

Learning Outcomes for Calculus II (Math 1920)

Upon completion of the course, the student will be able to:

1. interpret the area enclosed between curves as a definite integral and compute its value
2. set up the Riemann sum representing the volume enclosed by a geometric solid, convert the result to a definite integral and compute its value.
3. interpret a volume of revolution of a function's graph around a given axis as a (Riemann) sum of disks or cylindrical shells, convert to definite integral form and compute its value.
4. express the length of a curve as a (Riemann) sum of linear segments, convert to definite integral form and compute its value.
5. express the surface area of revolution of a function's graph around a given axis as a (Riemann) sum of rings, convert to definite integral form and compute its value.
6. anti-differentiate products of functions by parts.
7. recognize and implement appropriate techniques to anti-differentiate products of trigonometric functions.
8. devise and apply a trigonometric substitution in integrals involving Pythagorean quotients
9. decompose a rational integrand using partial fractions
10. determine convergence of improper integrals with discontinuities in their domain or infinite limits of integration
11. use the concept of the limit at infinity to determine whether a sequence of real numbers is bounded and whether it converges or diverges
12. interpret the concept of a series as the sum of a sequence, and use the sequence of partial sums to determine convergence of a series.
13. decide whether and to what value an infinite geometric series converges
14. recognize the embedded infinite geometric series in geometric applications.
15. use comparison with a corresponding integral with other series to decide whether infinite series (including p -series) converge or diverge

16. be able to decide whether an alternating series converges from the limit and monotonic decrease of the sequence of absolute values of its terms
17. distinguish between absolute and conditional convergence of series and be aware of the consequences of reordering terms in conditionally converging series
18. perform the ratio and root test to determine convergence of infinite series
19. interpret a converging power series as a function
20. determine the Taylor series of the n^{th} order and determine an upper bound on its remainder.
21. establish Euler's Formula by comparing the Taylor series for the complex exponential and the trigonometric functions
22. manipulate Taylor series by substitution and (anti-) differentiation to obtain expansions for other functions.
23. distinguish among the main types of conic sections based on the discriminant criterion
24. devise parametric representations for conic sections and other relations
25. compute the length of a curve segment from its parametric representation.
26. apply basic anti-differentiation techniques to selected problems arising in various fields such as physical modeling , economics and population dynamics.