

Mathematics – PLANNED COURSE OUTLINE

Avon Grove School District

Grade 11- Algebra II

State Benchmarks (K,3,5,8,11) & Grade Specific Benchmark	Eligible Content	The learner will be able to:	Instructional Strategies, Resources and Assessments
Standard: 2.1. Numbers, Number Systems and Number Relationships			
Enduring Understandings: Students will understand that: <ol style="list-style-type: none"> 1. Numbers can be represented in multiple ways. 2. Being able to compute fluently means making smart choices about which tools to use and when to use them. 3. Classifying helps us build mathematical networks of mathematical ideas. 4. There is a need to represent and model numbers verbally, physically, and symbolically. 		Essential Questions: <ol style="list-style-type: none"> 1. What makes an answer exact? 2. What makes a solution optimal? 3. Why do we classify numbers? 4. How can numbers be used to compare quantities and describe relationships between them? 5. What numbers should be used to compare quantities and describe relationships between them? 	
<p>A. Use operations (e.g., opposite, reciprocal, absolute value, raising to a power, finding roots, finding logarithms).</p> <p>M11.A Numbers and Operations</p> <p>M11.A.1 Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.</p> <p>M11.A.1.1 Represent and/or use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, square roots, exponents and scientific notation).</p> <p>M11.A.2 Understand the meanings of operations, use operations and understand how they relate to each other.</p> <p>M11.A.2.2 Use exponents, roots and/or absolute value to solve problems.</p>	<p>Find the square root of an integer to the nearest tenth using either a calculator or estimation. (2.1.8.A) M11.A.1.1.1</p> <p>Simplify square roots. (e.g., $\sqrt{24} = 2\sqrt{6}$) (2.1.11.A) M11.A.1.1.3</p> <p>Simplify/evaluate expressions involving positive and negative exponents, roots and/or absolute value (may contain all types of real numbers -exponents should not exceed power of 10). (2.1.11.A) M11.A.2.2.1</p> <p>Simplify/evaluate expressions involving multiplying with exponents (e.g. $x^6 \cdot x^7 = x^{13}$), powers of powers (e.g., $(x^6)^7 = x^{42}$) and powers of products $(2x^3)^6 = 8x^{18}$ (positive exponents only). (2.1.11.A) M11.A.2.2.2</p>	<ul style="list-style-type: none"> • To solve absolute value equations (1.5) • Use the quadratic formula to solve quadratic equations (5.8) • Order real numbers on a number line including fractions and square roots (1.1) • Simplify nth roots (7.1) • Simplify expressions with rational exponents (7.4) • Add and subtract radical expressions (7.3) • Multiply and divide radical expressions (7.2) 	<p>Instructional Strategies:</p> <p>Guided Practice Lecture Projects Group Work Discussion Independent Practice</p> <p>Resources:</p> <p>Textbook Publisher made supplemental materials Teacher made supplemental materials</p> <p>Assessments:</p> <p>Publisher made Teacher made</p>

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Standard: 2.1. Numbers, Number Systems and Number Relationships			
<p>B. Simplify and expand algebraic expressions using exponential forms. (Grade 8)</p> <p>M11.A Numbers and Operations</p> <p>M11.A.1 Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.</p> <p>M11.A.1.2 Apply number theory concepts to show relationships between real numbers in problem solving settings.</p>	<p>Find the Greatest Common Factor (GCF) and/or the Least Common Multiple (LCM) for sets of monomials. (2.1.8.E) M11.A.1.2.1</p>	<p>1. Factoring out the GCF of a polynomial (5.4)</p>	<p>Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice</p> <p>Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials</p> <p>Assessments: Publisher made Teacher made</p>

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State Benchmarks (K,3,5,8,11) & Grade Specific Benchmark	Eligible Content	The learner will be able to:	Instructional Strategies, Resources and Assessments
Standard: 2.2. Computation and Estimation			
Enduring Understandings: Students will understand that: <ul style="list-style-type: none"> Knowing the reasonableness of an answer comes from using good number sense and estimation strategies. 		Essential Questions: 1. What makes an estimate reasonable?	
A. Develop and use computation concepts, operations and procedures with real numbers in problem-solving situations. M11.A Numbers and Operations M11.A.2 Understand the meanings of operations, use operations and understand how they relate to each other. M11.A.2.1 Apply ratio and/or proportion in problem-solving situations. M11.A.3 Compute accurately and fluently and make reasonable estimates. M11.A.3.1 Apply the order of operations in computation and in problem-solving situations.	Solve problems using operations with rational numbers including rates and percents (single and multi-step and multiple procedure operations) (e.g., distance, work and mixture problems, etc.). (2.2.11.A) M11.A.2.1.1 Simplify/evaluate expressions using the order of operations to solve problems (any rational numbers may be used). (2.2.8.A) M11.A.3.1.1	<ul style="list-style-type: none"> Solve equations (1.3) Solve problems by writing equations (1.3) Solve problems with linear programming (3.4) Find maximum and minimum values (3.4) Simplify algebraic expressions (1.2) Solve a system of equations by substitution or elimination (3.2) 	Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials Assessments: Publisher made Teacher made

