The Department of Mathematics
2018–19–B term

Course Name Infinitesimal Calculus 2

Course Number 201.1.1021

Course web page
https://www.math.bgu.ac.il//en/teaching/spring2019/courses/
infinitesimal-calculus-2

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Office Hours https://www.math.bgu.ac.il/en/teaching/hours

Abstract

Requirements and grading[1]

Course topics

The derivative as a function: continuously dffierentiable functions, Darboux's theorem. Convex functions: definition, one-sided dffierentiability, connection to the second derivative. Cauchy's generalized Mean Value Theorem and its applications: L'Hospital's rule, Taylor polynomials with Lagrange remainder. The Newton-Raphson method. Series: Cauchy's criterion, absolutely convergent series, the comparison, quotient and root tests, the Dirichlet test, change of the order of summation, the product formula for series, Taylor series, Taylor series of elementary functions. The definition of an analytic function, the radius of convergence of a power series. The Riemann integral. Riemann sums. The fundamental theorem of calculus (the Newton-Leibniz formula). Methods for computing integrals (the indefinite integral): integration by parts, change of variable, partial fractions. Improper integrals. Numerical integration: the midpoint, trapezoid and Simpson's rules. Stirling's formula. Introduction to convergence of functions, problems with pointwise convergence. Introduction to ordinary dffierential equations: the dffierential equation y'=ky, solution of first order ODE's by separation of variables, initial value conditions.

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[1]Information may change during the first two weeks of the term. Please consult the webpage for updates