MATH DEPARTMENT

Year of 2026-2027

Lessons required for the Math Entrance Exam: (Grade 8Bac to 9Bac)

*Calculator is not allowed.

1) **Powers:**

   Students should be able to:

   - Determine the sign of a power.
   - Simplify numerical and algebraic expressions involving powers and fractions by applying the laws of exponent and order of operations.
   - Write negative powers of 10 in decimal form and vice versa.
   - Express a number in scientific notation.

2) **Square Roots:**

   Students should be able to:

   - Simplify square roots.
   - Perform operations on square roots.

3) **Literal Fractions:**

   Students should be able to:

   - Simplify numerical fractions.
   - Perform operations on numerical fractions (addition/subtraction/multiplication/division).
   - Simplify compound/complex fractions and perform operations on them.

4) **Algebraic Expressions/ Remarkable Identities:**

Students should be able to:

- Evaluate an algebraic expression for a given value of the variable.
- Simplify multi-step expressions using the correct order of operations.
- Add, subtract, and multiply polynomials.
- Expand identities of the form: $(a+b)^2$, $(a-b)^2$ and $(a+b)(a-b)$.
- Factorize an algebraic expression (Factoring by GCF / Factoring by Grouping / Factoring using Remarkable identities).

5) **Equations:**

Students should be able to:

- Verify that a given number is a solution for an equation.
- Solve a 1st degree equation including an equation with rational coefficients.
- Solve a 2nd degree equation by factoring and applying the zero-product rule.

6) **Rational Algebraic Expressions:**

Students should be able to:

- Determine the domain of definition of an algebraic expression of the form: $F(x) = \frac{A(x)}{B(x)}$.
- Simplify rational algebraic expressions.
- Solve rational algebraic equation of the form: $\frac{A(x)}{B(x)} = 0$.

7) **Parallelograms:**

Students should be able to:

- Use the properties of a parallelogram.
- Prove that a quadrilateral is a parallelogram.

8) **Special Parallelograms:**

Students should be able to:

- Use the properties of a rectangle, rhombus and square.
- Prove that a quadrilateral is a rectangle, rhombus, or square.

9) Midpoints Theorem:

Students should be able to:

- Apply the midpoints theorem and its converse in a triangle.

10)The Trapezoid:

Students should be able to:

- Find the length of the median of a trapezoid.
- Use the properties of a trapezoid, a right trapezoid and an isosceles trapezoid.
- Prove that a quadrilateral is a trapezoid, a right trapezoid or an isosceles trapezoid.

11)Pythagoras' Theorem:

Students should be able to:

- Apply Pythagoras' theorem and its converse.
- Use the relation between the median relative to the hypotenuse and the hypotenuse in a right triangle to find the length of the median or the hypotenuse/ to prove a triangle right.

12)Relative Positions of Two Circles:

Students should be able to:

- Determine the relative position of a point and a circle (exterior, on, interior).
- Determine the relative position of a line and a circle (exterior, tangent, and secant).
- Use the property that a line tangent to a circle is perpendicular to the radius at the point of tangency.
- Determine the relative position of two circles (Disjoint Circles (exterior/interior circles); Tangent Circles; Intersecting / Secant Circles) knowing their radii and the distance between their centers.
- Determine the relation between the distance of the centers of the two circles and the sum or difference of their radii, knowing the relative position of the two circles.

13)Arcs and Angles:

Students should be able to:

- Identify angle types (central, inscribed, interior, and exterior).
- Calculate the measure of angles/intercepted arcs.