Math Department

Year of 2026-2027

Lessons required for the Math Entrance Exam:(Grade 11ADP to 12ADP) (Precalculus)

*Calculator is needed. Word Problems are required.

1. Sets and Basic Probability

   Students should be able to:

- Use set notation to represent elements, subsets, unions, intersections, and complements.
- Calculate the number of possible outcomes of experiments using counting principles.
- Apply permutations and combinations in probability problems.
- Organize and represent statistical data using appropriate methods (Tables/diagrams).
- Calculate measures of central tendency and variability.

2. Complex Numbers

   Students should be able to:

   - Perform arithmetic operations with complex numbers.
   - Express quotients of complex numbers in standard form using complex conjugates.

3. Functions

   - Identify functions, evaluate them, and determine their domains.
   - Analyze graphs to determine domain, range, intercepts, and zeros.
   - Identify elements of symmetry and classify functions as even or odd.
   - Perform operations (including composition) on functions.
   - Determine intervals where functions are increasing, decreasing, or constant.
   - Identify relative extrema of functions.
   - Check whether functions have inverses and find inverse functions algebraically and graphically.

- Determine the average rate of change of functions.
- Analyze limits to describe continuity and end behavior.
- Graph polynomial and quadratic functions and analyze their key features.
- Graph and analyze radical, power and rational functions.
- Evaluate and graph logarithmic and exponential functions.
- Identify and graph common parent functions.
- Describe and graph transformations of functions.
- Determine real and complex zeros of polynomial functions.
- Divide polynomials using long division and synthetic division.

4. Expressions, Equations and Inequalities:

   Students should be able to:

- Simplify and evaluate expressions involving radicals and rational exponents.
- Solve quadratic equations algebraically and graphically.
- Solve radical, power and rational equations.
- Solve polynomial and rational inequalities.
- Solve systems of linear equations using algebraic and graphical methods.
- Solve systems of linear inequalities and represent solutions graphically.

5. Logarithms and Exponentials

- Evaluate logarithmic expressions.
- Apply properties of logarithms to simplify expressions.
- Use the change-of-base formula.
- Solve exponential and logarithmic equations.
- Solve problems involving exponential growth and decay.

6. Trigonometry:

- Evaluate trigonometric ratios in right triangles.
- Solve right triangles using trigonometric relationships.
- Convert between degree and radian measures.