

Math Department

Lessons Required for the Math Entrance Exam: (Grade 8ADP To 9ADP)

*Calculator is needed.

Algebra 1:

Note: Word problems are required in all chapters.

Chapter 1: Expressions, Equations, and Functions:

Students should be able to:

- Evaluate/simplify numerical and algebraic expressions using order of operations.
- Use the distributive property to evaluate and simplify expressions.
- Solve equations with one variable / two variables.

Chapter 2: Linear Equations:

Students should be able to:

- Solve equations by addition and subtraction / multiplication and division.
- Solve equations involving more than one operation / consecutive integers.

Chapter 7: Multiplication Properties of Exponents:

Students should be able to:

- Multiply / Divide monomials using the properties of exponents.
- Simplify expressions using the multiplication properties of exponents.
- Simplify expressions containing negative and zero exponents.
- Express numbers in scientific notation.
- Find products and quotients of numbers expressed in scientific notation.

Chapter 8: Quadratic Expressions and Equations:

Students should be able to:

- Write polynomials in standard form.
- Add and subtract polynomials.
- Multiply a polynomial by a monomial.
- Solve equations involving the products of monomials and polynomials.
- Multiply binomials using the FOIL method.
- Multiply polynomials using the Distributive Property.
- Find squares of sums and differences.
- Find the product of a sum and a difference.
- Factor polynomials using Distributive Property, difference of squares and perfect squares to factor polynomials.
- Solve equations of the form $ax^2 + bx = 0$.

- Solve equations using the mentioned factoring methods.

Chapter 10: Radical Functions and Geometry

Students should be able to:

- Solve problems by using the Pythagorean Theorem.
- Determine whether a triangle is a right triangle.

Geometry:

Chapter 1: Tools of Geometry

Students should be able to:

- Measure and classify angles.
- Identify and use congruent angles, the bisector of an angle, and special pairs of angles.
- Identify perpendicular lines.

Ch3: Parallel and Perpendicular Lines

Students should be able to:

- Identify and find the measure of: Interior angles, exterior angles, consecutive interior angles, alternate interior angles, alternate exterior angles, and corresponding angles.

Chapter 4: Congruent Triangles

Students should be able to:

- Identify and classify triangles by angle measures / by side measures.
- Apply the triangle Angle-Sum Theorem / Exterior Angle Theorem.
- Name and use corresponding parts of congruent polygons.
- Use the SSS, SAS, ASA, AAS to test for triangle congruence.
- Use properties of isosceles triangles / equilateral triangles.

Chapter 5: Relationships in Triangles

Students should be able to:

- Construct angle bisector, perpendicular bisector, median and altitude in a triangle.
- Apply The Angle Bisector Theorem and the Perpendicular Bisector Theorem as well as their converses.
- Apply the properties of incenter, circumcenter, centroid and orthocenter.

Chapter 6: Quadrilaterals

Students should be able to:

- Apply properties of the sides / angles / diagonals of parallelograms.
- Prove that a quadrilateral is a parallelogram.
- Apply properties of rectangles, rhombi and squares.
- Determine whether parallelograms are rectangles, rhombi and squares.
- Apply properties of trapezoids.

Chapter 8: Right Triangles and Trigonometry

Students should be able to:

- Use the Pythagorean Theorem / the Converse of the Pythagorean Theorem.
- Use the properties of $45^\circ - 45^\circ - 90^\circ$ triangles and of $30^\circ - 60^\circ - 90^\circ$ triangles.

Chapter 10: Circles

Students should be able to:

- Identify and find the measures of central angles, major arcs, minor arcs, and semicircles.
- Find arc lengths.
- Find measures of inscribed angles.
- Use properties of tangents.
- Find measures of angles formed by lines intersecting on a circle, inside a circle or outside a circle.