



# Mesquite ISD Curriculum Sequence

## High School Math - Algebra I

### 4th Six Weeks

Determine the domain and range of quadratic functions and represent the domain and range using inequalities. (A.6A)

Graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercept, y-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry. (A.7A)

Solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula. (A.8A)

Determine the domain and range of exponential functions of the form  $f(x) = ab^x$  and represent the domain and range using inequalities. (A.9A)

Interpret the meaning of the values of  $a$  and  $b$  in exponential functions of the form  $f(x) = ab^x$  in real-world problems. (A.9B)

Write exponential functions in the form  $f(x) = ab^x$  (where  $b$  is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay. (A.9C)

Graph exponential functions that model growth and decay and identify key features, including y-intercept and asymptote, in mathematical and real-world problems. (A.9D)

Write, using technology, exponential functions that provide a reasonable fit to data and make predictions for real-world problems. (A.9E)

Add and subtract polynomials of degree one and degree two. (A.10A)

Multiply polynomials of degree one and degree two. (A.10B)

Determine the quotient of a polynomial of degree one and polynomial of degree two when divided by a polynomial of degree one and polynomial of degree two when the degree of the divisor does not exceed the degree of the dividend. (A.10C)

Rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property. (A.10D)

Factor, if possible, trinomials with real factors in the form  $ax^2 + bx + c$ , including perfect square trinomials of degree two. (A.10E)

Decide if a binomial can be written as the difference of two squares and, if possible, use the structure of a difference of two squares to rewrite the binomial. (A.10F)

Simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents. (A.11B)

### 5th Six Weeks

Write linear equations in two variables given a table of values, a graph, and a verbal description. (A.2C)

Determine the effects on the graph of the parent function  $f(x) = x$  when  $f(x)$  is replaced by  $af(x)$ ,  $f(x) + d$ ,  $f(x - c)$ ,  $f(bx)$  for specific values of  $a$ ,  $b$ ,  $c$ , and  $d$ . (A.3E)

Determine the domain and range of quadratic functions and represent the domain and range using inequalities. (A.6A)

Write equations of quadratic functions given the vertex and another point on the graph, write the equation in vertex form ( $f(x) = a(x - h)^2 + k$ ), and rewrite the equation from vertex form to standard form ( $f(x) = ax^2 + bx + c$ ). (A.6B)

Write quadratic functions when given real solutions and graphs of their related equations. (A.6C)

Graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercept, y-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry. (A.7A)

Describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions. (A.7B)

Determine the effects on the graph of the parent function  $f(x) = x^2$  when  $f(x)$  is replaced by  $af(x)$ ,  $f(x) + d$ ,  $f(x - c)$ ,  $f(bx)$  for specific values of  $a$ ,  $b$ ,  $c$ , and  $d$ . (A.7C)

Solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula. (A.8A)

Write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems. (A.8B)

Write exponential functions in the form  $f(x) = ab^x$  (where  $b$  is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay. (A.9C)

Simplify numerical radical expressions involving square roots. (A.11A)

### 6th Six Weeks

#### STAAR Review

Graph the functions  $f(x) = \sqrt{x}$ ,  $f(x) = 1/x$ ,  $f(x) = x^3$ ,  $f(x) = \sqrt[3]{x}$ ,  $f(x) = b^x$ ,  $f(x) = |x|$ , and  $f(x) = \log_b(x)$  where  $b$  is 2, 10, and  $e$ , and, when applicable, analyze the key attributes such as domain, range, intercepts, symmetries, asymptotic behavior, and maximum and minimum given an interval. (2A.2A)

Analyze the effect on the graphs of  $f(x) = |x|$  when  $f(x)$  is replaced by  $af(x)$ ,  $f(bx)$ ,  $f(x - c)$ , and  $f(x) + d$  for specific positive and negative real values of  $a$ ,  $b$ ,  $c$ , and  $d$ . (2A.6C)

Derive and use the distance, slope, and midpoint formulas to verify geometric relationships, including congruence of segments and parallelism or perpendicularity of pairs of lines. (G.2B)



# Mesquite ISD Curriculum Sequence

## High School Math - Geometry

### 4th Six Weeks

Derive and use the distance, slope, and midpoint formulas to verify geometric relationships, including congruence of segments and parallelism or perpendicularity of pairs of lines (G.2B)

Investigate patterns to make conjectures about geometric relationships, including angles formed by parallel lines cut by a transversal, criteria required for triangle congruence, special segments of triangles, diagonals of quadrilaterals, interior and exterior angles of polygons, and special segments and angles of circles choosing from a variety of tools. (G.5A)

Use the constructions of congruent segments, congruent angles, angle bisectors, and perpendicular bisectors to make conjectures about geometric relationships. (G.5C)

Verify the Triangle Inequality theorem using constructions and apply the theorem to solve problems. (G.5D)

Verify theorems about angles formed by the intersection of lines and line segments, including vertical angles, and angles formed by parallel lines cut by a transversal and prove equidistance between the endpoints of a segment and points on its perpendicular bisector and apply these relationships to solve problems. (G.6A)

