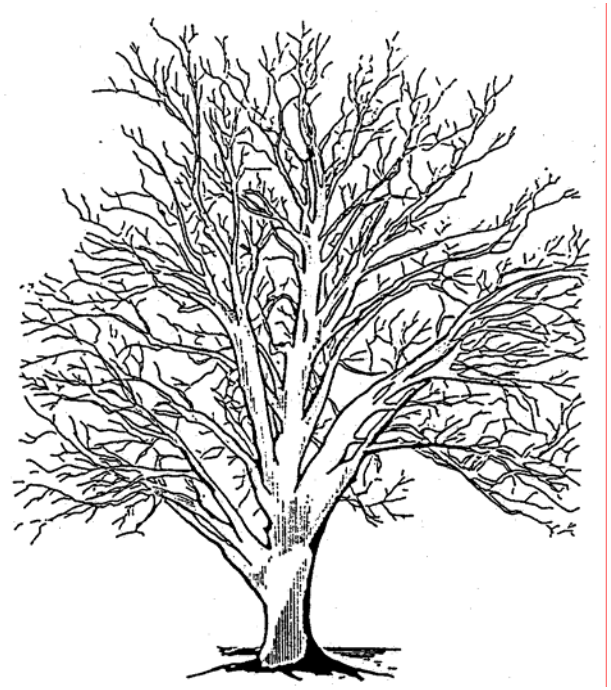
Monroe Township Schools



Curriculum Management System

High School 101 Mathematics

Grade 9

July 2006

*** For adoption by all regular education programs as specified and for adoption or adaptation by all Special Education Programs in accordance with Board of Education Policy # 2220.**

Board Approved: August 2006

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Acknowledgments

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Monroe Township Schools

Mission and Goals

Mission

The mission of the Monroe Township School District, a unique multi-generational community, is to collaboratively develop and facilitate programs that pursue educational excellence and foster character, responsibility, and life-long learning in a safe, stimulating, and challenging environment to empower all individuals to become productive citizens of a dynamic, global society.

Goals

To have an environment that is conducive to learning for all individuals.

To have learning opportunities that are challenging and comprehensive in order to stimulate the intellectual, physical, social and emotional development of the learner.

To procure and manage a variety of resources to meet the needs of all learners.

To have inviting up-to-date, multifunctional facilities that both accommodate the community and are utilized to maximum potential.

To have a system of communication that will effectively connect all facets of the community with the Monroe Township School District.

To have a staff that is highly qualified, motivated, and stable and that is held accountable to deliver a safe, outstanding, and superior education to all individuals.

INTRODUCTION, PHILOSOPHY OF EDUCATION, AND EDUCATIONAL GOALS

Philosophy

Monroe Township Schools are committed to providing all students with a quality education resulting in life-long learners who can succeed in a global society. The mathematics program, grades K-12, is predicted on that belief and is guided by the following six principals as stated by the National Council of Teachers of Mathematics (NCTM) in the *Principles and Standards for School Mathematics, 2000.* First, a mathematics education requires equity. All students will be given worthwhile opportunities and strong support to meet high mathematical expectations. Second, a coherent mathematics curriculum will effectively organize, integrate, and articulate important mathematical ideas across the grades. Third, effective mathematics teaching requires the following: a) knowing and understanding mathematics, students as learners, and pedagogical strategies, b) having a challenging and supportive classroom environment and c) continually reflecting on and refining instructional practice. Fourth, students must learn mathematics with understanding. A student's prior experiences and knowledge will actively build new knowledge. Fifth, assessment should support the learning of important mathematics and provide useful information to both teachers and students. Lastly, technology enhances mathematics learning, supports effective mathematics teaching, and influences what mathematics is taught.

As students begin their mathematics education in Monroe Township, classroom instruction will reflect the best thinking of the day. Children will engage in a wide variety of learning activities designed to develop their ability to reason and solve complex problems. Calculators, computers, manipulatives, technology, and the Internet will be used as tools to enhance learning and assist in problem solving. Group work, projects, literature, and interdisciplinary activities will make mathematics more meaningful and aid understanding. Classroom instruction will be designed to meet the learning needs of all children and will reflect a variety of learning styles.

In this changing world those who have a good understanding of mathematics will have many opportunities and doors open to them throughout their lives. Mathematics is not for the select few but rather is for everyone. Monroe township Schools are committed to providing all students with the opportunity and the support necessary to learn significant mathematics with depth and understanding. This curriculum guide is designed to be a resource for staff members and to provide guidance in the planning, delivery, and assessment of mathematics instruction.

Educational Goals

High School 101 Mathematics is designed to provide an in-depth and hands-on analysis of the real world number system. Concepts of algebra and geometry are included in this course. The curriculum for this course will support the Dynamics of Algebra I curriculum through pre-teaching and re-teaching strategies. Topics included are: data analysis, roots and powers, simplify mathematical expressions, linear equations, graphing linear equations, theoretical and experimental probability, linear inequalities, systems of equations and inequalities, polynomial equations, quadratic functions, graphing quadratic functions, mathematical models, functions, matrices, rational equations, as well as introduce concepts from geometry such as points, lines, and planes, properties of parallel lines and properties of triangles.

New Jersey State Department of Education
Core Curriculum Content Standards

A note about Mathematics Standards and Cumulative Progress Indicators.

The New Jersey Core Curriculum Content Standards for Mathematics were revised in 2002. The Cumulative Progress Indicators (CPI's) referenced in this curriculum guide refer to these new standards and may be found in the Curriculum folder on the district servers. A complete copy of the new Core Curriculum Content Standards for Mathematics may also be found at: http://www.nj.gov/njded/cccs/s4_math.htm

High School 101 Mathematics

Scope and Sequence

<table>
<tr><th colspan="2">Quarter I</th></tr>
<tr><td>I. Data Analysis
a. Collecting data
b. Continuous and discrete data
c. Graphing data; Scatterplots
d. Spreadsheets
e. Measures of central tendency (mean, median, mode)
f. Box-and-Whisker plots, Stem-and-Leaf plots</td><td>II. Real Numbers
a. Order of Operations
b. Exponents and Powers
▪ Positive, Negative, and Zero Exponents
▪ Properties of Exponents
c. Scientific Notation
d. Variables
e. Operations With Real Numbers
f. Combining Like Terms
g. Distributive Property
h. Absolute Value
i. Matrices</td></tr>
<tr><td>III. Linear Equations
a. Translating words into algebraic expressions
b. Applications
c. Forming Equations
d. Solving One-Step Equations
e. Solving Multi-Step Equations
▪ Combining Like Terms and Solving
▪ Variables on Both Sides of Equation
▪ Rational Coefficients
f. Transforming Formulas</td><td>IV. Graphing (begin only)
a. Functions and Relations
b. Identify Whether a Relation is a Function Visually
c. Families of Functions (Absolute Value, Linear, Quadratic)
d. Line of Best Fit
e. Types of Correlation
f. Graphing Linear Equations Using a Table
g. Finding the Slope of a Line
h. Graphing Using Slope-Intercept Form
i. Graphing Using the x- and y-intercepts.</td></tr>
<tr><th colspan="2">Quarter II</th></tr>
<tr><td>V. Writing Linear Equations
a. Writing Equations in Slope-Intercept Form
b. Writing Equations Given Point and Slope (Point Slope form)
c. Writing Equations Given Two Points
d. Writing the Standard Form of a Linear Equation</td><td>VI. Patterns
a. Find the next three terms (arithmetic, geometric, and pictures)
b. Find an equation to represent the n^{th} term
c. Find the n^{th} term</td></tr>
<tr><td>VI. Solving and Graphing Linear Inequalities
a. Solving One-Step Linear Inequalities
b. Solving Multi-Step Linear Inequalities
c. Solving Compound Inequalities
e. Graphing Linear Inequalities in Two Variables</td><td>VII. Probability
a. Interpreting Probabilities as Ratio, Percents, and Decimals
b. Making Predictions Based on Experimental & Theoretical Probabilities
c. Determining the Probabilities of Conditional, Complementary, Dependent, and Independent Events.
d. Situations With and Without Replacement</td></tr>
</table>

<table>
<tr><th colspan="2">Quarter III</th></tr>
<tr><td>VIII. Systems of Linear Equations and Inequalities
a. Solving Systems by the following methods:
▪ Graphing
▪ Substitution
▪ Linear Combination (Elimination)
b. Special Types of Linear Systems
▪ Exactly One Solution
▪ No Solution
▪ Infinitely Many Solutions
c. Solving Systems of Linear Inequalities</td><td>IX. Polynomials and Factoring
a. Adding and Subtracting Polynomials
b. Multiplying Polynomials
c. Special Products
▪ Sum and Difference Pattern
▪ Square of a binomial Pattern
d. Factoring Using the GCF
e. Factoring $x^2 + bx + c$
f. Factoring $ax^2 + bx + c$
g. Simplifying Radicals
h. Solving Quadratic Equations
▪ In Factored Form
▪ In Standard Form, Using Factoring
▪ In Standard Form, Using the Quadratic Formula</td></tr>
<tr><th colspan="2">Quarter IV</th></tr>
<tr><td>X. Quadratic Functions
a. Graphing Quadratic Functions
b. Analyzing the effect of coefficients in standard form $y = ax^2 + bx + c$
c. Solving Quadratic Equations by Graphing
d. Applications of the Discriminant (optional, if time)</td><td>XI. Geometry Relationships:
a. Identify points, lines, and planes.
b. Finding the distance between two points (of a segment) using the distance formula.
c. Find the midpoint of a segment.
d. Measure angles using a protractor and classify as acute, right, obtuse, or straight.
e. Complementary and Supplementary Angles
f. Vertical Angles.</td></tr>
<tr><td>XII. Parallel Lines
a. Relationships between lines and a transversal
b. Relationships when parallel lines are cut by a transversal
c. Slopes of Lines, determine whether parallel, perpendicular, or neither.</td><td>XIII. Triangle Relationships:
a. Triangle Classifications
b. Angle Measures of Triangles
c. Exterior Angle Theorem
d. Special properties of Isosceles and Equilateral Triangles
e. In a triangle, a side opposite a larger angle is longer than a side opposite a smaller angle.
f. Triangle Inequality</td></tr>
</table>