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Standard: 2.2. Computation and Estimation			
<p>B. Use estimation to solve problems for which an exact answer is not needed.</p> <p>M11A. Numbers and Operations</p> <p>M11.A.3 Compute accurately and fluently and make reasonable estimates.</p> <p>M11.A.3.1 Apply the order of operations in computation and in problem-solving situations.</p>	<p>Use estimates to solve problems. (2.2.11.B) M11.A.3.2.1</p>	<ul style="list-style-type: none"> Use estimation to solve word problems (drop in after 8.6) 	<p>Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice</p> <p>Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials</p> <p>Assessments: Publisher made Teacher made</p>
<p>C. Construct and apply mathematical models, including lines and curves of best fit, to estimate values of related quantities.</p> <p>M11.A Numbers and Operations</p> <p>M11.A.1 Demonstrate an understanding of numbers, ways of representing numbers, relationships among numbers and number systems.</p> <p>M11.A.1.3 Estimate the value of an irrational number.</p>	<p>Locate/identify irrational numbers at the approximate location on a number line. (2.2.8.C) M11.A.1.3.1</p> <p>Compare and/or order any real numbers (rational and irrational may be mixed). (2.2.8.C) M11.A.1.3.2</p>	<ul style="list-style-type: none"> To graph and order real number (1.1) To write linear equations that model real world data (2.4) To make predictions from linear models (2.4) To model exponential growth and decay (8.1) 	
<p>D. Describe and explain the amount of error that may exist in a computation using estimates.</p>	<p>Not assessed at grade 11.</p>	<p>1. Use estimation with solving word problems (drop in after 8.6)</p>	

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State Benchmarks (K,3,5,8,11) & Grade Specific Benchmark	Eligible Content	The learner will be able to:	Instructional Strategies, Resources and Assessments
Standard: 2.3 Measurement and Estimation			
Enduring Understandings: Student will understand that: <ul style="list-style-type: none"> • Mathematics can be used to solve problems outside of the mathematics classroom. • All measurements are approximations and the precision of the measurement depends on the tool and unit used. • Understand measurable attributes of objects and the units, systems, and processes of measurement. 		Essential Questions: <ol style="list-style-type: none"> 1. Is your plan working? Should you try a different method? 2. How does what we measure affect how we measure? 	
A. Select and use appropriate units and tools to measure to the degree of accuracy required in particular measurement situations. M11.B Measurement M11.B.2 Apply appropriate techniques, tools and formulas to determine measurements. M11.B.2.1 Use and/or compare measurements of angles. M11.B.2.2 Use and/or develop procedures to determine or describe measures of perimeter, circumference, area, surface area and/or volume. (May require conversions within the same system.)	Measure and/or compare angles in degrees (up to 360°) (protractor must be provided or drawn). (2.3.11.A & 2.3.11.B) M11.B.2.1.1 Calculate the surface area of prisms, cylinders, cones, pyramids and/or spheres. Formulas are provided on the reference sheet. (2.3.8.A & 2.3.8.D) M11.B.2.2.1 Calculate the volume of prisms, cylinders, cones, pyramids and/or spheres. Formulas are provided on the reference sheet. (2.3.8.A & 2.3.8.D) M11.B.2.2.2 Estimate area, perimeter or circumference of an irregular figure. (2.3.8.A & 2.3.8.D) M11.B.2.2.3 Find the measurement of a missing length given the perimeter, circumference, area or volume. (2.3.8.A & 2.3.8.D) M11.B.2.2.4	Measurement review: Calculate the surface area and volume of prisms, cylinders, cones and spheres. Estimate area, perimeter or circumference of an irregular figure. Find the measurement of a missing length given the perimeter, circumference, area and volume. Describe how a change in the linear dimension of a figure affects its perimeter, circumference, area or volume. (drop in after Chapter 5)	Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials Assessments: Publisher made Teacher made