Verify theorems about the relationships in triangles, including proof of the Pythagorean Theorem, the sum of interior angles, base angles of isosceles triangles, midsegments, and medians, and apply these relationships to solve problems. (G.6D)

Prove a quadrilateral is a parallelogram, rectangle, square, or rhombus using opposite sides, opposite angles, or diagonals and apply these relationships to solve problems. (G.6E)

Apply the relationships in special right triangles 30-60-90 and 45-45-90 and the Pythagorean theorem, including Pythagorean triples, to solve problems. (G.9B)

### 5th Six Weeks

Identify the sequence of transformations that will carry a given pre-image onto an image on and off the coordinate plane. (G.3C)

Investigate patterns to make conjectures about geometric relationships, including angles formed by parallel lines cut by a transversal, criteria required for triangle congruence, special segments of triangles, diagonals of quadrilaterals, interior and exterior angles of polygons, and special segments and angles of circles choosing from a variety of tools. (G.5A)

Prove theorems about similar triangles, including the Triangle Proportionality theorem, and apply these theorems to solve problems. (G.8A)

Identify and apply the relationships that exist when an altitude is drawn to the hypotenuse of a right triangle, including the geometric mean, to solve problems. (G.8B)

Determine the lengths of sides and measures of angles in a right triangle by applying the trigonometric ratios sine, cosine, and tangent to solve problems. (G.9A)

Apply the relationships in special right triangles 30°-60°-90° and 45°-45°-90° and the Pythagorean theorem, including Pythagorean triples, to solve problems. (G.9B)

Apply theorems about circles, including relationships among angles, radii, chords, tangents, and secants, to solve non-contextual problems. (G.12A)

Apply the proportional relationship between the measure of an arc length of a circle and the circumference of the circle to solve problems. (G.12B)

Apply the proportional relationship between the measure of the area of a sector of a circle and the area of the circle to solve problems. (G.12C)

Describe radian measure of an angle as the ratio of the length of an arc intercepted by a central angle and the radius of the circle. (G.12D)

Show that the equation of a circle with center at the origin and radius  $r$  is  $x^2 + y^2 = r^2$  and determine the equation for the graph of a circle with radius  $r$  and center  $(h, k)$ ,  $(x - h)^2 + (y - k)^2 = r^2$ . (G.12E)

### 6th Six Weeks

Compare geometric relationships between Euclidean and spherical geometries, including parallel lines and the sum of the angles in a triangle. (G.4D)

Identify the shapes of two-dimensional cross-sections of prisms, pyramids, cylinders, cones, and spheres and identify 3-dimensional objects generated by rotations of two-dimensional shapes. (G.10A)

Determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and nonproportional dimensional change. (G.10B)

Apply the formula for the area of regular polygons to solve problems using appropriate units of measure. (G.11A)

Determine the area of composite two-dimensional figures comprised of a combination of triangles, parallelograms, trapezoids, kites, regular polygons, or sectors of circles to solve problems using appropriate units of measure. (G.11B)

Apply the formulas for the total and lateral surface area of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure. (G.11C)

Apply the formulas for the volume of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure. (G.11D)

Develop strategies to use permutations and combinations to solve contextual problems. (G.13A)

Determine probabilities based on area to solve contextual problems. (G.13B)

Identify whether two events are independent and compute the probability of the two events occurring together with or without replacement. (G.13C)

Apply conditional probability in contextual problems. (G.13D)

Apply independence in contextual problems. (G.13E)



# Mesquite ISD Curriculum Sequence

## High School Math - Algebra II

### 4th Six Weeks

Graph the functions  $f(x)=\sqrt{x}$ ,  $f(x)=1/x$ ,  $f(x)=x^3$ ,  $f(x)=3\sqrt{x}$ ,  $f(x)=bx$ ,  $f(x)=|x|$ , and  $f(x)=\log_b(x)$  where  $b$  is 2, 10, and  $e$ , and, when applicable, analyze the key attributes such as domain, range, intercepts, symmetries, asymptotic behavior, and maximum and minimum given an interval. (2A.2A)

Analyze the effect on the graphs of  $f(x) = x^3$  and  $f(x) = 3\sqrt{x}$  when  $f(x)$  is replaced by  $af(x)$ ,  $f(bx)$ ,  $f(x - c)$ , and  $f(x) + d$  for specific positive and negative real values of  $a$ ,  $b$ ,  $c$ , and  $d$ . (2A.6A)

Add, subtract, and multiply complex numbers. (2A.7A)

Add, subtract, and multiply polynomials. (2A.7B)

Determine the quotient of a polynomial of degree three and of degree four when divided by a polynomial of degree one and of degree two. (2A.7C)

Determine the linear factors of a polynomial function of degree three and of degree four using algebraic methods. (2A.7D)

Determine linear and quadratic factors of a polynomial expression of degree three and of degree four, including factoring the sum and difference of two cubes and factoring by grouping. (2A.7E)

Rewrite radical expressions that contain variables to equivalent forms. (2A.7G)