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Data Analysis** **Goal 1: The student will be able to use, interpret, analyze, and evaluate data.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
12	1.1. Collect Data and Display in a Graph. (CPI 4.4.12 A1; 4.5.12 E1) 1.2. Display Data in a Scatterplot. (CPI 4.4.12 A4; 4.5.12 E1) 1.3. Make and Use a Spreadsheet and to Analyze Data. (CPI 4.4.12 A5; 4.5.12 E1, F2)	• *What statistical techniques can be used to organize, display, and compare sets of data?* • Students use data to draw bar graphs, line graphs, and double line graphs. • Students plot points in scatter plot, introduce positive, negative, and no correlation. • **INTRODUCTORY ACTIVITY**: Classroom Survey: Have students write as many x's on a sheet of paper as they can in 60 seconds, all students must use their right hand. Then repeat, this time all students must use their left hand. Plot results on board to demonstrate scatter plot and trend line. • Students make formulas to find the sum of a set of numbers or find the average of a set of numbers using cell numbers. • Disucss what makes a graph valid vs. misleading. **PROJECT IDEA:** Friend Survey Students must ask 50 people a question. (favorite color, type of food, etc.) After recording the answers, students must use Excel, or another spreadsheet program to display the data and form a graph. (Or students search for statistics on the internet or in media center.)	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -1.6 Tables and Graphs (pg. 40-45) -4.1 Coordinates and Scatter Plots (pg. 203-209) - Spreadsheet Example - Pg. 430 # 34, 35 • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -1.1 – Displaying Data Relationships w/ Graphs -2.1 – Analyzing Data Using Scatter Plots. -1.9–Variables and Formulas In Spreadsheet • Prentice Hall: Data Analysis and Probability Workbook (small purple workbook) -Section 1: Graphs (pg. 1-32) -Sec.3: Use and Misuse of Data Displays(42-53) • Connected Math – Variables and Patterns(2004) - Investigation 1: Variables and Coordinate Graphs

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Data Analysis** **Goal 1: The student will be able to use, interpret, analyze, and evaluate data.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
			- Investigation 2: Graphing Change - Investigation 3: Analyzing Graphs and Tables - Investigation 4: Patterns and Rules - Investigation 5: Using a Graphing Calculator
	1.4. Interpret and Sketch Graphs From Stories. (CPI 4.5.12 C2, E3, F2)	• *How does the data displayed tell a story? How can I determine what happened by reading the graph?* • Sketch a graph of a transportation scenario: A commute home from school combines walking with taking the subway. Use Time and Total Distance as your axes.	• Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -2.2 – Relating Graphs to Events
	1.5. Determine whether a set of data is continuous or discrete. (CPI 4.3.12 B2; 4.5.12. B2)	• *In what situations is the use of decimals appropriate? Inappropriate?* • When taking a field trip, 150 students are attending the field trip plus 15 chaperones. If each bus holds 80 passengers, how many busses are needed?	• Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -Ch 2.2 – Relating Graphs to Events

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Data Analysis** **Goal 1: The student will be able to use, interpret, analyze, and evaluate data.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	1.6. Find the Mean, Median, and Mode of a Set of Data. (CPI 4.1.12 B1; 4.5.12 C4)	• *Five houses on my street have been sold in the last two months. They have sold for the following prices: $450,000, $480,000, $465,000, $440,000, and $625,000. Is the average the best way to describe the houses market value?* • What are measures of central tendency and why do we use them? What is the best measure of central tendency for a given set of data? • Given a set of data, find the mean, median, and mode. • If Sally scored 80, 77, 83, 90, and 95 on her last 5 tests and there is one test left in the marking period. What must she score on her next test to have a test average of 88? • Determine which measure is the best measure of central tendency based on a given set of data. (Look for outliers that skew data) • Open Ended: Create a set of data for the given mean, median, and mode. EX. Mean = 5, Median = 6, Mode = 8 and 3.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -6.6 Stem-and-Leaf Plots and Mean, Median, and Mode (pg. 368-374) • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -1.1 – Displaying Data Relationships w/ Graphs • Prentice Hall: Data Analysis and Probability Workbook (small purple workbook) -Sec. 2: Measures of Central Tendency(p.33-41) **HSPA:** • Amsco: MATHEMATICS: Preparing for the New Jersey HSPA, Grade 11 (navy blue binding – paperback) • Cluster 3.C.2 – pg. 127-129 • Prentice Hall: New Jersey HSPA Mathematics Comprehensive Review (textbook - purple binding – paperback) • 9.3 Measures of Central Tendency, Quartiles, and Percentiles pg. 195-199

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Data Analysis** **Goal 1: The student will be able to use, interpret, analyze, and evaluate data.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	1.7. Make a Box-and-Whisker Plot and a Stem-and-Leaf Plot From a Set of Data. (CPI 4.5.12 E1) **End, Topic 1**	• *What are the whiskers in a Box-and-Whisker plot used for? How is a Stem-and-Leaf Plot useful?* • Using any data, students find median, 1st Quartile and 3rd Quartile to form Box and Whisker Plot. • Students use Stem-and-Leaf Plots to display data, and help them to find mean, median, and mode. • Discuss how the Stem-and-Leaf Plot is helpful in computing measures of central tendencies. Use Test or Quiz scores to display Stem-and-Leaf Plot. Show Uses for finding the median and mode using the Stem-and-Leaf Plot.	• Prentice Hall: Data Analysis and Probability Workbook (small purple workbook) • Section 2: Measures of Central Tendency (pg. 33-41) **RESOURCES:** • McDougal-Littell: Algebra 1 2004 • 6.6 Stem-and-Leaf Plots and Mean, Median, and Mode (pg. 368-374) • 6.7 Box-and-Whisker Plots (pg. 375-381) • Pg. 382 Using Technology – Box-and-Whisker Plots • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) • Pg. 10 – Math Toolbox. • Prentice Hall: Data Analysis and Probability Workbook (small purple workbook) • Stem-and-Leaf Plots (Pg. 13-17) • Box-and-Whisker Plots (Pg. 18-20)

Suggested days of Instruction	Curriculum Management System **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Real Numbers** **Goal 2:** **The student will be able to perform operations with real numbers, evaluate expressions with variables, and simplify algebraic expressions.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
21	2.1. Operations With Real Numbers. (CPI 4.1.12 A1, B1)	• *A submarine is currently 100 feet under water (sea level). To avoid collisions with the ocean floor and other marine vessels, the submarine made the following movements: first it moved 20 feet up, then 50 feet deeper, then 40 feet deeper, then 20 feet up, then surfaced. How far did the submarine have to travel from its last depth to get to the surface?* • Add, Subtract, Multiply, and Divide positive and negative real numbers. • Students should memorize rules; some may need to use a number line. • Explanation: Multiplication of Signed Numbers: The story of the good guys (positive) and the bad guys (negative) being in town (positive) and out of town (negative). If the good guys are in town, it's good, + times + = + If the good guys are out of town, it's bad + times - = - If the bad guys are in town, it's bad - times + = - If the bad guys are out of town, it's good - times - = +	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -2.2 Addition of Real Numbers (pg. 72-77) -2.3 Subtraction of Real Numbers (pg. 79-85) -2.5 Multiplication of Real Numbers (pg. 93-98) -2.7 Division of Real Numbers (pg. 109-114) • Connected Math – Accentuate the Negative (2004) - Investigation 1: Extending the Number Line - Investigation 2: Adding Integers - Investigation 3: Subtracting Integers - Investigation 4: Multiplying and Dividing Integers
	2.2. Evaluate Expressions With Variables (CPI 4.1.12 A1, B1; 4.3.12 D1)	• *What is a variable?* • Evaluate 8x + 4 if x = -3	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -1.1 Variables in Algebra p.3-8 -1.2 Exponents and Powers (pg. 9-14)

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	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	2.3. Identify and Use the Commutative and Associative Properties of Addition and Multiplication to Simplify and Evaluate Algebraic Expressions. (CPI 4.1.12 B1; 4.3.12 D2)	• *Does order matter when we add, subtract, multiply, or divide, will I get the same answer?* • Students must know the difference between commutative and associative properties and be able to identify which property is being used.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -Pg. 73 Green Box • Connected Math – Say it with Symbols (2004) -Investigation 1: Order of Operations • Algebra with Pizzazz (binder in cabinet) – (pg. 4)
	2.4. Simplify Algebraic Expressions Using the Order of Operations. (CPI (4.1.12 B1; 4.3.12 D2)	• *Does it matter if I deposit money in my checking account before I write the checks out?* • *Why do we need an order of operations?* • Use either PEMDAS, or GEMDAS, be sure students understand that M and D are equal as well as A and S just move left to right. • Do some more difficult problems such as: $\frac{2\bullet 3-1}{4(6-8\bullet 3)}-7^2+-3^3+(-2)^4$ • Reinforce skills as students learn more throughout the chapter.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -1.2 Exponents and Powers (pg. 9-14) -1.3 Order of Operations (pg. 16-22) • Look in College Algebra Textbooks for some good examples, some teachers in the departments have copies, there should be on the shelf mixed in the Algebra I and Algebra II Resources.

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Real Numbers** **Goal 2:** **The student will be able to perform operations with real numbers, evaluate expressions with variables, and simplify algebraic expressions.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	2.5. Simplify and Evaluate Algebraic Expressions by Using the Distributive Property. (CPI 4.1.12 B1; 4.3.12 D2)	• *What does it mean to distribute, how does that translate mathematically? What about negative signs?* • Simplify 2(3x -4) • Simplify 2 + 3(2x + 8) • Simplify 2 – (x + 4) • Simplify using the order of operations (note: change in problem above) $\frac{2 \bullet 3-1}{4(6-8 \bullet 3)}-\left(7^2+-3^3+(-2)^4\right)$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -2.6 The Distributive Property (pg. 100-107) -10.1 Adding and Subtracting Polynomials (pg. 576-582) • Connected Math – Say it with Symbols (2004) -Investigation 2: Equivalent Expressions - Investigation 3: Some Important Properties
	2.6. Simplify and Evaluate Algebraic Expressions by Combining Like Terms. (CPI 4.1.12 B1)	• *What is a like term? What is a coefficient?* • Simplify 2x + 3x + 5 • Simplify 2x + 3xy + 5x • Simplify $2x^2$ + 3x + 5x	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -2.6 The Distributive Property Pg. 102, Example 5
	2.7. Evaluate Expressions Using Absolute Value. (CPI 4.1.12 B1)	• *What does Absolute Value mean? Why is it always positive?* • Simplify $\lvert 5 \rvert$ • Simplify $\lvert -5 \rvert$ • Simplify $-\lvert 5 \rvert$ • Simplify $-\lvert -5 \rvert$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -2.1 The Real Number Line (pg. 63-70)

