

## Mathematics: Grade Eight

<p><b>Content Standard #4</b> Students will have demonstrated proficiency in mathematics by solving problems requiring number sense, accurate computation, accurate measurement, collection of data and statistics, algebraic methods and geometry.</p>
<p><b>#4A</b> Number sense, properties, and operations</p>
<p><b>#4B</b> Patterns, functions, and algebraic structures</p>
<p><b>#4C</b> Data analysis, statistics, and probability</p>
<p><b>#4D</b> Shape, dimension, and geometric relationships</p>

**Description**

The eighth grade pre-algebra program consists of review of 6<sup>th</sup> and 7<sup>th</sup> grade math topics followed with algebra and geometry. The algebra topics cover several of the abstract algebraic ideas, such as functions and patterns, positive and negative numbers, solving for variables, trigonometric ratios, probability and the linear function. The geometry portion covers perimeter, area, surface area of several geometric shapes, the Pythagorean Theorem, nets, elevations and 3D drawings.

**Time Allocation**  
Daily 1 hour

**Texts/References**  
Mathematics Course 2, Holt McDougal, 2009  
Supplementary resources associated with textbook

**Assessments**  
**Formative**  
 Daily problems  
 Pop quizzes  
 Section quizzes  
**Summative**  
 Chapter tests  
 Final test

**Grades and Achievement Levels**  
 Grades are based on completion of assignments and quality of work. Each student also receives a rating that shows the student's achievement performance level on the mathematics standard. The rating is based upon the student's attainment of course expectations.

## Essential Concepts: Mathematics Grade Eight

<b>Standard #4A</b> <b>Number sense, properties, and operations</b>	<b>Standard #4B</b> <b>Patterns, functions, and algebraic structures</b>	<b>Standard #4C</b> <b>Data analysis, statistics, and probability</b>	<b>Standard #4D</b> <b>Shape, dimension, and geometric relationships</b>
<ul style="list-style-type: none"> <li>• In the real number system, rational and irrational numbers are in one to one correspondence to points on the number line</li> <li>• Formulate, represent, and use algorithms with rational numbers flexibly, accurately, and efficiently</li> <li>• Demonstrated an understanding the real number properties in problem solving situations</li> <li>• Constructed, used and explained effective efficient computation procedures with rational numbers in problem solving situations</li> </ul>	<ul style="list-style-type: none"> <li>• Linear functions model situations with a constant rate of change and can be represented algebraically, graphically, and using tables</li> <li>• Properties of algebra, equality, and inequality are used to solve linear equations and inequalities</li> <li>• Graphs and tables can be used to distinguish between linear and nonlinear functions</li> <li>• Described linear patterns, relations, and function relationships using equations, tables and graphs in problem solving situations, and conversions among these forms</li> <li>• Used properties of algebra, equality, and inequality creating equivalent algebraic expressions and solved linear equations and inequalities using various methods including technology</li> </ul>	<ul style="list-style-type: none"> <li>• Visual displays and summary statistics of two-variable data condense the information in data sets into usable knowledge</li> <li>• Solving problems and making decisions by understanding, explaining and quantifying variability in data</li> <li>• Using various methods to collect data, display the data and answer questions concerning the data</li> <li>• Understanding and correcting misleading data, graphs, charts and statements</li> <li>• Understanding that equivalence is a foundation of mathematics</li> </ul>	<ul style="list-style-type: none"> <li>• Objects in the plane and their parts and attributes can be analyzed</li> <li>• Direct and indirect measurements can be used to describe and make comparisons</li> <li>• Properties and theorems to establish proof of various unknown lengths</li> <li>• Transformations applied to numbers, shapes, functional representations, and data</li> <li>• Concepts of perimeter, area and volume</li> <li>• Communicating an effective, logical argument using mathematical justification and proof</li> <li>• Measurement and measurement conversions for geometric shapes, maps and drawings</li> </ul>