Analyze data to select the appropriate model from among linear, quadratic, and exponential models. (2A.8A)

Predict and make decisions and critical judgments from a given set of data using linear, quadratic, and exponential models. (2A.8C)

### 5th Six Weeks

Graph the functions  $f(x)=\sqrt{x}$ ,  $f(x)=1/x$ ,  $f(x)=x^3$ ,  $f(x)=3\sqrt{x}$ ,  $f(x)=bx$ ,  $f(x)=|x|$ , and  $f(x)=\log_b(x)$  where  $b$  is 2, 10, and  $e$ , and, when applicable, analyze the key attributes such as domain, range, intercepts, symmetries, asymptotic behavior, and maximum and minimum given an interval. (2A.2A)

Graph and write the inverse of a function using notation such as  $f^{-1}(x)$ . (2A.2B)

Describe and analyze the relationship between a function and its inverse (quadratic and square root, logarithmic and exponential), including the restriction(s) on domain, which will restrict its range. (2A.2C)

Use the composition of two functions, including the necessary restrictions on the domain, to determine if the functions are inverses of each other. (2A.2D)

Determine the effect on the graph of  $f(x) = \sqrt{x}$  when  $f(x)$  is replaced by  $af(x)$ ,  $f(x) + d$ ,  $f(bx)$ , and  $f(x - c)$  for specific positive and negative values of  $a$ ,  $b$ ,  $c$ , and  $d$ . (2A.4C)

Formulate quadratic and square root equations using technology given a table of data. (2A.4E)

Solve quadratic and square root equations. (2A.4F)

Identify extraneous solutions of square root equations. (2A.4G)

Analyze the effect on the graphs of  $f(x) = x^3$  and  $f(x) = 3\sqrt{x}$  when  $f(x)$  is replaced by  $af(x)$ ,  $f(bx)$ ,  $f(x - c)$ , and  $f(x) + d$  for specific positive and negative real values of  $a$ ,  $b$ ,  $c$ , and  $d$ . (2A.6A)

Solve cube root equations that have real roots. (2A.6B)

Analyze the effect on the graphs of  $f(x) = 1/x$  when  $f(x)$  is replaced by  $af(x)$ ,  $f(bx)$ ,  $f(x-c)$ , and  $f(x) + d$  for specific positive and negative real values of  $a$ ,  $b$ ,  $c$ , and  $d$ . (2A.6G)

Formulate rational equations that model real-world situations. (2A.6H)

Solve rational equations that have real solutions. (2A.6I)

Determine the reasonableness of a solution to a rational equation. (2A.6J)

Determine the asymptotic restrictions on the domain of a rational function and represent domain and range using interval notation, inequalities, and set notation. (2A.6K)

Formulate and solve equations involving inverse variation. (2A.6L)

Determine the sum, difference, product, and quotient of rational expressions with integral exponents of degree one and of degree two. (2A.7F)

Rewrite radical expressions that contain variables to equivalent forms. (2A.7G)

Solve equations involving rational exponents. (2A.7H)

Write the domain and range of a function in interval notation, inequalities, and set notation. (2A.7I)

### 6th Six Weeks

Graph the functions  $f(x)=\sqrt{x}$ ,  $f(x)=1/x$ ,  $f(x)=x^3$ ,  $f(x)=3\sqrt{x}$ ,  $f(x)=bx$ ,  $f(x)=|x|$ , and  $f(x)=\log_b(x)$  where  $b$  is 2, 10, and  $e$ , and, when applicable, analyze the key attributes such as domain, range, intercepts, symmetries, asymptotic behavior, and maximum and minimum given an interval. (2A.2A)

Graph and write the inverse of a function using notation such as  $f^{-1}(x)$ . (2A.2B)

Describe and analyze the relationship between a function and its inverse (quadratic and square root, logarithmic and exponential), including the restriction(s) on domain, which will restrict its range. (2A.2C)

Determine the effects on the key attributes on the graphs of  $f(x) = bx$  and  $f(x) = \log_b(x)$  where  $b$  is 2, 10, and  $e$  when  $f(x)$  is replaced by  $af(x)$ ,  $f(x) + d$ , and  $f(x - c)$  for specific positive and negative real values of  $a$ ,  $c$ , and  $d$ . (2A.5A)

Formulate exponential and logarithmic equations that model real-world situations, including exponential relationships written in recursive notation. (2A.5B)

Rewrite exponential equations as their corresponding logarithmic equations and logarithmic equations as their corresponding exponential equations. (2A.5C)

Solve exponential equations of the form  $y = ab^x$  where  $a$  is a nonzero real number and  $b$  is greater than zero and not equal to one and single logarithmic equations having real solutions. (2A.5D)

Determine the reasonableness of a solution to a logarithmic equation. (2A.5E)

Analyze data to select the appropriate model from among linear, quadratic, and exponential models. (2A.8A)

Use regression methods available through technology to write a linear function, a quadratic function, and an exponential function from a given set of data. (2A.8B)

Predict and make decisions and critical judgments from a given set of data using linear, quadratic, and exponential models. (2A.8C)