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Real Numbers** **Goal 2:** **The student will be able to perform operations with real numbers, evaluate expressions with variables, and simplify algebraic expressions.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	2.8. Add and Subtract Matrices. (CPI 4.1.12 B1, B3) 2.9. Use Matrices to Display and Evaluate Data. (CPI 4.1.12 B3)	• *What are Matrices? What does corresponding mean?* • If $A=\begin{bmatrix}3 & 4\\ 2 & -2\end{bmatrix}, B=\begin{bmatrix}9 & -3\\ -2 & 4\end{bmatrix}$, find A + B, then find A – B. • Is matrix addition commutative, associative? How about matrix subtraction. • Use matrices to organize data.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -2.4 Adding and Subtracting Matrices (pg. 86-91) **HSPA:** • Prentice Hall: New Jersey HSPA Mathematics Comprehensive Review (textbook - purple binding – paperback) -13.2 Matrices pg. 302-304 -13.3 Vertex Edge Graphs pg. 304-307, see example 6 and 7 on pg. 306.
	2.10. Evaluate Algebraic Expressions Using Domain and Range. (CPI 4.1.12 B1; 4.3.12 D1)	• *If there are 20 students in the classroom and I want to form 5 groups, should the students count off by 5 for the number of groups, or by 4 since there will be 4 in a group?* • *What are Domain and Range? What do I input for?* • Given the domain {2, 3, 5}, find the range for y = 2x -3. • Introduce Function Notation: f(x) = 2x +1	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -1.7 An Introduction to Functions (pg. 46-52)

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Real Numbers** **Goal 2:** **The student will be able to perform operations with real numbers, evaluate expressions with variables, and simplify algebraic expressions.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	2.11. Use Multiplication Properties of Exponents to Simplify Expressions With Positive Integers as Exponents. (CPI 4.1.12 B1, B2, B4) 2.12. Simplify Expressions With Zero and Negative Integers as Exponents. (CPI 4.1.12 B1, B2, B4) 2.13. Use Division Properties of Exponents to Simplify Expressions with integers and exponents. (CPI 4.1.12 B1, B2, B4)	• *What is an exponent? What does it mean to have the same base?* • Simplify $(a^2)^3$ • Simplify $a^2 * a^3$ • Simplify $2x^5 + 3x^5 + 5x^3$ • Simplify $(2x^3y)^2$ • *What does it mean to have a negative exponent? Why divide instead of multiply?* • Show students relation of exponents, positive means multiply, negative means divide, show steps in increasing in power one by one, then decreasing: $2^3 = 8$ $2^2 = 4$ $2^1 = 2$ Look for pattern: $2^0 = 1$ $2^{-1} = \frac{1}{2}$ $2^{-2} = \frac{1}{4}$ $2^{-3} = \frac{1}{8}$ • Simplify 3^{-2} • Simplify 8^0 • Simplify $\frac{1}{(4x)^{-5}}$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -1.2 Exponents and Powers (pg. 9-14) -8.1 Multiplication Properties of Exponents (pg. 450-455) -8.2 Zero and Negative Exponents (pg. 456-462) -8.3 Division Properties of Exponents (pg. 463-469) • Connected Math – Growing, Growing, Growing (2004) -Investigation 1: Exponential Growth - Investigation 2: Growth Patterns - Investigation 3: Growth Factors

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Real Numbers** **Goal 2:** **The student will be able to perform operations with real numbers, evaluate expressions with variables, and simplify algebraic expressions.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	2.14. Convert Numbers from Standard Notation to Scientific Notation and vice-versa. (CPI 4.1.12 B1, B4; 4.5.12 C4) **End, Topic 2**	• *Why do we use Scientific Notation? When is it useful?* • Relate Scientific Notation to Science with examples • Write 230,000,000 in Scientific Notation. • Write 0.000000056 in Scientific Notation • Write 8.45×10^{9} in Standard Notation • Write 6.79×10^{-7} in Standard Notation • HSPA style problem: Given the problem $(4.345 \times 10^{16})(9.\_\_\_\_\_ \times 10^{12})$, what is the range of possible answers.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -8.4 Scientific Notation (pg. 470-475) **HSPA:** • Amsco: MATHEMATICS: Preparing for the New Jersey HSPA, Grade 11 (navy blue binding – paperback) -Cluster 1.A.2 – pg. 3-5

Suggested days of Instruction	Curriculum Management System **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Solve Linear Equations** **Goal 3:** **The student will be able to solve various linear equations.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
14	3.1. Translate English Phrases Into Algebraic Expressions. (CPI 4.3.12 C1)	• *How are English and algebra related? How can I write an equation from a word problem?* • Three less than a number *n*. • Three less a number *n*. • Five more than twice a number *a*. • Three times the difference of a number and five.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -3.1 Solving Equations Using Addition and Subtraction (pg. 132-137) -Pg. 134 Example 4 • Connected Math – Accentuate the Negative (2004) - Investigation 4 Solving Equations (4.1-4.3)
	3.2. Model and Solve One-Step Linear Equations. (CPI 4.3.12 C1, D2)	• *If you have $28 in your wallet, and you want to purchase a jacket for $43, how much more money do you need? 28 + x = 43* • I can solve these problems in my head. How do I use algebra to solve equations? What does it mean to use the opposite operation? • Solve x – 3 = 5 • Solve: x + 5 = 11 • Solve -4x = 28 • Solve $\frac{x}{3} = -39$ • Focus on writing equations from word problems	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -3.1 Solving Equations Using Addition (pg. 132-137) -3.2 Solving Equations Using Multiplication and Division (pg. 138-144)

Suggested days of Instruction	Curriculum Management System **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Solve Linear Equations** **Goal 3:** **The student will be able to solve various linear equations.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	3.3. Model and Solve Multi-Step Linear Equations. (CPI 4.3.12 C1, D2) 3.4. Combine Like Terms to Solve Linear Equations. (CPI 4.3.12 C1, D1, D2) 3.5. Use the Distributive Property to Solve Linear Equations. (CPI 4.3.12 C1, D2)	• *Lisa's mother is three more than twice Lisa's age. Lisa's mother is 47, how old is Lisa?* • Always undo the addition or subtraction first, then the multiplication or division. • Solve 3x + 4 = 25 • Solve 7x – 3x + 8 = -24 • Solve 5x + 3(x + 4) = 28	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -3.3 Solving Multi-Step Equations (pg. 145-152) -3.6 Solving Decimal Equations (pg. 166-172)
	3.6. Solve Linear Equations with Rational Coefficients or Constants. (CPI 4.3.12 C1, D2)	• Solve $-\frac{3}{2}x = -12$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -3.6 Solving Decimal Equations (pg. 166-172)

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Solve Linear Equations** **Goal 3:** **The student will be able to solve various linear equations.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	3.7. Solve Linear Equations with Variables on Both Sides. (CPI 4.3.12 C1, D2)	• *How do I get all of the variables together when they are on both sides of the equation?* • Solve 18y + 13 = 12y – 25 • Solve 6y – (3y – 6) = -14 – 3y • Focus on writing equations from word problems and using tables to solve problems.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -3.4 Solving Equations with Variables on Both Sides (pg. 154-159) -3.5 Linear Equations and Problem Solving. (pg. 160-165) **HSPA:** • Amsco: MATHEMATICS: Preparing for the New Jersey HSPA, Grade 11 (navy blue binding – paperback) -Cluster 4.C.2 – pg. 221-226 -Note the representations with a balanced scale squares, and circles.
	3.8. Transform Formulas. (Solve for one Variable in a formula.) (CPI 4.3.12 C1, C2, D2)	• *Sam travels the same distance to work every day, but he goes different speeds each day depending on the traffic. Sam knows there is an equation D=rt that he can figure out the time it is going to take him each day, but he doesn't want to have to solve it every day, is there a way to change the formula so that it says t= and gives him the time right away when he evaluates with his distance and his rate for that day?* • There are many variables in a formula, how do I get one of them alone? • A = l * w, solve for length. • Rewrite the equation 3x + y = 4 so that x is a function of y.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -3.7 Formulas and Functions (pg. 174-179)

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Solve Linear Equations** **Goal 3: The student will be able to solve various linear equations.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	3.9. Use Rates, Ratios and Percents to solve problems. (CPI 4.1.12 B1, 4.3.12 B2)	• *How do I put a rate or a percent into an equation?* • Unit Analysis: $\frac{mm}{cm} \bullet \frac{cm}{m} \bullet \frac{m}{km} = ?$ • *How can I figure the discount, sales tax, or shipping quickly?* • Many students use the method: $\frac{part}{whole} = \frac{\%}{100}$ or $\frac{is}{of} = \frac{\%}{100}$. The former is preferred since it is more conceptual in nature. • 30 is 15% of what? • 30 is what % of 15? • What is 30% of 15? • The sides of a triangle are related by the ratio 3: 4: 5. The perimeter is 41 cm, what are the lengths of each side? • Discounts: A $60 pair of shoes is on sale for 20% off, what is the sale price? • Find the original: A jacket is on sale for 20% off; the sale price is $160, what was the original price? • Double Discounts: A $750 Couch is on sale for 30% off with an additional 10% off? Discuss why this is not the same as 40% off. • Sales Tax and Discount: A $200 set of pots and pans is on sale for 25% off, what is the price after 6% sales tax? • Solve: $\frac{3}{y} = \frac{5}{8}$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -3.8 Rates Ratios and Percents (pg. 180-185) -11.2 Percents (pg. 649-655) **HSPA:** • Prentice Hall: New Jersey HSPA Mathematics Comprehensive Review (textbook - purple binding – paperback) -3.2 Problems Involving Linear Equations in One Variable pg. 46-50 -11.1 Ratio and Proportion (pg. 643-648)

Suggested days of Instruction	Curriculum Management System Grade Level/Subject: **Grade 9** **High School 101 Math**	**Topic: Solve Linear Equations** **Goal 3: The student will be able to solve various linear equations.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	3.10. Find the Percent of Change in Given Data. (CPI 4.3.12 B2, D2) **End, Topic 3**	• *A person who makes $40,000/year and a person who makes $70,000/year both get a raise of $5,000. Why does the $70.000 person claim that he got less of a raise?* • Formula for Percent of Change: $\frac{\text{Amount of Change}}{\text{Original Amount}}$; students must realize that percent of change is always positive, it must be labeled as an increase or a decrease. • A retailer purchases a handbag for $15, and sells it for $95. What is the percent markup? • A beach blanket originally sold for $30, but it is on sale for $18, what is the percent discount? • Be sure to check HSPA books for more percent problems. **PROJECT IDEA:** Analyzing Change Students investigate the percent change in something that interests them. Work with a partner to investigate the topic. Data should include at least 4 numerical values that change over time. (State population, number of cars going through a green light at intersection, morning vs. afternoon). Students must make a graph and present their analysis including original data, explain data and calculations, and make conclusions based on their data. See Explorations and Projects workbook by McDougal-Littell pg. 30-31.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -3.8 Rates, Ratios, and Percents (pg. 180-186) -11.2 Percents (pg. 649-655) • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -3.7 Percent Equations (pg. 139-144) -3.8 Percent of Change (pg. 146-149) **HSPA:** • Prentice Hall: New Jersey HSPA Mathematics Comprehensive Review (textbook - purple binding – paperback) -3.2 Problems Involving Linear Equations in One Variable – see Examples 6 and 7 – (pg. 46-50)

