

MATHEMATICS

Algebra

Grade 8		
<p>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.</p> <p>8.1.1 students use properties of numbers to demonstrate that assertions are true or false</p> <p>4. Students simplify expressions prior to solving linear equations and inequalities in one variable such as $3(2x-5) + 4(x-2) = 12$.</p> <p>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.</p>	<p>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.</p> <p>5. Students solve multi-step problems, including word problems, involving linear equations and linear inequalities in one variable, with justification of each step.</p> <p>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.</p>	<p>3. Students solve equations and inequalities involving absolute values.</p> <p>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 $2x + 6y < 4$).</p> <p>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.</p>

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<p>10. Students add, subtract, multiply and divide monomials and polynomials. Students solve multi-step problems, including word problems, using these techniques.</p>	<p>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.</p>	<p>12. Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing to lowest terms.</p>
<p>13. Students add, subtract, multiply, and divide rational expressions and functions. Students solve both computationally and conceptually challenging problems using these techniques.</p>	<p>14. Students solve a quadratic equation by factoring or completing the square.</p>	<p>15. Students apply algebraic techniques to rate problems, work problems, and percent mixture problems.</p>
<p>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.</p>	<p>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.</p>	<p>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.</p>
<p>19. Students know the quadratic formula and are familiar with its proof by completing the square.</p>	<p>20. Students use the quadratic formula to find the roots of a second degree polynomial and to solve quadratic equations.</p>	<p>21. Students graph quadratic functions and know that their roots are the x-intercepts.</p>
<p>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.</p>	<p>23. Students apply quadratic equations to physical problems such as the motion of an object under the force of gravity.</p>	<p>24. See Geometry 24.</p>

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<p>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.</p> <p>8.25.1 students use properties of numbers to construct simple valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions</p> <p>8.25.2 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</p> <p>8.25.3 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</p>	<p>S26. Students convert numbers from common form into scientific notation, and from scientific notation to common form, and manipulate numbers within scientific notation.</p>	<p>S27. Students use the Pythagorean Theorem to find the lengths of unknown sides of right triangles.</p>