## Expectations: Mathematics Grade Eight

<b>Standard #4A</b> <b>Number sense, properties, and operations</b>	<b>Standard #4B</b> <b>Patterns, functions, and algebraic structures</b>	<b>Standard #4C</b> <b>Data analysis, statistics, and probability</b>	<b>Standard #4D</b> <b>Shape, dimension, and geometric relationships</b>
<ol style="list-style-type: none"> <li>1. Compared and ordered sets of integers and rational numbers that are expressed as fractions, decimals, or percents</li> <li>2. Given a whole number from 0 - 100, determined whether it is a perfect square or find the two consecutive whole numbers between which its square root lies</li> <li>3. Approximated the location of square roots between two whole numbers on a number line</li> <li>4. Added, subtracted, multiplied and divided rational numbers including integers, positive and negative fractions and decimals</li> <li>5. Understood quantity through estimation, precision, order of magnitude, and comparison</li> <li>6. Gained a firm foundation in mathematics including a complete understanding of the four basic operations for integers, fractions and decimals</li> <li>7. Demonstrated fluency with basic symbolic facts and algorithms and selection and using appropriate methods</li> <li>8. Understood relative and absolute comparisons between quantities</li> <li>9. Recognized and made sense of the ways variability, chance, and randomness appear</li> </ol>	<ol style="list-style-type: none"> <li>1. Converted from one representation of a linear function to another, including situations, tables, equations (slope-intercept form), and graphs</li> <li>2. Used representations of linear functions to analyze situations and solve problems</li> <li>3. Identified the dependent and independent variable in real-world situations</li> <li>4. Identified and interpreted the slope (rate of change) and y-intercept in graphs, in tables, and from equations in slope-intercept form</li> <li>5. Modeled and graphed two linear equations in slope-intercept form on the same coordinate plane and interpreted the point of intersection as the solution to the system of equations</li> <li>6. Used the distributive, associative, and commutative properties to simplify algebraic expressions</li> <li>7. Solved one-variable equations including those involving multiple steps, rational numbers, variables on both sides, and the distributive property</li> <li>8. Solved inequalities in one variable including negative coefficients and graphed the solution on a number line</li> </ol>	<ol style="list-style-type: none"> <li>1. Given a scatter plot, calculated quadrant count ratio to quantify the magnitude and strength of the association between two variable for numeric data as positive, negative, or no correlation</li> <li>2. Given a scatter plot suggesting a linear relationship, drew a line of fit to make predictions</li> <li>3. Used time series plots (line graphs) to analyze the trend of a set of data over time</li> <li>4. Recognized ways in which statistics can be measured</li> </ol>	<ol style="list-style-type: none"> <li>1. Classified quadrilaterals and applied angle and side properties, including the sum of the interior angles</li> <li>2. Applied properties of complementary, supplementary, and vertical angle relationships</li> <li>3. Applied properties of parallel lines including corresponding angles and alternate interior angles</li> <li>4. Used properties of similar triangles to find unknown lengths</li> <li>5. Used the Pythagorean Theorem to find unknown lengths in right triangles</li> <li>6. Used proportional reasoning to estimate distance, weight, and capacity</li> <li>7. Used proportional reasoning to convert among measures including dimensional analysis</li> <li>8. Described, analyzed and reasoned about angles, parallel and perpendicular lines, and distance on a coordinate plane</li> </ol>

Expectations: Mathematics Grade Eight continued

<p><b>Standard #4A</b>  <b>Number sense, properties, and operations</b></p>	<p><b>Standard #4B</b>  <b>Patterns, functions, and algebraic structures</b></p>	<p><b>Standard #4C</b>  <b>Data analysis, statistics, and probability</b></p>	<p><b>Standard #4D</b>  <b>Shape, dimension, and geometric relationships</b></p>
<p>10. Applied computational methods to solve multi-step application problems involving percents and rational numbers</p> <p>11. Analyzed how credit and debt impact personal financial goals (PFL)</p>	<p>9. Represented the distributive property in a variety of ways including numerically, geometrically, and algebraically</p> <p>10. Given a table or graph, determined if the function is linear</p> <p>11. Explained the properties of linear functions in tables and graphs</p> <p>12. Represent the distributive property in a variety of ways including numerically, geometrically, and algebraically</p> <p>13. Applied properties of linear relations and functions to interpret linear situations using algebraic methods</p> <p>14. Converted from the various algebraic representations of equation, table, graph and verbal model</p> <p>15. Made sound predictions and generations based on patterns and relationships that arise from numbers, shapes, symbols and data</p> <p>16. Solved problems of inequality with algebra and graphing</p> <p>17. Understood algebraic function as functions and patterns</p> <p>18. Used algebra properties to simplify and solve expressions</p>		<p>9. Estimated, created, and used direct and indirect measurements to describe and make comparisons</p>