

Bachelor's Preliminary Mathematics Foundations

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Introduction

It is completely obvious that mathematics is the most important tool for modelling various phenomena. With the help of these tools we can understand all processes involved in complex social, economic, political, natural, physical, biological, chemical and other kinds of universal rules and interactions. Therefore, all bachelor students must be familiar with some fundamental mathematical principles useful for their curriculum in order to succeed.

Some examples are introduced in every chapter which are helpful for facilitation of innovation in students. In other way, they must be familiar with different rules, function manipulation methods and some other skills in order to simplify challenging math problems.

In chapter 1, limits and continuity are presented. This two concepts are extremely interrelated and it can be

said that they are complementary in nature. Chapter 2 deals with differentiation which is also related to topics discussed in chapter 1. In this chapter, all practical differentiation rules will be analyzed and some easy and challenging examples will be discussed. Actually in most of bachelor math curriculums, first 2 chapters are devoted to these concepts.

Chapter 3 is about integrals. Methods of integration, improper integrals, basic properties of integral and definite integrals are some topics discussed in this chapter. As always, good examples are presented too. Chapter 4 relates to important applications of integrals such as calculation of average of a function, area of a planar region, curve length, volume of a solid of revolution, surface of a solid of revolution, mass and center of gravity for planar regions and solids of rotation. Meanwhile derivative of an integral and Gamma and Beta functions will be discussed.

Chapter 5 is about Sequences. After introduction, limit of a sequence and applications of sequence will be presented and discussed. Basic properties of sequences and various examples will be presented. Finally in Chapter 6 Series are introduced. Convergence testing and series of functions plus summing up series and some

problems will be analyzed and solved. It is hoped that all topics covered in this book, help students and other interested stakeholders to gain a deeper knowledge about useful mathematic concepts and tools.

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