

MONROE COUNTY COMMUNITY SCHOOL CORPORATION  
CURRICULUM GUIDE

**ALGEBRA 3-4**

**PROFICIENCY 1: THE LEARNER WILL SOLVE, GRAPH, AND USE EQUATIONS AND INEQUALITIES**

- 1.1 Solve linear equations and formulas for a specified variable
- 1.2 Graph linear equations, linear inequalities, and absolute value equations and inequalities
- 1.3 Interpret the slope and intercepts of a line
- 1.4 Apply the concepts of parallel and perpendicular lines as determined by a comparison of their slopes
- 1.5 Write and use an equation of a line which models a set of linear data
- 1.6 Fit a line to a set of linear data. Interpret the slope and intercepts

**PROFICIENCY 2: THE LEARNER WILL DEMONSTRATE AN UNDERSTANDING OF RELATIONS AND FUNCTION**

- 2.1 Determine if a given relation is a function
- 2.2 Identify the domain and range of a relation
- 2.3 Use function notation
- 2.4 Graph relations and functions with and without graphing technology
- 2.5 Find the zeros of a function
- 2.6 Solve an inequality by examining the graph
- 2.7 Communicate graphically, algebraically, and verbally real world phenomena as functions
- 2.8 Find the composition of two functions
- 2.9 Use iterative definitions of functions
- 2.10 Draw a scatter plot and solve problems using its prediction equation

**PROFICIENCY 3: THE LEARNER WILL OPERATE WITH MATRICES**

- 3.1 Organize data into an array or a matrix
- 3.2 Add and subtract matrices

- 3.3 Use scalar multiplication and multiply matrices
- 3.4 Find identity and inverse matrices of the second order
- 3.5 Solve real world problems using matrices
- 3.6 Solve matrix equations of the form  $AX = B$
- 3.7 Write and solve systems of linear equations in matrix form

**PROFICIENCY 4: THE LEARNER WILL GRAPH AND SOLVE SYSTEMS OF EQUATIONS AND INEQUALITIES**

- 4.1 Solve systems of two equations graphically
- 4.2 Solve systems of two equations in two variables using substitution and/or elimination
- 4.3 Solve systems of three equations in three variables using elimination
- 4.4 Use systems of equations and inequalities to solve real world and “word” problems through linear programming
- 4.5 Solve systems of inequalities by graphing

**PROFICIENCY 5: THE LEARNER WILL PERFORM OPERATIONS AND SOLVE PROBLEMS WITH POLYNOMIALS**

- 5.1 Divide one polynomial by another of a lower degree
- 5.2 Use synthetic division to divide a polynomial by a linear polynomial
- 5.3 Factor polynomials completely
- 5.4 Use factoring to solve polynomial equations
- 5.5 Use polynomial equations to solve real world and “word” problems
- 5.6 Expand powers of binomials using Pascal’s Triangle or the binomial theorem
- 5.7 Write a polynomial equation given its solutions

**PROFICIENCY 6: THE LEARNER WILL USE RATIONAL EXPRESSIONS TO SOLVE PROBLEMS**

- 6.1 Use expressions involving negative and fractional exponents
- 6.2 Find products and quotients of rational algebraic expressions
- 6.3 Simplify complex fractions
- 6.4 Solve fractional equations

- 6.5 Solve real world and “word” problems involving fractional equations
- 6.6 Solve problems of direct and inverse variation
- 6.7 Use joint and combined variation to solve real world and “word” problems

**PROFICIENCY 7: THE LEARNER WILL SOLVE PROBLEMS INVOLVING IRRATIONAL AND COMPLEX NUMBERS**

- 7.1 Simplify radicals having various indices
- 7.2 Simplify radicals using multiplication and division
- 7.3 Rationalize the denominator of a fraction
- 7.4 Add, subtract, multiply, and divide radical expressions
- 7.5 Evaluate expressions in either exponential or radical form
- 7.6 Simplify expressions containing rational exponents
- 7.7 Solve equations containing radicals
- 7.8 Identify and simplify expressions containing pure imaginary numbers
- 7.9 Solve quadratic equations that have pure imaginary solutions
- 7.10 Add, subtract, multiply, and divide complex numbers

**PROFICIENCY 8: THE LEARNER WILL SOLVE PROBLEMS WITH QUADRATIC EQUATIONS AND INEQUALITIES**

- 8.1 Complete the square to solve quadratic equations
- 8.2 Use the quadratic formula to solve quadratic equations
- 8.3 Define complex numbers and perform basic operations with them
- 8.4 Solve quadratic inequalities
- 8.5 Determine the solutions of quadratic and other polynomial equations using graphing technology
- 8.6 Solve real world and “word” problems using quadratic equations and inequalities
- 8.7 Interpret maximum and minimum values of a quadratic function
- 8.8 Use the discriminant of a quadratic equation to determine the nature of the roots and the number of x-intercepts of the graph

**PROFICIENCY 9: THE LEARNER WILL USE ANALYTIC GEOMETRY TO SOLVE PROBLEMS**

- 9.1 Write the equations of and graph circles and parabolas given their geometric properties
- 9.2 Write the equations of and graph ellipses and hyperbolas given their geometric properties
- 9.3 Solve systems of quadratic equations algebraically
- 9.4 Solve systems of quadratic equations using graphing calculators and finding intersection points

**PROFICIENCY 10: THE LEARNER WILL SOLVE PROBLEMS WITH POLYNOMIAL FUNCTIONS**

- 10.1 Identify general shapes of the graphs of polynomial functions
- 10.2 Find factors of polynomials using the Factor Theorem and synthetic division
- 10.3 Find the number of positive real zeros, negative real zeros, and complex zeros for a polynomial function
- 10.4 Identify all possible rational zeros of a polynomial function
- 10.5 Find the zeros of polynomial functions
- 10.6 Determine the inverse of a function or relation and use to solve real-life and “word” problems

**PROFICIENCY 11: THE LEARNER WILL SOLVE PROBLEMS INVOLVING LOGARITHMIC AND EXPONENTIAL FUNCTIONS**

- 11.1 Write an exponential function of the form  $f(x) = a \cdot b^x$  given the base and a point
- 11.2 Graph exponential functions of the form  $f(x) = a \cdot b^x$
- 11.3 Use exponential equations of the form  $f(x) = (1 + r)^x$  where  $r$  is given as a rate of growth
- 11.4 Apply the definition of logarithms
- 11.5 Use properties of logarithms and exponents
- 11.6 Use logarithms to solve expressions of the form  $a \cdot b^x = c$  for  $x$

**PROFICIENCY 12: THE LEARNER WILL SOLVE PROBLEMS INVOLVING SEQUENCES AND SERIES**

- 12.1 Generate the terms of an arithmetic series by iteration
- 12.2 Use a calculator or computer to generate the terms of a geometric series by iteration
- 12.3 Use summation notation to describe the sums in a series