Suggested days of Instruction	Curriculum Management System **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Graphing Linear Equations** **Goal 4:** **The student will be able to graph linear equations using various methods.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
20	4.1. Determine Whether a Graph is a Relation or a Function Visually. (CPI 4.3.12 B1, B4)	• *You have $20 and need to purchase a shirt and a pair of shorts. The shirt is $18, and the shorts are $16. You have to decide which one to purchase. Which one do you choose? Would you always make the same decision? A function must always make the same decision. A relation can pick between two things.* • What is the difference between a function and a relation? • Vertical Line Test • Determine from a Table of Values whether a set of data is a function or a relation.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -4.8 Functions and Relations (pg. 256-262) • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -Ch 2.4 – Functions (pg. 73-78)
	4.2. Determine the Family of an Equation and a Graph (Linear, Absolute Value, or Quadratic). (CPI 4.3.12 B1, B4)	• *What does the graph of a line look like? An absolute value? A quadratic equation?* • Looking at a graph: identify the "U" shape of a parabola – quadratic equation; "V" shape of an absolute value equation; and the line of a linear equation.	**RESOURCES:** • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -Ch 2.7 Families of Functions (pg. 90-94) **HSPA:** • Amsco: MATHEMATICS: Preparing for the New Jersey HSPA, Grade 11 (navy blue binding – paperback) -Cluster 4.B.1 Relations and Functions – pg. 192-201 -*pg. 196 has excellent table *

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Graphing Linear Equations** **Goal 4: The student will be able to graph linear equations using various methods.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	4.3. Draw the Line of Best Fit on a Scatter Plot. (CPI 4.3.12 C2; 4.4.12 A4) 4.4. Determine Whether a Set of Data has Positive, Negative, or No Correlation. (CPI 4.3.12 C2; 4.4.12 A4)	• *How can I use a scatter plot to predict future values? Why do some scatterplots have an upward trend, some have a downward trend, and some have no relation at all?* • Looking at a scatterplot, identify the positive, negative, or no correlation. • Discuss situational correlation such as: number of people wearing coats vs. temperature; number of people at the beach vs. temperature; amount of free time vs. number of classes taken; shoe size vs. grades earned.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -4.1 Coordinates and Scatter Plots (pg. 203-209) -5.7 Investigation Pg. 315 -5.7 Predicting with Linear Models (pg. 316-322) • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -Ch 2.1 – Analyzing Data Using Scatter Plots
	4.5. Graph Linear Equations Using a Table of Values.(CPI 4.3.12 B1; 4.5.12 E2)	• *How does a line represent an equation?* • Given the equation y = 2x – 5, students make a table of at least 3 values and graph in a coordinate plane. • Review x-axis, y-axis, origin, quadrants.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -4.2 Graphing Linear Equations (pg 210-217) • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -Ch 2.3 – Linking Graphs to Tables (pg. 69-72)

Suggested days of Instruction	Curriculum Management System Grade Level/Subject: **Grade 9** **High School 101 Math**	**Topic:** Graphing Linear Equations **Goal 4:** The student will be able to graph linear equations using various methods.	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	4.6. Find the Slope of a Line. (CPI 4.3.12 B2; 4.5.12 E2)	• *What is a rate of change, how is it represented in an equation? What is slope?* • Given a graph, students identify rise and run, to form slope fraction. Emphasize simplest form of a fraction. • Identify that a horizontal line has zero slope, and a vertical line has an undefined slope or no slope. • Explanation: Ski Slopes: A positive or negative slope is an acceptable slope for a downhill skier. A cross-country skier skis on a flat surface (horizontal line) which has zero slope. A vertical drop is not acceptable for a skier…would you like to ski off of a cliff? Heck no! • Given two points on a line, students use the equation $\frac{y_2 - y_1}{x_2 - x_1}$, to find the slope of the line. Emphasize the meaning of the sub numbers to identify the point; it is not for an operation.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -4.4 The Slope of a Line (pg 226-234) • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -Ch 5.1 Slope (pg. 215-218) -Ch 5.2 Rates of Change (pg. 220-224) • Connected Math – Moving Straight Ahead (2004) -Investigation 2: Walking Rates - Investigation 5: Exploring Slope

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Graphing Linear Equations** **Goal 4: The student will be able to graph linear equations using various methods.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	4.7. Graph Linear Equations using Slope Intercept Form. (CPI 4.3.12 B1, B2; 4.5.12 E2)	• *Now that I know the slope of a line, how can I find the slope by looking at an equation? What does the rest of the information in the equation mean?* • Identify y = mx + b, have students graph and discover the slope and y-intercept. • Given the equation y = 2x – 5, graph without making a table of values. • Given the equation $y = \frac{1}{2}x + 3$, graph using slope-intercept form. • Emphasize that slope moving up and right is the same as down and left (+/+ and -/-) • And slope moving up and left is the same as down and right (+/- and -/+) • Put the equation 4x – 2y = 10 into slope-intercept form. **PROJECT IDEA:** Functions of Time Students collect and graph data about something that changes over time. Look for patterns in graph. Students must collect and record data, organize into a spreadsheet, make a graph and present their data to the class. (ex. height of a pedal on a moving bicycle, temperature at each hour of the day, number of cars in a restaurant parking lot at different times of day) See Explorations and Projects workbook by McDougal-Littell pg. 32-33	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -4.6 Quick Graphs Using Slope-Intercept Form (pg. 241-247)
	4.8. Graph Linear Equations Using the x- and y-Intercepts. (CPI 4.3.12 B1, D2; 4.5.12 E2) **End, Topic 4**.	• *If there is a y-intercept, is there also an x-intercept? Is it as easy to find as the y-intercept? What is an intercept?* • Emphasize that at the x-intercept, y = 0 • Emphasize that at the y-intercept, x = 0 • Given the equation 2x + 6y = 18, find the x- and y-intercepts and graph. • Review, how many points make a line? • Focus on making equations from word problems.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -4.3 Quick Graphs Using Intercepts (pg. 218-224)

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Writing Linear Equations.** **Goal 5:** **The student will be able to find the equation of a line and write the equation in slope-intercept form as well as standard form.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
20	5.1. Write the Equation of a Line given the Slope and y-intercept in Slope-Intercept Form. (CPI 4.3.12 B1; 4.5.12 E2) 5.2. Write the Equation of a Line given the slope and one point using Slope-Intercept Form. (CPI 4.3.12 B1; 4.5.12 E2) 5.3. Write the Equation of a Line given the slope and one point using Point-Slope Form. (CPI 4.3.12 B1; 4.5.12 E2) 5.4. Write the Equation of a Line given two points. (CPI 4.3.12 B1; 4.5.12 E2)	• *Since a line represents an equation, can I use a line to find an equation?* • We already know slope and y-intercept from, how can we identify these things in a graph. • If the slope of a line is ½ and the y-intercept is -3, what is the equation of the line? • Given the graph of a line, find the slope and y-intercept of a line, and write the equation. • Use y = mx + b to find y-intercept and rewrite equation. • Use Point-Slope Form $y - y_1 = m(x - x_1)$ • Restate what the sub numbers mean, discuss why some variables have sub numbers and others do not. • Write the equation of the line going through the points: (3, 5) and (-4, -9), Students must know to find the slope first, then pick one of the points to find the equation as in 5.3 • Review horizontal lines (y = number) and vertical lines (x = number) **PROJECT IDEA:** Creating Linear Puzzles Students design and create a book of linear puzzles for other students in the class to solve. Students work in groups of 4 or 5. Each student chooses a shape or letter to draw plots it on a coordinate plane. Students must find equations for each line in their graph. Students must also find endpoints for each of the lines. The equations and endpoints should be on a separate sheet of paper from the drawing. Students share with their group members to check their work, and then organize their puzzles into a portfolio or a book. See Explorations and Projects workbook by McDougal-Littell pg.34-35	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -5.1 Writing Linear Equations in Slope-Intercept Form (pg. 274-278) -5.2 Writing Linear Equations Given the Slope and a Point (pg. 279-284) -5.5 Point-Slope form (pg. 300-306) -5.3 Writing Linear Equations Given Two Points. • Connected Math – Moving Straight Ahead (2004) -Investigation 6: Writing an Equation for a Line • Connected Math – Thinking with Mathematical Models (2004) -Investigation 1: Linear Models -Investigation 4: A World of Patterns **TECHNOLOGY** -SOFTWARE: Green Globs – draws graphs of lines, requires students to write the correct equation before moving on.

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Writing Linear Equations.** **Goal 5: The student will be able to find the equation of a line and write the equation in slope-intercept form as well as standard form.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	5.5. Write the Standard form of a Linear Equation. (CPI 4.3.12 B1; 4.5.12 E2)	• *Is slope-intercept forming the only form of an equation?* • Given Equation in slope-intercept form, transform the equation into standard form. • Discuss when graphing an equation in standard form, what is the easiest method (table of values, change to slope-intercept form, or find x-and y-intercepts?) • Discuss effects of A, B, and C on the graph of equation (optional).	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -5.6 Investigation Pg. 307 -5.6 The Standard Form of a Linear Equation (pg. 308-314)
	5.6. Determine the Slope of a Line Parallel to a Given Line and Find the Equation of the Line. (CPI 4.2.12 C1; 4.3.12 B1; 4.5.12 E2) 5.7. Determine the Slope of a Line Perpendicular to a Given Line and Find the Equation of the Line. (CPI 4.2.12 C1; 4.3.12 B1; 4.5.12 E2) **End, Topic 5**.	• *Do all lines intersect? How does the slope identify how the lines will intersect?* • Discuss: What are parallel lines? How is the slope of two parallel lines related? • Show students symbol for parallel: ∥ and for perpendicular: ⊥ • Discuss: What are perpendicular lines? How are their slopes related, allow the students to plot and discover how to change the slope • Books describe perpendicular slopes as slopes whose product is -1. Students understand negative or opposite reciprocal much better.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -Pg. 242 Example 3 -Pg. 245-246 # 46-51, 62, 63, 71-77 -Pg. 280 Example 2 -Pg. 283 # 32-41 -Pg. 286 Example 2 -Pg. 289-290 #45-50, 60 -5.6 The Standard Form of a Linear Equation (pg. 308-314) • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -5.8 Parallel and Perpendicular Lines (pg. 250-255)

