



**UNIVERSAL COLLEGE - ALEY**

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# Math Department

**Year of 2025-2026**

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

## **ALGEBRA 1:**

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

### **Algebra**

#### **1. Expressions**

**Students should be able to:**

- Write numerical and algebraic expressions for verbal expressions and vice versa.
- Evaluate numerical and algebraic expressions.
- Use the property of equality and identity.
- Evaluate expressions by applying the inverse, identity, commutative, associative and distributive properties.
- Use the distributive property to simplify expressions.
- Evaluate absolute value expressions.

#### **2. Equations in One Variable**

**Students should be able to:**

- Translate sentences into equations and vice versa.
- Solve one-step and multi-steps equations.
- Solve equations with the variable on each side.
- Solve equations with absolute value.
- Solve proportions.
- Solve equations for specific variables.
- Convert units of measure.

### **3. Linear and Non-linear Functions**

**Students should be able to:**

- Calculate and interpret rate of change.
- Calculate and interpret slope.
- Rewrite linear equations in slope-intercept form.
- Graph and interpret linear functions.

### **4. Exponents and Roots**

**Students should be able to:**

- Find products and quotients of monomials.
- Find the power of a power.
- Find the power of a product/ quotient.
- Simplify expressions containing zero and negative exponents.
- Simplify expressions containing negative exponents.
- Simplify square roots.
- Add, subtract and multiply radical expressions.

### **5. Polynomials**

**Students should be able to:**

- Identify and write polynomials by using the standard form.
- Add and subtract polynomials.
- Multiply polynomials by monomials.
- Multiply binomials (distributive property, FOIL method, squares of sums and squares of differences)
- Factor polynomials (distributive property, grouping, perfect squares, differences of squares).

## **Geometry**

### **1. Geometry Tools**

#### **Students should be able to:**

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

### **2. Angles and Geometric Figures**

#### **Students should be able to:**

- Calculate angle measures using the definitions of congruent angles/angle bisectors and the characteristics of perpendicular lines and complementary/supplementary angles.
- Find perimeters and areas of two-dimensional geometric shapes.
- Prove theorems about angles by using the angle addition postulate.
- Prove theorems about angles by using properties and theorems of angle congruence.
- Prove theorems about right angles.

### **3. 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.

### **4. 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.

## 5. Quadrilaterals

### Students should be able to:

- Prove and use the polygon interior/exterior angles sum theorems.
- Apply the properties of parallelograms.
- Use the tests for parallelograms to determine whether quadrilaterals are parallelograms.
- Apply the properties of rectangles, rhombi and squares.
- Determine whether parallelograms are rectangles, rhombi or squares.
- Apply the properties of trapezoids to solve real-world and mathematical problems.

## 6. Right Triangles and Trigonometry

### Students should be able to:

- Use the Pythagorean theorem to solve problems involving right triangles.
- Classify triangles using the converse of the Pythagorean theorem.
- Identify special right triangles (right isosceles/ semi-equilateral).
- Solve problems (including real-world problems) by using trigonometric ratios for acute angles.