first and second derivatives. Find the position function for a particle when given the velocity or velocity and acceleration of the particle. Problems: p. 279.
12. Approximate the area under a curve by use of rectangles and right endpoints, left endpoints or midpoints. Problems: p. 298.

13. Approximate definite integrals by calculating Riemann sums. Express limits of Riemann sums as definite integrals. Evaluate definite integrals by interpreting the integrals in terms of area. Problems: p. 310.
14. Evaluate definite integrals by using the Fundamental Theorem of Calculus Part II. Use the Fundamental Theorem of Calculus Part I to evaluate derivatives. Compute indefinite integrals. Prove both parts of the Fundamental Theorem of Calculus. Problems: p. 321, 329.
15. Compute indefinite integrals and definite integrals by use of substitution. Problems: p. 338.
16. Sketch the region between two curves and find the area of the region. Problems: p. 352.
17. Find the volume of a solid of rotation by using slices and shells. Find the volume of a solid of known cross-sectional area. Problems: p. 362, 368.
18. Solve "work" problems. Problems: p. 373.
19. Show that two functions are inverses of each other. Find the inverse of a function. Sketch the graphs of a function and its inverse. Problems: p. 391.
20. Find derivatives of expressions involving the natural logarithmic function and use the natural logarithmic function to evaluate integrals. Sketch the graphs of logarithmic functions. Problems: p. 428.
21. Evaluate derivatives and integrals involving the natural exponential function. Sketch the graphs of exponential functions. Problems: p. 435.
22. Evaluate derivatives and integrals involving the general exponential and logarithmic functions. Problems: p. 445.
23. Solve exponential growth and decay problems. Problems: 453.