

The Department of Mathematics

2021–22–A term

Course Name Calculus B1

Course Number 201.1.9141

Course web page

<https://math.bgu.ac.il/en/teaching/fall2022/courses/calculus-b1>

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Abstract

Requirements and grading¹

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. High-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,

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

by parts, by substitution.9. Use in definite integrals to calculation of areas, volumes and curve lengths. Rectungular and polar coordinate systems.10. First-order ordinary dffierential equations. General definitions. Cauchy problem. Separated variables.