Suggested days of Instruction	Curriculum Management System **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Probability** **Goal 6:** **The student will be able to determine theoretical and experimental probabilities of one event and compound events.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
13	6.1. Interpret Probabilities as a Ratio, a Percent, and a Decimal. (CPI 4.4.12 B1, B3) 6.2. Make Predictions Based on Experimental and Theoretical Probabilities. (CPI 4.4.12 B1, B3, B5) 6.3. Determine the Probabilities of Complementary Events. (CPI 4.4.12 B1, B3, B4)	• *If I guess an answer, what is the likelihood that I will guess the answer correctly?* • Find Theoretical Probabilities such as: Find the probability of rolling a 3 on a normal number cube. And, find the probability of pulling a blue sock out of a drawer containing 3 black, 8 white, and 5 blue socks. Using the formula: $\text{Probability}=\frac{\text{Numer of favorable outcomes}}{\text{Total number of outcomes}}$ • Make predictions using theoretical probability such as: If a fair coin is tossed 80 times, how many times should it land heads up? • Investigate Experimental Probability (brown box - pg. 115) • Discuss: Law of Large Numbers: the more an experiment of is done, the closer the probability of an event will come to the theoretical probability. • Open Ended: A fair die was rolled 60 times; the 3 only came up 7 times, why is this different from the theoretical probability? • Discuss: What kind of an event has a probability of 0? What kind of an event has a probability of 1? • If the probability of rolling a two is 1 out of 6, what is the probability of not rolling a two? This is the complement. • *What if there is more than one event?* • Find the Probability of rolling a 2, then rolling a 3 on the next roll. P(2 and then a 3) • Find the Probability of rolling a 2 or rolling a 3 with one roll. P(2 or 3) • Find the probability of rolling a 5 and flipping a 2. • Find the probability of getting a sum of 6 when rolling 2 dice.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -2.8 Probability and Odds (pg. 114-120) • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -1.7 Experimental Probability and Simulations (pg. 36-39) -2.8 The Probability Formula (pg. 95-97) • Prentice Hall: Data Analysis and Probability Workbook (small purple workbook) -Section 5: Theoretical Probability (pg. 62-78) -Section 6: Experimental Probability (pg. 79-87) -Section 7: Statistical Investigations and Simulations (pg. 88-106) -Independent and Dependent Events (pg. 71-73) **HSPA:** • Amsco: MATHEMATICS: Preparing for the New Jersey HSPA, Grade 11 (navy blue binding –

Suggested days of Instruction	Curriculum Management System Grade Level/Subject: **Grade 9** **High School 101 Math**	**Topic:** **Probability** **Goal 6:** **The student will be able to determine theoretical and experimental probabilities of one event and compound events.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
			paperback) -Cluster 3.A.1 Probability – Simple Events – pg. 103-108 -Cluster 3.A.3 The Counting Principle – pg. 111-113 • Connected Math – What do you Expect? (2004) -Investigation 1: Evaluating Games of Chance - Investigation 2: Analyzing Number Cube Games - Investigation 3: Probability and Area - Investigation 4: Analyzing Two-Stage Games - Investigation 5: Expected Value - Investigation 7: Analyzing Sequences of Outcomes

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Probability** **Goal 6:** **The student will be able to determine theoretical and experimental probabilities of one event and compound events.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	6.4. Determine the Probability of Compound Events. (CPI 4.4.12 B1, B4) 6.5. Determine the Probability of Independent and Dependent Events. (Situations with and without replacement). (CPI 4.4.12 B1, B4) **End, Topic 6**	• *How many socks must I pull out of the drawer before I have a matching set? Does it make a difference if I keep them in my hand as I draw them out, or if I keep putting them back after each draw?* • Find the probability of drawing an ace of spades, then the king of hearts if you replace the ace of spades. • Find the probability of drawing an ace of spades, then the king of hearts if you keep the ace of spades.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -2.8 Probability and Odds (pg. 114-120) -Appendix 2: Probability of Compound Events (pg. 833-838) **HSPA:** • Amsco: MATHEMATICS: Preparing for the New Jersey HSPA, Grade 11 (navy blue binding – paperback) -Cluster 3.A.2 Probability – Compound Events – pg. 108-111

Suggested days of Instruction	Curriculum Management System **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Solving and Graphing Linear Inequalities** **Goal 7:** **The student will be able to solve and graph a linear inequality in one variable and in two variables.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
13	7.1. Solve and One-Step Linear Inequalities and Graph on a Number Line. (CPI 4.1.12 A1, B1; 4.3.12 B1, B2) 7.2. Solve Multi-Step Linear Inequalities and Graph on a Number Line. (CPI 4.1.12 A1, B1; 4.3.12 B1, B2)	• *If the fishing boat can hold a load of up to 500 lbs. If I have four friends, weighing 110, 125, 220, and I weigh 150, can we go fishing together on the boat?* • Solve and graph: x + 5 > 12 • Solve and graph: $x-3\leq 8$ • Discuss: Open Circle - not equal to the number (excluded). Closed Circle - can be equal to the number (included). • Solve and graph: 3x < -20 • Solve and graph: $-5x\geq 45$ • Emphasize rule: when multiplying or dividing by a negative number, you must switch inequality sign. • Solve and graph: 3x – 4 > -13 • Solve and graph: 2x – 4 < 4x – 1 **PROJECT IDEA:** Making a Profit Students determine the expenses of making cookies and determine a selling price to earn a profit. Students work in partners and determine the type of cookie they want to make. They must calculate the expenses: ingredients, time, permit (make one cost for all students $25), and calculate the income. Then, make a report using tables and graphs to model expenses and income as functions of number of batches sold and find the break-even point (when they start making a profit). Extend the reports by surveying friends, neighbors and cookie manufacturers. See Explorations and Projects workbook by McDougal-Littell pg.36-37	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -Pg. 333 Investigating Inequalities. -6.1 Solving One Step Linear Inequalities (pg. 334-339) -6.2 Solving Multi-Step Linear Inequalities (pg. 340-345) • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -4.5 Solving Inequalities Using Addition and-Subtraction (pg. 179-184) -4.6 Solving Inequalities Using Multiplication and Division (pg. 185-189) -4.7 Solving Multi-Step Inequalities (pg. 190-194)

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Solving and Graphing Linear Inequalities** **Goal 7:** **The student will be able to solve and graph a linear inequality in one variable and in two variables.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	7.3. Solve Compound Linear Inequalities and Graph on a Number Line. (CPI 4.3.12 B1, B2)	• *What does it mean when someone says there are 20 students in each class give or take 5?* • Solve and graph: $3 < 3x - 9 \leq 21$ • Graph and discuss differences $5 < x$ and $x < 10$ $5 < x$ and $x > 10$ $5 < x$ or $x < 10$ $5 < x$ or $x > 10$ • Solve and graph $3<2x + 1$ or $10>2x -1$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -6.3 Solving Compound Inequalities (pg. 347-352) • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -4.8 Compound Inequalities (pg. 195-200) -4.9 Interpreting Solutions (pg. 202-205) reasonableness of answers – good discussion
	7.4. Graph Linear Inequalities in Two Variables. (CPI 4.3.12 B1, B3) **End, Topic 7**	• *In algebra we have used many variables, equations with one and variables, can we use two variables in inequalities, how is that represented in a graph?* • Relate dashed line to open circle and solid line to closed circle. (discuss: included / excluded values) • Compare shading above and below to greater than or less than. Many students will need to plug in a point to check (0,0 is the easiest point, if it is not on the line) • Graph: $y > -3x + 5$, give 5 values that make the equation true. • Focus on word problems.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -6.5 Solving and Graphing Linear Inequalities in Two Variables (pg. 360-366) -Pg. 367 TECHNOLOGY Graphing Inequalities • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -6.5 Linear Inequalities (pg. 289-293) -Pg. 294 TECHNOLOGY

Suggested days of Instruction	Curriculum Management System **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Systems of Equations and Inequalities** **Goal 8: The student will be able to solve systems of linear equations and inequalities.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
13	8.1. Solve Systems of Linear Equations by Graphing.(CPI 4.3.12 C1, D2; 4.5.12 C2)	• *The cost for an internet connection using Company A is $10 / month and an additional $.20 per hour online. Company B charges $23 / month. How do I know which plan is a better plan?* Graphing: • Introduce systems of linear equations (linear systems). • Solve systems by graphing; discuss how to identify the answers on a graph. Students may need a reminder of how a line is connected to an equation (the points are the solutions to the equation). • Emphasize checking the solution. • Solve by graphing: $\begin{cases} x+2y=8 \\ 2x-3y=3 \end{cases}$ • Practice writing equations from word problems: admission prices, coin problems, age problems, etc.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -7.1 Solving Linear Systems by Graphing (pg. 360-366) -Pg. 404 TECHNOLOGY Solving Linear Systems by Graphing
	8.2. Solve Systems of Linear Equations by Substitution. (4.3.12 C1, D2; 4.5.12 C2)	Substitution: • *Discuss: what does it mean to substitute? Relate this to algebra.* • For students who have difficulty understanding: lay the linear system with sheets of paper taped to the board such as: $\begin{cases} y=x+1 \\ 2x+y=-2 \end{cases}$, have each part of the equations written on a separate piece of paper: y, =, x + 1, 2, x, +y, =, -2. (you should have 8 sheets of paper) have students restate what substitution means. Then take the pieces of paper and move them to other locations based on the equals signs. Such as: in the first equation, lift the x+1 and place it on top of the y since they are equal. Then since both y's must be equal, place the x + 1 on top of the y in the other equation. • Solve, isolate a variable: $\begin{cases} 3x+y=3 \\ 7x+2y=1 \end{cases}$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -7.2 Solving linear Systems by Substitution (pg. 405-410)

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Systems of Equations and Inequalities** **Goal 8: The student will be able to solve systems of linear equations and inequalities.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	8.3. Solve Systems of Linear Equations by Linear Combination (Elimination). (CPI 4.2.12 C1, D2; 4.5.12 C2)	Linear Combinations (Elimination): • Solve by addition: $\begin{cases} 4x+3y=16 \\ 2x-3y=8 \end{cases}$ • Solve by multiplying by -1: $\begin{cases} 2x-y=2 \\ 2x-3y=22 \end{cases}$ • Solve by multiplication: $\begin{cases} 2x-3y=0 \\ 3x-2y=5 \end{cases}$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -7.3 Solving Linear Systems by Linear Combinations (pg. 411-417)
	8.4. Determine the Best Method for Solving a System of Linear Equations. (CPI 4.2.12 C1, D2; 4.5.12 C2)	Best method • Discussion: now that we know three ways to solve a linear system, which one is the best? Give examples of different types of linear systems, and discuss which method is best and why. Look for isolated variables, coefficients of 0 or 1, or coefficients that are multiples of each other. • Focus on writing equations from word problems, real-world problems. **PROJECT IDEA:** Design a Word Problem Students design their own word problem that requires using a system of equations to solve. Students must solve the system in all three ways (graphing, substitution, and linear combination) showing each step. Then, write a paragraph describing which method was the easiest and which was the most difficult to use on the problem.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 • 7.4 Applications of Linear Systems (pg. 418-424)

