



MATH DEPARTMENT

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

1) Powers:

Students should be able to:

- Determine the sign of a power.
- Apply the rules of calculation with powers.
- Write negative powers of 10 in decimal form and vice versa.
- Express a number in scientific notation.
- Find the GCD and LCM of two or more natural numbers.

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.

4) Remarkable Identities:

Students should be able to:

- 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:

- Solve 1st degree equation of the form: $ax + b = cx + d$.
- Solve 1st degree equation with rational coefficients.
- Solve product equation of the form: $(ax + b)(cx + d) = 0$.
- Solve 2nd degree equation (Factorize then solve product of 2 factors equal to zero).

6) Rational Algebraic Expressions:

Students should be able to:

- Determine the domain of definition of an algebraic expression in fractional 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.
- Prove that a quadrilateral is a rectangle.
- Use the properties of a rhombus.
- Prove that a quadrilateral is a rhombus.
- Use the properties of a square.
- Prove that a quadrilateral is a square.

9) Relative Positions of Two Circles:

Students should be able to:

- Recognize parts of a circle (center, radius, diameter...).
- 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.

10) Midpoints Theorem:

Students should be able to:

- Apply the midpoints theorem in a triangle.
- Use the converse of midpoints theorem.

12) Pythagoras' Theorem:

Students should be able to:

- Apply Pythagoras' theorem.
- Use the Converse of Pythagoras' theorem.
- 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.

13) Arcs and Angles:

Students should be able to:

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