MATHEMATICS

Algebra 1-2 (Algebra 1)

Grades 9-12		
1. Students identify and use the arithmetic properties of subsets of integers, rational, irrational and real numbers. This includes closure properties for the four basic arithmetic operations where applicable. 1.1 Students use properties of numbers to demonstrate that assertions are true or false.	**2. Students understand and use such operations as taking the opposite, reciprocal, raising to a power, and taking a root. This includes the understanding and use of the rules of exponents.**	**3. Students solve equations and inequalities involving absolute values.**
4. Students simplify expressions prior to solving linear equations and inequalities in one variable such as 3(2x-5) + 4(x-2) = 12.	**5. Students solve multi-step problems, including word problems, involving linear equations and linear inequalities in one variable, with justification of each step.**	**6. Students graph a linear equation and compute the x- and y-intercepts (e.g., graph 2x + 6y = 4). They are also able to sketch the region defined by linear inequality (e.g., sketch the region defined by 2x + 6y < 4).**
7. Students verify that a point lies on a line given an equation of the line. Students are able to derive linear equations using the point-slope formula.	**8. Students understand the concepts of parallel and perpendicular lines and how their slopes are related. Students are able to find the equation of a line perpendicular to a given line that passes through a given point.**	**9. Students solve a system of two linear equations in two variables algebraically, and are able to interpret the answer graphically. Students are able to use this to solve a system of two linear inequalities in two variables, and to sketch the solution sets.**
10. Students add, subtract, multiply and divide monomials and polynomials. Students solve multi-step problems, including word problems, using these techniques.	**11. Students apply basic factoring techniques to second and simple third degree polynomials. These techniques include finding a common factor to all of the terms in a polynomial and recognizing the difference of two squares, and recognizing perfect squares of binomials.**	**12. Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing to lowest terms.**

MATHEMATICS

Algebra 1-2 (Algebra 1)

Grades 9-12		
13. Students add, subtract, multiply, and divide rational expressions and functions. Students solve both computationally and conceptually challenging problems using these techniques.	**14. Students solve a quadratic equation by factoring or completing the square.**	**15. Students apply algebraic techniques to rate problems, work problems, and percent mixture problems.**
16. Students understand the concepts of a relation and a function, determine whether a given relation defines a function, and give pertinent information about given relations and functions.	**17. Students determine the domain of independent variables, and range of dependent variables defined by a graph, a set of ordered pairs, or symbolic expression.**	**18. Students determine whether a relation defined by a graph, a set of ordered pairs, or symbolic expression is a function, and justify the conclusion.**
19. Students know the quadratic formula and are familiar with its proof by completing the square.	**20. Students use the quadratic formula to find the roots of a second degree polynomial and to solve quadratic equations.**	**21. Students graph quadratic functions and know that their roots are the x-intercepts.**
22. Students use the quadratic formula and/or factoring techniques to determine whether the graph of a quadratic function will intersect the x-axis in zero, one, or two points.	**23. Students apply quadratic equations to physical problems such as the motion of an object under the force of gravity.**	**24. (see Geometry A24)**
25. Students use properties of the number system to judge the validity of results, to justify each step of a procedure and to prove or disprove statements. 25.1 Students use properties of numbers to construct simple valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions.	**SM26. Students convert numbers from common form into scientific notation, and from scientific notation to common form, and manipulate numbers within scientific notation.**	**SM27. Students use the Pythagorean Theorem to find the lengths of unknown sides of right triangles.**

MATHEMATICS

Algebra 1-2 (Algebra 1)

Grades 9-12		
25.2 Students judge the validity of an argument based on whether the properties of the real number system and order of operations have been applied correctly at each step. 25.3 Given a specific algebraic statement involving linear, quadratic or absolute value expressions, equations or inequalities, students determine if the statement is true sometimes, always, or never.		