Suggested days of Instruction	Curriculum Management System **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Systems of Equations and Inequalities** **Goal 8: The student will be able to solve systems of linear equations and inequalities.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	8.5. Determine the Number of Solutions of a System of Linear Equations (one solution, no solutions, or infinitely many solutions). (CPI 4.3.12 C1, D2; 4.5.12 C2)	• *The cost for an internet connection using Company A is $15 month. Company B charges $23 / month. How do I know which plan is a better plan?* • Sometimes in life, there is more than one solution to a problem, or no solution to a problem, sometimes the same thing happens in math. • Refer to solving by graphing. Discussion: how did we identify the solution to the graph? When would there be no solution? (parallel lines) And, how can we identify if lines are parallel? Well, when would there be more than one solution? Allow students to be creative (parabolas, circles, functions, and relations) then redirect them to linear systems, what does infinitely many mean? • How many solutions are there in each of the following linear systems: $A)\begin{cases}-2x+4y=1\\3x-6y=9\end{cases}$ $B)\begin{cases}2x-2y=4\\-x+y=-2\end{cases}$ $C)\begin{cases}5x+3y=17\\x-3y=-2\end{cases}$ • Discuss things to look for in an equation to identify the types of solutions.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -7.5 Special Types of Linear Systems (pg. 429-431)

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Systems of Equations and Inequalities** **Goal 8: The student will be able to solve systems of linear equations and inequalities.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	8.6. Solve Systems of Linear Inequalities by Graphing (graph by hand as well as using the graphing calculators). (CPI 4.3.12 C1, D2; 4.5.12 C2) **End, Topic 8**	• *The summer is coming, and you have been rewarded a $250 shopping spree in a store. All shirts in the store are $15 and all shorts are $18. How many shirts and shorts could you get during the shopping spree if you know that you want at least 5 shirts and at least 3 pairs of shorts? How many different combinations could you get?* • Warm Up graphing linear inequalities, remind students of solid line, dotted lines, and shading. • Discuss equations of horizontal and vertical lines. • Discuss how you could do two of these graphs on one coordinate plane. Practice one; discuss where the solution to both equations can be identified on the graph. • Solve by Graphing: $\begin{cases} y < 2 \\ y \geq x - 2 \end{cases}$ • Solve by Graphing: $\begin{cases} x > 0 \\ -x + 3y \leq 6 \\ y > x \end{cases}$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -7.6 Solving Systems of Linear Inequalities (pg. 432-438) **TECHNOLOGY:** • Prentice Hall Mathematics: -TI – 83/84 PLUS Activities for Algebra, Geometry, and Algebra II (resource workbook) -Linear Inequality Systems – pg. 23

Suggested days of Instruction	Curriculum Management System **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Polynomials and Factoring** **Goal 9:** **The student will be able to Manipulate Polynomial Expressions and Solve Polynomial Equations.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
26	9.1. Classify Polynomials Based on Number of Terms and Degree of Variables. (CPI 4.5.12 B1)	• *We identified 3 families of functions when we first did graphs, what were they? Can anyone think of ways to group equations into families? Show students various polynomials, and let them discuss.* • Classifications by number of terms: 1 Term = Monomial 2 Terms = Binomial 3 Terms = Trinomial 4 or more Terms = Polynomial • Classifications by degree, largest value of exponent: No variables (Exponent 0) = Constant x^1 = Linear x^2 = Quadratic x^3 = Cubic x^4 or higher exponent = number of exponent, $x^4 = 4^{th}$ degree. • Emphasize: All polynomials must be in simplest form in order to classify correctly. • Classify the following: 6 -2x 3x+1 $-x^2 + 2x - 5$ $4x^3 - 8x$ $2x^4 - 7x^3 - 5x + 1$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -10.1 Adding and Subtracting Polynomials (pg. 576-582) • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -10.1 Adding and Subtracting Polynomials (pg. 464-469)

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Polynomials and Factoring** **Goal 9:** **The student will be able to Manipulate Polynomial Expressions and Solve Polynomial Equations.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	9.2. Add and Subtract Polynomials. (CPI 4.3.12 D1)	• *What is a like term? What is a coefficient?* • Review like terms. • Review Standard Form: put terms in order of exponents, then alphabetical order. • Simplify: $(2x^2 – 3x + 4) + (3x^2 + 2x – 3)$ • Simplify: $(7x^3 – 3x +1) – (x^3 + 4x^2 – 2)$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -10.1 Adding and Subtracting Polynomials (pg. 576-582) • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -10.1 Adding and Subtracting Polynomials (pg. 464-469)
	9.3. Multiply Polynomials. (CPI 4.3.12 D1) 9.4. Multiply Special Cases of Polynomials (sum and difference; square of a binomial).(CPI 4.3.12 D1)	• *Is $(x+4)(x+5)$ equal to $x^2 + 20$?* • Take a poll in class to see what students think…then pick some numbers and plug in the values. Discussion: Why is it different? • Multiply using the FOIL method. • Multiply using distribution; discuss how they are the same thing. • Simplify: $3x(2x^2 – 5x – 8)$ • Simplify: $(x + 3)(2x – 8)$ • Simplify: $(2x – 3)(2x^2 – 3x + 4)$ • Simplify: $(x – 3)^2 = (x – 3)(x – 3)$ • Simplify $(2x – 8)^2 = (2x + 8)(2x + 8)$ • Simplify $(3x – 2)(3x + 2)$ • Discuss patterns noticed with the special cases of polynomials, the square of a binomial and the sum and difference. • Students may need reminder that to square something is to multiply it by itself.	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -10.2 Multiplying Polynomials (pg. 584-589) -10.3 Special Products of Polynomials (pg. 590-596)

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Polynomials and Factoring** **Goal 9:** **The student will be able to Manipulate Polynomial Expressions and Solve Polynomial Equations.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	9.5. Factor Polynomials using the GCF. (CPI 4.3.12 D1)	• *What does prime mean? What are prime numbers? Can a polynomial be prime?* • Discuss Common Factors; look for things that are the same in each term. Factoring by GCF is doing the reverse of distributing. • Factor: $5x^8 + 30x^3 – 40s$ • Discuss what exponent the variable should have when factoring. • Factor: $2x^4 – 2x^3 + 12x^2$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -10.8 Factoring Using the Distributive Property (pg. 625-632) • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -10.2 Multiplying and Factoring (pg. 470-474)
	9.6. Factor $x^2 + bx + c$. (CPI 4.3.12 D1)	• *In math, we learn addition, and then we learn its opposite, subtraction. Multiplication then division, etc. Can we use a polynomial and find its binomial factors?* • Students should be able to identify from the sign of b and c whether the factors will contain both addition, both subtraction, or one addition and one subtraction. • Factor: $x^2 + 3x + 2$ • Factor: $x^2 -5x + 6$ • Factor: $x^2 + 7x – 18$ • Factor: $x^2 – 2x - 8$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -10.5 Factoring $x^2 + bx + c$ (pg. 604-609)
	9.7. Factor $ax^2 + bx + c$. (use gcf to factor completely – 10.4) (CPI 4.3.12 D1)	• Have students practice factoring the GCF first; this should always be the first step when factoring as it may make it simpler and remove the coefficient of the first term. • Factor: $6x^2 – 19x + 15$ • Factor: $6x^2 – 2x – 8$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -10.6 Factoring $ax^2 + bx + c$ (pg.611-617)

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Polynomials and Factoring** **Goal 9: The student will be able to Manipulate Polynomial Expressions and Solve Polynomial Equations.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	9.8. Factoring Special Products. (CPI 4.3.12 D1)	• *Factoring when the coefficient of the quadratic term is greater than 1 can be hard, tiring, even grueling, isn't there anything else, any tricks that we can use?* • Remind students of patterns they saw when multiplying special products in 10.4. Review each special product. Ask the students how to identify the product as having special factors? Allow the students to discover the patterns and what to look for, especially when there is an ax^2 term • Factor: $x^2 + 4x + 4$ • Factor: $3x^2 + 30x – 75$ • Factor: $x^2 – 36$ • Factor $4x^2 – 25$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -10.7 Factoring Special Products (619-624
	9.9. Solve Quadratic (and Polynomial) Equations in Factored Form. (CPI 4.3.12 D1, D2) 9.10. Solve Quadratic (and Polynomial) Equations by Factoring. (CPI 4.3.12 D1, D2)	• *Discussion – what two numbers can you multiply to get zero. Try positive and positive, positive and negative, negative and negative, opposites. Let the students discuss and give an explanation.* • Solve: $(x – 2)(x + 3) = 0$ • Solve: $(2x + 1)(3x – 2)(x – 1) = 0$ • Solve: $3x^2(2x – 5) = 0$ • Move to problems they have to factor first. Remind the students that since there is both an x^2 term and an x term, they cannot get x alone, they will have to factor to solve. • Solve: $x^2 – 5x + 6 = 0$ • Solve: $6x^2 – 19x + 15 = 0$ • Solve: $4x^2 – 25 = 0$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -10.4 Solving Polynomial Equations in Factored Form (pg. 597-602) -10.5 Factoring $x^2 + bx + c$ (pg. 604-609) -10.6 Factoring $ax^2 + bx + c$ (pg.611-617)

Suggested days of Instruction	Curriculum Management System **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Polynomials and Factoring** **Goal 9:** **The student will be able to Manipulate Polynomial Expressions and Solve Polynomial Equations.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	9.11. Solve quadratic equations by finding square roots. (CPI 4.3.12 D1, D2) 9.12. Simplify Radicals. (CPI 4.1.12 B1, B2)	• *A can of paint reads that a quart of paint covers 75 to 100 square feet. What does this mean? How big of a wall will it cover?* • Students must be able to identify solutions to: $\sqrt{9}, \sqrt{-9}, -\sqrt{9}$, and $\pm\sqrt{9}$ • Review types of numbers: counting (natural), whole, integers, and rational, and irrational. Emphasize the differences between rational and irrational. (terminating or repeating). Look in HSPA books for questions about types of numbers. • Solve $x^2 = 121$ • Solve: $x^2 = 24$; this does not have a whole number answer, we must simplify. • Emphasize the need for exact answers, the need for simplifying radicals. $\sqrt{64}$ $\sqrt{18}$ • Simplify these: $\sqrt{\frac{25}{16}}$ $\sqrt{\frac{30}{12}}$	**RESOURCES** • McDougal-Littell: Algebra 1 2004 -9.1 Solving Quadratic Equations by Finding-Square Roots (pg. 503 – 510) -9.2 Simplifying Radicals (pg. 511-516) -11.1 Ratio and Proportion (pg. 643-648) -12.2 Operations with Radical Expressions (pg. 716-721) – only multiplying and dividing as in Example 2 and 3, or Problem #'s 7, 10, 12, 31, 32, 40, 41, 43 • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -9.4 Simplifying Radicals (pg. 430-434)

