

Macau University of Science and Technology

2016/2017 Admission Examination Syllabus (Mathematics)

The admission examination on mathematics is designed for the applicants of undergraduate programs. Examination duration is two hours and the syllabus is:

Set, proposition, and prove

Concept of set; set operations (union, intersection, complement).

Sets of integers, set of rational numbers, set of real numbers, set of complex numbers.

Proposition, sufficient condition, necessary condition, sufficient and necessary condition.

Mathematical induction.

Equation and inequality

Quadratic equation.

system of linear equations.

Concept and basic properties of inequalities. Set of solution of inequality.

System of linear inequalities with two variables, quadratic inequalities. and Absolute value inequalities.

Simple mean inequalities.

Function

Mapping and inverse mapping of sets; function and inverse function. domain and range of functions. composite function, graphs and properties of functions.

Graph and properties of quadratic function

Graphs and properties of power functions.

Graphs and properties of exponential functions.

Graphs and properties of logarithmic functions.

Trigonometric functions

Extension of angle and radian.

Trigonometric functions of a angle. Relationship between Trigonometric functions.

Trigonometric identities (about double angles and half of angles).

Graphs of Trigonometric functions and inverse trigonometric functions.

Solve a triangle.

One-variable polynomial

Division with a remainder.

Roots of one-variable polynomial with real coefficients.

Factoring.

Relationship between roots and coefficients.

Sequence

Concept of sequence. Sum of sequence.

General term formula of Arithmetic sequence and its sum.

General term formula of Geometric sequence and its sum.

Permutations, combinations, binomial theorem, and elementary property

Permutations.

Combinations, two properties of combinations

$$(C_n^m = C_n^{n-m}, C_{n+1}^m = C_n^m + C_n^{m-1}).$$

Binomial theorem.

Events, simple calculation of classical probability

Analytic geometry

Distance between two points.

Slopes and equations of straight lines,

Conditions of perpendicular and parallel straight lines.

Curves and equations.

Equation of circle. Relative position of two circles.

Equations of conic sections (ellipse, hyperbola, parabola).