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Standard: 2.3 Measurement and Estimation			
<p>B. Describe how a change in linear dimension in a object affects its perimeter, area and volume. (Grade 8)</p> <p>M11.B Measurement</p> <p>M11.B.2 Apply appropriate techniques, tools and formulas to determine measurements.</p> <p>M11.B.2.3 Describe how a change in one dimension of a figure (2 or 3 dimensional) affects other measurements of that figure.</p>	<p>Describe how a change in the linear dimension of a figure affects its perimeter, circumference, area or volume. (2.3.8.E) M11.B.2.3.1</p> <ul style="list-style-type: none"> • How does changing the length of the radius of a circle affect the circumference of the circle? • How does changing the length of the edge of a cube affect the volume of the cube? • How does changing the length of the base of a triangle affect the area of the triangle? 	<p>Measurement review: Calculate the surface area and volume of prisms, cylinders, cones and spheres. Estimate area, perimeter or circumference of an irregular figure. Find the measurement of a missing length given the perimeter, circumference, area and volume. Describe how a change in the linear dimension of a figure affects its perimeter, circumference, area or volume. (drop in after Chapter 5)</p>	<p>Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice</p> <p>Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials</p> <p>Assessments: Publisher made Teacher made</p>

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Standard: 2.4. Mathematical Reasoning and Connections			
Enduring Understandings: Students will understand that: <ul style="list-style-type: none"> • Reasoning allows us to make conjectures and prove conjectures. • Precise language helps us express mathematical ideas and receive them. • Connections can be made to various strands of mathematics as well as other subject areas. • Understand how mathematical ideas interconnect and build 		Essential Questions: <ol style="list-style-type: none"> 1. How are solving and proving different? 2. How are showing and explaining different? 3. How do you know when you have proven something? 4. How do you develop a convincing argument? 5. What previous learning helps us to learn new materials? 6. What makes a strategy both effective and efficient? 7. Questions on Connections? 	
A. Demonstrate mathematical solutions to problems (e.g., in the physical sciences).		Throughout Text	Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials Assessments: Publisher made Teacher made

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State Benchmarks (K,3,5,8,11) & Grade Specific Benchmark	Eligible Content	The learner will be able to:	Instructional Strategies, Resources and Assessments
Standard: 2.5. Mathematical Problem Solving and Communication			
Enduring Understandings: Students will understand that: <ul style="list-style-type: none"> • Mathematics can be used to solve problems outside of the mathematics classroom. • Mathematics is built on reasoning. • To demonstrate understanding of a given mathematical problem, it is essential to effectively represent and communicate our thinking using pictures, numbers, and words. • Use the language of mathematics to express mathematical ideas precisely. 		Essential Questions: <ol style="list-style-type: none"> 1. How do you make sense of different strategies? 2. How do you determine their strengths and weaknesses? 3. How do you determine similarities and differences? 4. What information in the problem is relevant to solve the problem? 5. How do we determine the appropriate strategy to solve a problem? 6. What should be included in the work shown to affectively represent our thinking and understanding? 7. What should be included in our writing to effectively communicate our thinking and understanding? 8. Why is it important to use mathematical words in our writing? 	
A. Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.		Solve polynomial equations by factoring. Factor the sum and difference of two cubes. (6.4)	Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials Assessments: Publisher made Teacher made
B. Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.		<ul style="list-style-type: none"> • Solve equations and solve word problems. (1.3) • Solve systems by substitution and elimination. (3.2) • Add and subtract matrices. Solve matrix equations by addition and subtraction. (4.2) (if time permits) • Multiply matrices by a scalar and multiply two matrices. (4.3) (if time permits) • Solve polynomial equations by factoring. Factor the sum and difference of two cubes. (6.4) • Solve radical equations. (7.5) 	

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State Benchmarks (K,3,5,8,11) & Grade Specific Benchmark	Eligible Content	The learner will be able to:	Instructional Strategies, Resources and Assessments
Standard: 2.6. Statistics and Data Analysis			
Enduring Understandings: Students will understand that: <ul style="list-style-type: none"> • The question to be answered determines the data to be collected and how best to collect it. • Basic statistical techniques can be used to analyze data in the work place. • The probability of an event can be used to predict the probability of future events. • The study of statistics allows us to interpret and analyze data in order to make informed decisions. • The type of data determines how data sets can be organized, displayed, and analyzed. • Calculating the mean, median, mode, and range creates a numerical picture of data. 		Essential Questions: <ol style="list-style-type: none"> 1. What is average? 2. What makes a data representation useful? 3. How does my sample affect confidence in my prediction? 4. What is random? 5. How can we use data to make informed decisions? 6. How does the type of data influence the type of graph? 7. How can mean, median, mode, and range be used to describe the shape of data? 8. In what ways can data and data displays be misleading? 	
A. Design and conduct an experiment using random sampling. Describe the data as an example of a distribution using statistical measures of center and spread. Organize and represent the results with graphs. (Use standard deviation, variance and t-tests.) M11.E Data Analysis and Probability M11.E.1 Formulate or answer questions that can be addressed with data and/or organize, display, interpret or analyze data. M11.E.1.1 Appropriately display and/or use data in problem-solving settings. M11.E.2 Select and/or use appropriate statistical methods to analyze data. M11.E.2.1 Use measures of central tendency to describe a set of data.		<ul style="list-style-type: none"> • To find the standard deviation of a set of values (12.4) (if time permits) • To use standard deviation in real world situations (12.4) (if time permits) • To find sample proportions and find the margin of error (12.5) (if time permits) 	Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials Assessments: Publisher made Teacher made

