

## The Department of Mathematics

2022–23–A term

**Course Name** Calculus B1

**Course Number** 201.1.9141

**Course web page**

<https://www.math.bgu.ac.il/en/teaching/fall2023/courses/calculus-b1>

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

### Abstract

### Requirements and grading<sup>1</sup>

### Course topics

- 1 Introduction to number theory. Intervals and segments. Concept of a function. Elementary functions.
- 2 Limit of a function.
- 3 Continuity and discontinuity of functions.
- 4 Derivative and differential. Basic derivatives. Differentiability and continuity. Linear approximation by differentials. Higher-order derivatives. The fundamental theorems of differentiation and their applications. L'Hopital's theorem and its application to calculation of limits.
- 5 Taylor's polynom. Expansion of functions into Taylor's and McLoran's series. Expansions of some usage functions. Application of Taylor's and McLoran's polynoms a) to approximate calculations, and b) to calculation of limits.
- 6 Investigation of a function. Extremal points. Necessary and sufficient conditions for extrema. Max. and min. of a function within a segment. Convexity and concavity, inflection point. Asymptotes. Graph construction.
- 7 Primitive function and indefinite integral. Table integrals. Calculation of indefinite integrals by decomposition, by parts, by substitution. Integration of rational and trigonometric functions.
- 8 Definite integrals. Reimann's sum. The fundamental theorem. Formula of Newton-Leibnitz. Calculation of definite integrals. Integration by decomposition, by parts, by substitution.
- 9 Use in definite integrals to calculation of areas,

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<sup>1</sup>Information may change during the first two weeks of the term. Please consult the webpage for updates



volumes and curve lengths. Rectangular and polar coordinate systems.10.  
First-order ordinary differential equations. General definitions. Cauchy  
problem. Separated variables.