Midwest Region PASS Center
Course Descriptions

ALGEBRA IB
English and Spanish

SCOPE OF COURSE

Algebra IB covers relations, functions, functional metations, linear equations, inequalities, quadratic functions, and problem solving through statistical applications. Algebra IB contains 5 units with each unit comprised of 14 lessons. The course builds upon Algebra IA concepts and strategies from mathematical standards of various states.

SEQUENCE OF SKILLS

Unit 1 – Linear Functions

1. Functions and relations
2. Functional notation
3. Graphing
4. Linear functions
5. Slope of a line
6. Intercepts
7. Applications of slope and intercepts
8. Effects of change of slope and intercepts
9. Parallel and perpendicular lines
10. Writing linear equations
11. More on writing linear equations
12. Horizontal and vertical lines
13. More special linear equations and inverses
14. Applications

Unit 2 – Inequalities, Absolute Value, and Radicals

1. Graphing and writing inequalities – Part I
2. Graphing and writing inequalities – Part II
3. The algebra of inequalities
4. Linear inequalities in two variables
5. Writing linear inequalities in two variables
6. Absolute value equations
7. Absolute value inequalities with one variable
8. Absolute value inequalities with two variables
9. Simplifying radicals with variables
10. Multiplying and dividing radical expressions with variables
11. Addition and subtraction of radicals with variables
12. Rational expressions with radical monomial denominators
13. Rational expressions with radical binomial denominators
14. Gears, pulleys, and the wheel and axle

Unit 3 – Quadratic Functions, Circles, and Modeling Exponential Growth

1. Conic sections
2. The basics about quadratic functions
3. Solving quadratic equations – using square roots
4. Solving quadratic equations – by factoring

5. Completing the square
6. The quadratic formula
7. The discriminant and the nature of roots
8. The vertex of a parabola
9. Graphing quadratic functions
10. Writing the equations of quadratic functions
11. Maximum and minimum problems
12. The distance formula and a circle
13. The midpoint formula and the circle
14. Mathematical modeling – exponential growth and decay

Unit 4 – Systems of Equations and Inequalities

1. Systems of two linear equations – graphing
2. Systems of two linear equations – substitution
3. Systems of two linear equations – addition or elimination method
4. Writing systems of equations
5. Systems of equations with more than two variables
6. Solving systems of equations in three variables by elimination
7. Applications of systems of equations with three variables
8. Simultaneous solutions – a linear equation and a quadratic function
9. Simultaneous solutions – a linear equation and an absolute value function or a circle
10. Matrices – introduction
11. Solving systems of equations with matrices
12. Determinants and Cramer's rule
13. Systems of linear inequalities
14. Linear programming

Unit 5 – Probability and Statistics

1. Theoretical probability
2. Mutually exclusive and complementary events
3. Tree diagrams and multi-stage experiments
4. Geometric probability and expected value
5. Experimental probability and simulations
6. Permutations
7. Combinations
8. Statistics – organizing data
9. Bar graphs
10. Line graphs and pictographs
11. Circle graphs
12. Mean and median
13. Frequency distributions
14. Box and whisker plots