Suggested days of Instruction	Curriculum Management System **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic:** **Polynomials and Factoring** **Goal 9:** **The student will be able to Manipulate Polynomial Expressions and Solve Polynomial Equations.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	9.13. Solve Quadratic Equations by Using the Quadratic Formula. (CPI 4.3.12 D1, D2) 9.14. Use the Discriminant to determine the number of solutions of a Quadratic Equation. (CPI 4.3.12 D1, D2) **End, Topic 9**	• *Some trinomials cannot be factored, or if you just can't figure out what the factors are, here is another trick solving.* • Show students how using the discriminant can help them save time, they will know if it has no solutions, or has one solution (perfect square trinomial) right away, or if they do have do go on, part of the equation is done for them. • Remind students to see if it is easily factorable if the discriminant determines there are two answers. • Introduce the formula, it is important that students memorize this formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$. Many teachers sing a song to different show tunes to help their students remember the formula. Ask someone in the department to share the tune. • Solve $2x^2 - 3x = 8$ • Solve $-x^2 - 2x + 5 = 0$ • Solve: $\frac{x}{3} = \frac{12}{x}$ • Solve: $\frac{x}{3} = \frac{4}{x+1}$	**RESOURCES** • McDougal-Littell: Algebra 1 2004 -9.5 Solving Quadratic Equations by Using the Quadratic Formula (pg. 533-538) -Pg. 539 TECHNOLOGY -9.6 Applications of the Discriminant (pg. 541-547)

Suggested days of Instruction	Curriculum Management System **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Quadratic Functions** **Goal 10: The student will be able to analyze and graph quadratic functions.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
7	10.1. Graph quadratic functions. (CPI 4.3.12 B1, B2, B4, C2) 10.2. Analyze the Effect of the Coefficients of a Quadratic Equation in Standard Form. (CPI 4.3.12 B1, B2, B4, C2)	• *When a homerun is hit in baseball, the announcers tell the audience how far the ball was hit, how do they know this when the ball is hit out of the park and they don't know where it landed?* • Have students graph the functions $y = x^2$, $y = 2x^2$, and $\frac{1}{2}x^2$ on the same coordinate plane, using an entire sheet of graph paper or using graphing calculator. • Discuss the shape of a parabola (don't forget symmetry) and the effect of the coefficient on the width of the parabola. Next graph the function $y = -x^2$ and make more conclusions about the effects of the coefficients. • Discuss whether the vertex is the minimum or the maximum of the graph based on its direction (coefficient). • Next, have students compare the graphs of $y = x^2$ to the graphs of $y = x^2 + 2$ and $y = x^2 - 3$. Discuss the fact that c is the y-intercept, but it also makes the entire parabola move up and down. Discuss whether the width of the graph changed at all. Many students will think that the width has changed. • Finally graph some equations on the graphing calculator with a b term such as $y = x^2 - 4x - 5$ and $y = -2x^2 - x + 2$. Allow the students to discuss the width, the y-intercept and the vertex. • Explain how to graph: find the vertex, first the x-coordinate, the axis of symmetry $x = \frac{-b}{2a}$, then substitute the value of x into the equation to find y. Then make a table of values. • Graph: $y = 2x^2,\ y = \frac{1}{4}x^2 - 3,\ y = -2x^2 + 16x,\ y = \frac{1}{3}x^2 - 2x - 5$ $y = 3x^2 + 12x - 10,\ y = -x^2 + 3x + 2$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -9.3 Graphing Quadratic Functions (pg. 518-524) -Pg. 524 TECHNOLOGY – Quadratic Curves of Best Fit (optional) -Pg. 583 TECHNOLOGY – Graphing Polynomial Functions • Prentice Hall: Algebra - Tools for a Changing World (textbook - purple binding) -7.2 Graphing Simple Quadratic Functions (pg. 323-326) -7.3 Graphing Quadratic Functions (pg. 327-331) **TECHNOLOGY:** • Prentice Hall Mathematics: - TI – 83/84 PLUS Activities for Algebra, Geometry, and Algebra II (resource workbook) -Quadratic Graphs I – pg. 33 -Quadratic Graphs II – pg. 35 -Quadratic Function Match I – pg. 37

Suggested days of Instruction	Curriculum Management System **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Quadratic Functions** **Goal 10: The student will be able to analyze and graph quadratic functions.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	10.3. Solve Quadratic Functions by Graphing. (CPI 4.3.12 B1, D2) **End, Topic 10**	• Solve the equations: $x^2 - 5x + 6 = 0$, $x^2 - 19x + 15 = 0$, and $4x^2 - 25 = 0$ • Then graph the same equations, discuss where the solutions are located on the graph. Why is this, what is the y-value in the equations? • Review how to use the discriminant to determine the number of solutions and discuss what this means to the graph. • Solve by graphing: $y = -x^2 - 2x + 3 = 0$ • Solve by graphing: $8x^2 - 4 = 4x$	**RESOURCES:** • McDougal-Littell: Algebra 1 2004 -9.4 Solving Quadratic Equations by Graphing (pg. 526-531) -Pg. 532 TECHNOLOGY – Approximating Solutions by Graphing **TECHNOLOGY:** • Prentice Hall Mathematics: -TI – 83/84 PLUS Activities for Algebra, Geometry, and Algebra II (resource workbook) -Graphs, Solutions, and Factors - 39 -The Discriminant – pg. 41

Suggested days of Instruction	Curriculum Management System **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Patterns** **Goal 11: The student will be able to use inductive and deductive reasoning to solve problems.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
5	11.1. Identify the next three terms in a pattern. (CPI 4.3.12 A1) 11.2. Find the n^{th} term of an arithmetic pattern. (CPI 4.2.13 A1) **End, Topic 11.**	• *If you start a savings account with $500, and add $20 each week, how much money will you have after 1 year?* • Visual patterns – repeating shapes. • Number patterns, arithmetic, geometric, Fibonacci • Repeating patterns: what is the 38^{th} term in GEOMETRYGEO…? What is the 47^{th} digit in $\frac{1}{7}$? Or what is the units digit in 3^{25}? • In the pattern 4, 6, 8, 10, … what are the next three terms? What is the 40^{th} term? What is the n^{th} term (write an equation)?	**HSPA:** Amsco: MATHEMATICS: Preparing for the New Jersey HSPA, Grade 11 - Cluster 2.A.4 Inductive and Deductive Reasoning – pg. 36-38 - Cluster 4.A.1 Patterns – pg. 177-181 - Cluster 4.A.2 Sequences and Series – pg. 181-187 - Cluster 4.A.3 Representation of Relationships and Patterns – pg. 188-189 Prentice Hall: New Jersey HSPA Mathematics Comprehensive Review ▪ 3.1 Patterns and Sequences pg. 298-301

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Geometry Relationships** **Goal 12: The student will be able to identify and use parts and types of lines, angles, and planes in problems solving.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	12.1. Identify and use points, lines, and planes in space. (CPI 4.2.12 A1)	• *Why do chairs sometimes wobble?* • Identify collinear and coplanar points. • Name points, lines, line segments, and planes both in words and by symbols • Coordinate Geometry: identify the x-axis, y-axis, origin, quadrants, and plot points. • Introduce z-axis (mention) • Two lines intersect to form a point • Two planes intersect to form a line. • Skew lines are in two different planes, never intersect, but are not parallel.	**RESOURCES:** Geometry, Glencoe, © 2005 -Review of plotting points pg. 728 -1.1 pg. 6-12 **HSPA:** Amsco: MATHEMATICS: Preparing for the New Jersey HSPA, Grade 11 - Cluster 2.A.1Geometric Terms – pg. 23-26 Prentice Hall: New Jersey HSPA Mathematics Comprehensive Review - 10.1 Points, Lines, Planes, and Segments pg. 206-210

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Geometry Relationships** **Goal 12: The student will be able to identify and use parts and types of lines, angles, and planes in problems solving.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	12.2. Find the distance between two points. (CPI 4.2.12 C1) 12.3. Identify and find the midpoint of a segment. (CPI 4.2.12 C1) 12.4. Identify and use segments, midpoints, and segment bisectors. (CPI 4.2.12 C1)	• *I want to make a garden that is 12 feet by 4 feet. If the border pieces are 4 feet long, how many pieces will I need?* • Name distance in words and by symbols. • Find the distance on a number line (whether horizontal or vertical) • Use a ruler to measure the distance of a segment, in inches and in centimeters. • Find the distance on a number line (whether horizontal or vertical) • Distance formula – $D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ • Midpoint formulas: Number Line: $\frac{x_1 + x_2}{2}$ Coordinate Plane: $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ Emphasize - coordinates. EX 1: Find AB if A(3, 2) and B(3, -5) EX 2: Find AB if A(-5, 3) and B(7, -2) EX 3: A(2, -2), B(2,8), find the coordinates of M.	**RESOURCES:** Geometry, Glencoe, © 2005 -1.3 pg. 21-28 -Activity – The Pythagorean Theorem pg. 28

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Geometry Relationships** **Goal 12: The student will be able to identify and use parts and types of lines, angles, and planes in problems solving.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	12.5. Use the Pythagorean Theorem to solve problems. (CPI 4.2.12 A1, 4.2.12 E1)	• *What whole number side lengths always form right triangles, Pythagorean Triples? How can I use these to solve problems?* • Pythagorean theorem: $a^2 + b^2 = c^2$ $leg^2 + leg^2 = hyp^2$ • In a right triangle one leg is 5, the other leg is 12, find the hypotenuse. • In a right triangle one leg is 20, the hypotenuse is 25, find the other leg. • If two sides of a right triangle are 3 and 4, what are the possible side lengths for the third side?	**RESOURCES:** Geometry, Glencoe, © 2005 - Geometry Activity pg. 349 - 8.2 pg. 350-356 **HSPA:** Amsco: MATHEMATICS: Preparing for the New Jersey HSPA, Grade 11 - Cluster 2.C.6 Pythagorean Theorem – pg. 87-88
	12.6. Measure and Classify Angles. (CPI 4.2.12 C1) 12.7. Identify and use congruent angles in problem solving. (CPI 4.2.12 C1)	• *Why when it is the brightest outside does no one use their visors in their cars, yet in the early morning or evening they do?* • Identify the sides, vertex, interior, and exterior of an angle. • Name a ray in words and by symbols. • Name an angle by symbols, using one letter (the vertex), three letters, and a number. • Know the difference between the symbols: $\angle ABC$ and $m\angle ABC$ • Measure an angle using a protractor (optional) • Angles are measured in degrees: Emphasize - students must have degree signs next to angle measures. • Classify Angles as acute, right, obtuse, or straight. • Identify and label congruent angles • Use Algebra to find angle measurements. • Identify and use properties of angle bisectors: Bisector is exactly in middle. Bisector cuts the whole angle in half.	**RESOURCES:** Geometry, Glencoe, © 2005 - 1.4 pg. 29-36 **HSPA:** Prentice Hall: New Jersey HSPA Mathematics Comprehensive Review - 10.2 Rays and Angles pg. 211-214 **TECHNOLOGY:** Prentice Hall Mathematics: - TI – 83/84 PLUS Activities for Algebra, Geometry, and Algebra II (resource workbook) - Angle Bisectors – pg. 55

