Math Department

Year of 2026-2027

Lessons Required for the Math Entrance Exam: (Grade 9ADP to 10ADP)

ALGEBRA 1:

*Calculator is needed. Real-world problems are included.

Algebra 1

1. **Expressions**

Students should be able to:

- Write numerical/algebraic expressions from verbal statements and vice versa.
- Evaluate numerical and algebraic expressions.
- Evaluate numerical expressions using inverse, identity, commutative and associative properties.
- Use the distributive property to simplify and evaluate expressions.
- Evaluate absolute value expressions.

2. **Equations in One Variable**

Students should be able to:

- Translate verbal statements into equations and vice versa.
- Solve equations (one-step, multi-steps, equations with variables on both sides).
- Determine whether an equation is an identity or has no solution.
- Solve absolute value equations.
- Solve proportions.
- Solve formulas for a specified variable.
- Convert units of measure.

3. Linear and Non-linear Functions

Students should be able to:

- Interpret linear functions from graphs and equations.
- Graph linear functions.
- Write equations of lines in slope-intercept and point-slope forms.
- Identify and write equations of parallel and perpendicular lines.
- Solve and graph linear and multi-step linear inequalities.
- Solve and graph compound inequalities involving “and”/”or”.
- Solve and graph absolute value inequalities.
- Determine the number of solutions of a system of linear equations.
- Solve systems of equations graphically, algebraically (substitution/elimination) and by using graphing calculator.

4. Exponents and Roots

Students should be able to:

- Multiply and divide monomials.
- Simplify power expressions including those with zero and negative exponents.
- Rewrite expressions involving nth roots and rational exponents and their powers.
- Simplify square roots.
- Perform operations with radical expressions.
- Solve exponential equations.

5. Polynomials

Students should be able to:

- Identify and write polynomials in standard form.
- Add and subtract polynomials.
- Multiply polynomials by monomials.
- Multiply binomials using the distributive property and the FOIL method and using patterns of sums and differences of squares.
- Factor polynomials using the distributive property and grouping.
- Factor trinomials with a leading coefficient of 1 and a leading coefficient not equal to 1.
- Factor binomials that are differences of squares and perfect squares.

Geometry

1. Geometry Tools

Students should be able to:

- Identify points, lines, planes, and their intersections.
- Calculate measures of line segments and find missing values.
- Find the length of a line segment on a number line.
- Find the distance between two points on the coordinate plane.
- Find the coordinates of a midpoint or endpoint of a line segment on a number line or coordinate plane.
- Find missing values using the definition of a segment bisector/congruent segments.

2. Angles and Geometric Figures

Students should be able to:

- Identify different angle types (adjacent, linear pairs, vertical, complementary, supplementary)
- Calculate angle measures using angel types, congruent angles, angle bisectors, and properties of perpendicular lines.
- Find perimeters, circumferences, and areas of two-dimensional figures.

3. Line Relationships

Students should be able to:

- Classify lines as parallel, perpendicular, or neither by comparing slopes or equations.
- Apply angle relationship theorems to identify parallel lines and find missing values.
- Find the distance between a point and a line and between two parallel lines.

4. Triangles and Congruence

Students should be able to:

- Apply the angle-sum theorem and exterior angles theorem in a triangle to solve problems.
- Use congruence criterion of corresponding congruent parts of triangles to solve problems.
- Use the SSS, SAS, ASA and AAS congruence criteria for triangles to solve problems and prove relationships in geometric figures.
- Use the right triangle congruence theorem to prove relationships in geometric figures.
- Solve problems involving isosceles and equilateral triangles.

5. Relationships in Triangles

Students should be able to:

- Prove theorems and solve problems about perpendicular bisectors of line segments and angle bisectors.
- Solve problems by applying the centroid theorem.
- Use altitudes and the slope criteria for perpendicular lines to determine the coordinates of the orthocenters of triangles on the coordinate plane.