Mathematical prerequisites

The course in **Mathematics for Economics and Business 1** requires knowledge in mathematics based on the curriculum of an Austrian secondary school. As we are an Austrian based university, the curricula are designed according to the Austrian educational standard. This is why we expect applicants to have the knowledge in mathematics which is required from Austrian students in secondary school.

This course is based on the contents of the Austrian Matura, which comprises:

Fundamental Operations with Numbers (Real Numbers, Exponents, Powers, Fractions, etc.), Fundamental Operations with Algebraic Expressions (Terms, Degrees, Grouping, Computations, etc.), Properties of Numbers, Special Products, Factoring (Factorization Procedures, Greatest Common Factor, Least Common Multiple), Fractions (Operations with Fractions, Rational Algebraic Fractions, Complex Fractions), Exponents (Integral Exponents, Roots, Rational Exponents, General Laws of Exponents, etc.), Radicals (Radical Expressions, Laws for Radicals, Operations with Radicals, Rationalizing Binomial Denominators, etc.), Operations with Complex Numbers (Graphical Representation of, Algebraic Operations with Complex Numbers, etc.), Equations (Transformation, Equivalent Equations, Polynomial Equations, etc.), Ratio/Proportion/Variation, Functions and Graphs (Variables, Relations, Functions, Function Notations, Rectangular Coordinate System, Function of Two Variables, Symmetry, Shifts, Scaling, etc.), Linear Equations in One Variable (Linear/Literal Equations), Equations of Lines (Slope of a Line, Parallel and Perpendicular Lines, Slope-Intercept form, Slope-Point Form, Two-point Form, Intercept Form), Simultaneous Linear Equations (Systems of Two/Three Linear Equations), Quadratic Equations in One Variable (Methods of Solving Quadratic Equations, etc.), Systems of Equations Involving Quadratics (Graphical/Algebraic Solution), Inequalities (Principles, Absolute Value Inequalities, Higher Degree Inequalities, Linear Inequalities in Two Variables, Systems of Linear Inequalities, etc.), Polynomial Functions (Polynomial Equations, Zeros of Polynomial Equations, Solving Polynomial Equations, Approximating Real Zeros), Rational Functions (Vertical/Horizontal Asymptotes, Graphing Rational Functions, etc.), Sequences and Series (Arithmetic/Geometric/Harmonic Sequences, Infinite Geometric Series, Means, etc.), Logarithms (Definitions, Laws, Common Logarithms, Natural Logarithms, Use of Tables/Calculators, etc.), Application of Logarithms and Exponents (Simple/Compound Interests, etc.), Permutations and Combinations, The Binominal Theorem, Probability

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(Simple/Compound/Binominal/Conditional Probability, Mathematical Expectation), Mathematical Induction (Principles of and Proof by Mathematical Induction), Partial Fractions (Rational/Proper/Partial Fractions, Identically Equal Polynomials, Fundamental Theorem, Finding Decompositions), The Derivative (Slope of a Function, Limits, Derivative Function, Adjectives for Functions), Rules for Finding Derivatives (Power/Product/Quotient/Chain Rule, Linearity of Derivatives), Curve Sketching (Maxima and Minima, First/Second Derivative Test, Concavity and Inflection Points, Asymptotes, etc.), Integration (Substitution, Integration by Parts, Rational Functions, etc.).

Recommended material for self-study preparation

1) **Schaum's Outline of College Algebra, 4th Edition (Schaum's Outline Series) by Murray Spiegel, Robert Moyer**

2) **David Guichard, Single and Multivariable Calculus** (available online)
You don't have to go through everything from the book – only the yellow marked parts in the below-mentioned table of content of the book are obligatory prerequisites. The other chapters are helpful but not mandatory.

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