Suggested days of Instruction	Curriculum Management System Grade Level/Subject: **Grade 9** **High School 101 Math**	**Topic: Geometry Relationships** **Goal 12: The student will be able to identify and use parts and types of lines, angles, and planes in problems solving.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	12.8. Identify and use special types of angles and pairs of angles. (CPI 4.2.12 C1) **End, Topic 12.**	The measure of each angle on either side of the bisector is equal. EX. $\overrightarrow{BD}$ is the angle bisector of $\angle ABC$, If $\angle ABD = (8X - 10)^O$ and $\angle DBC = (10x - 20)^o$, find x, $m\angle ABC$ • Angle addition postulate • *Streets intersect to form many different types of angles, discuss the angels of roads around Monroe and Jamesburg.* • Identify and name adjacent angles • Identify vertical angles - congruent • Complementary angles - two angles whose sum is 90^o • Supplementary angles – two angles whose sum is 180^o • Linear Pair of angles form a line; they are supplementary and their sum is 180^o • Perpendicular lines form 4 right angles. Use Algebra to find angle measurements using each angle type listed above.	**RESOURCES:** Geometry, Glencoe, © 2005 - 1.5 pg. 37-43 **HSPA:** Amsco: MATHEMATICS: Preparing for the New Jersey HSPA, Grade 11 - Cluster 2.A.3 – pg. 33-36 **TECHNOLOGY:** Prentice Hall Mathematics: - TI – 83/84 PLUS Activities for Algebra, Geometry, and Algebra II (resource workbook) - Linear Pairs – pg. 57 - Vertical Angles – pg. 59

Suggested days of Instruction	Curriculum Management System Grade Level/Subject: **Grade 9** **High School 101 Math**	**Topic: Parallel and Perpendicular Lines** **Goal 13: The student will be able to use angle relationships with parallel and perpendicular lines to solve problems.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
5	13.1. Identify angles formed by two lines and a transversal. (CPI 4.2.12 A3, 4.2.12 A4, 4.2.12 C1)	• *When a house is built, Construction workers must up walls straight. They use beams in the walls called studs to stabilize the wall. How can the workers determine if the studs are parallel?* • Discuss parallel lines and parallel planes. • Introduce types of angles: Alternate exterior, Alternate interior, Corresponding, Consecutive (Same-Side Interior) • Identify angles when three lines cross (not parallel), and when four lines cross (two sets of parallel lines).	**RESOURCES:** Geometry, Glencoe, © 2005 - 3.1 pg. 126-131 - Geometer sketchpad activity p. 132 **HSPA:** Prentice Hall: New Jersey HSPA Mathematics Comprehensive Review - Intersecting, Perpendicular, and Parallel Lines pg. 215-219
	13.2. Identify and use angle relationships formed by two parallel lines and a transversal. (CPI 4.2.12 A3, 4.2.12 C1, 4.5.12 C1, 4.5.12 D3)	• *A railroad train travels along two rails. The two rails must be the same distance apart along the entire track. How can we make sure the train will not derail?* • Identify the alternate interior, alternate exterior, and corresponding angles, and identify the congruent angles • Identify the consecutive angles and the supplementary angles, show relationship is supplementary. • Congruent angles can be identified by making a "Z", zigzagging across the transversal. • Perpendicular transversal theorem. • Use algebra to solve problems involving parallel lines and a transversal.	**RESOURCES:** Geometry, Glencoe, © 2005 - Geometer sketchpad activity pg. 132 - 3.2 pg. 133-138 - 3.5 pg. 151-158 **TECHNOLOGY:** Prentice Hall Mathematics: - TI – 83/84 PLUS Activities for Algebra, Geometry, and Algebra II (resource workbook) - Parallel Lines, Related Angles – pg. 61

Suggested days of Instruction	Curriculum Management System Grade Level/Subject: **Grade 9** **High School 101 Math**	**Topic: Parallel and Perpendicular Lines** **Goal 13: The student will be able to use angle relationships with parallel and perpendicular lines to solve problems.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	13.3. Use the slope of a line to determine whether two lines are intersecting, parallel, or perpendicular. (CPI 4.2.12 C1, 4.3.12 B2) **End, Topic 13.**	• *When driving in the mountains, or a very hilly area, there are signs posted with pictures of a truck and percentages on them. What are these used for, what does the percentage mean?* • Review slope formula: $\frac{y_2 - y_1}{x_2 - x_1}$ • Review relationships of slopes of parallel and perpendicular lines. • Review slope-intercept form of an equation. • Use slope to graph a line: given the slope and a point, given slope-intercept form.	**RESOURCES:** Geometry, Glencoe, © 2005 - 3.3 pg. 139-144 - pg. 741 – Review graphing using intercepts and slopes. **HSPA:** Amsco: MATHEMATICS: Preparing for the New Jersey HSPA, Grade 11 (navy blue binding – paperback) - Cluster 2.B.5 Coordinate Geometry – pg. 58-61

Suggested days of Instruction	Curriculum Management System Grade Level/Subject: **Grade 9** **High School 101 Math**	**Topic: Triangle Relationships** **Goal 14: The student will be able to use the relationships of sides and angles in triangles to solve problems.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
10	14.1. Classify triangles by sides and angles (CPI 4.2.12 A3, 4.2.12 A4)	• *Construction workers use triangles when building houses, office buildings, and bridges, name some locations where you've seen triangles used in construction. Why do you think this is?* • Identify the vertices, angles, and sides of a triangle. • Side Classifications – scalene, isosceles, and equilateral • Angle Classifications – acute, obtuse, right, and equiangular • Emphasize: In a right triangle, there is at most 1 right angle. And, in an obtuse triangle, there is at most 1 obtuse angle. • In a right triangle, identify the right angle, the legs and the hypotenuse. • In an isosceles triangle, identify the base, the vertex, and the base angles.	**RESOURCES:** Geometry, Glencoe, © 2005 - 4.1 pg. 178-183 **HSPA:** Prentice Hall: New Jersey HSPA Mathematics Comprehensive Review (textbook - purple binding – paperback) -10.4 Triangles
	14.2. Use the exterior and interior angles of a triangle to solve problems. (CPI 4.2.12 A3, 4.2.12 A4)	• Angle Sum Theorem, the sum of the angles inside an triangle is 180^{o} • Exterior Angles Theorem, the exterior angle is equal to the sum of the two remote interior angles. • Solve problems involving interior and exterior angles.	**RESOURCES:** Geometry, Glencoe, © 2005 - 4.2 pg. 216-221 **TECHNOLOGY:** Prentice Hall Mathematics: - TI – 83/84 PLUS Activities for Algebra, Geometry, and Algebra II (resource workbook) - Exterior Angle of a Triangle – pg. 63

Suggested days of Instruction	**Curriculum Management System** **Grade Level/Subject:** **Grade 9** **High School 101 Math**	**Topic: Triangle Relationships** **Goal 14: The student will be able to use the relationships of sides and angles in triangles to solve problems.**	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) **The student will be able to:**	**Essential Questions** **Sample Conceptual Understandings**	**Instructional Tools / Materials / Technology / Resources / Learning Activities / Interdisciplinary Activities / Assessment Model**
	14.3. Use properties of isosceles triangles to solve problems. (CPI 4.2.12 A3, 4.2.12 A4)	• Review the vertex, the base, and the base angels. • If the triangle is isosceles, then the base angles are congruent, (If sides then angles). • If the base angles are congruent then the triangle is isosceles. (If angles then sides). • Given one angle in an isosceles triangle, find the other two angels. • Use algebra to solve isosceles triangle problems. EX. In isosceles triangle ABC, where A is the vertex, AB = 4x – 5, AC = 11 + 2x, BC = 3X. Find x, BC.	**RESOURCES:** Geometry, Glencoe, © 2005 - 4.6 pg. 216-221
	14.4. Recognize and Apply triangle inequalities. (CPI 4.2.12 A3, 4.3.12 C1, 4.5.12 A3)	• *Without using a protractor, How can you tell which angle is the biggest angle?* • Angle-Side Relationships: The angle opposite a longer side is larger than an angle opposite a shorter side and vice-versa. • Triangle Inequality Theorem: The sum of the lengths of any two sides of a triangle is greater than the length of the third side. EX. Is it possible for a triangle to have side lengths of 3, 5, and 8? 2, 4, and 5? 3, 3, 10? • Given two side lengths, find the range of lengths for the 3rd side. EX. If two sides of a triangle are 10 and 13, what is the range of sizes for the third side? • Also, apply algebra to solving inequalities.	**RESOURCES:** Geometry, Glencoe, © 2005 - 5.2 pg. 247-254 - 5.4 pg. 261-266 - 5.5 pg. 267-273 **TECHNOLOGY:** Prentice Hall Mathematics: - TI – 83/84 PLUS Activities for Algebra, Geometry, and Algebra II (resource workbook) - Inequalities in Triangles – pg. 75
	End, Topic 14.		

High School 101 Mathematics

COURSE BENCHMARKS

1. The student will be able to use, interpret, analyze, and evaluate data.
2. The student will be able to perform operations with real numbers, evaluate expressions with variables, and simplify algebraic expressions.
3. The student will be able to solve various linear equations.
4. The student will be able to graph linear equations using various methods.
5. The student will be able to find the equation of a line and write the equation in slope-intercept form as well as standard form.
6. The student will be able to determine theoretical and experimental probabilities of one event and compound events.
7. The student will be able to solve and graph a linear inequality in one variable and in two variables.
8. The student will be able to solve systems of linear equations and inequalities.
9. The student will be able to Manipulate Polynomial Expressions and Solve Polynomial Equations.
10. The student will be able to analyze and graph quadratic functions.
11. The student will be able to use inductive and deductive reasoning to solve problems.
12. The student will be able to identify and use parts and types of lines, angles, and planes in problems solving.
13. The student will be able to use angle relationships with parallel and perpendicular lines to solve problems.
14. The student will be able to use the relationships of sides and angles in triangles to solve problems.