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Standard: 2.6. Statistics and Data Analysis			
<p>B. Use appropriate technology to organize and analyze data taken from the local community.</p>		<ul style="list-style-type: none"> To write linear equations that model real world data (2.4) Make predictions from linear models (2.4) To model exponential growth and decay (8.1) 	<p>Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice</p> <p>Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials</p> <p>Assessments: Publisher made Teacher made</p>
<p>C. Determine the regression equation of best fit (e.g., linear, quadratic, exponential).</p> <p>M11.E Data Analysis and Probability</p> <p>M11.E.4 Develop and/or evaluate inferences and predictions or draw conclusions based on data or data displays</p> <p>M11.E.4.2 Analyze and/or interpret data on a scatter plot and/or use a scatter plot to make predictions.</p>	<p>Draw, find and/or write an equation for a line of best fit for a scatter plot. (2.6.11.C) M11.E.4.2.1</p>	<ul style="list-style-type: none"> To write linear equations that model real world data (2.4) Make predictions from linear models (2.4) To model exponential growth and decay (8.1) 	
<p>D. Make predictions using interpolation, extrapolation, regression and estimation using technology to verify them.</p> <p>M11.E Data Analysis and Probability</p> <p>M11.E.4 Develop and/or evaluate inferences and predictions or draw conclusions based on data or data displays.</p> <p>M11.E.4.1 Make predictions using data displays and probability.</p> <p>M11.E.4.2 Analyze and/or interpret data on a scatter plot and/or use a scatter plot to make predictions.</p>	<p>Use probability to predict outcomes. (References 2.6.11.D) M11.E.4.1.2</p> <p>Make predictions using the equations or graphs of best-fit lines of scatter plots. (References 2.6.11.D) M11.E.4.2.2</p>	<ul style="list-style-type: none"> To write linear equations that model real world data (2.4) Make predictions from linear models (2.4) To find experimental and theoretical probabilities (1.6) To find probabilities of dependent and independent events (9.7) Use probability to predict outcomes (9.7) 	
<p>H. Use sampling techniques to draw inferences about large populations.</p>		<ul style="list-style-type: none"> To find sample proportions (12.5) (if time permits) 	

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Standard: 2.7. Probability and Predictions			
Enduring Understandings: Students will understand that: <ul style="list-style-type: none"> • The probability of an event can be used to predict the probability of future events. • Probability is the mathematics of chance. • The predicted outcome of an event is a prediction of what might actually happen in the long run. 		Essential Questions: <ol style="list-style-type: none"> 1. What is a fair outcome? 2. How do you count outcomes? 3. Why is probability used? 4. How is the likelihood of an event determined and communicated? 	
A. Compare odds and probability. M11.E Data Analysis and Probability M11.E.3 Understand and/or apply basic concepts of probability or outcomes. M11.E.3.1 Apply probability and/or odds to practical situations. M11.E.3.2 Apply counting techniques in problem-solving settings.	Find, convert and/or compare the probability and/or odds of a simple event. (Reference 2.7.11.A) M11.E.3.1.2 Determine the number of permutations and/or combinations or apply the fundamental counting principle. (Formula provided on the reference sheet). (References 2.7.8.A) M11.E.3.2.1	<ul style="list-style-type: none"> • To find experimental and theoretical probabilities (1.6) • To find the probabilities of dependent and independent events (9.7) • To count permutations and combinations (6.7) • To make a probability distribution (12.1&12.2) (if time permits) • To find conditional probabilities (12.1&12.2) (if time permits) • To use formulas and tree diagrams (12.1&12.2) (if time permits) 	Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials Assessments: Publisher made Teacher made
B. Solve problems involving independent simple and compound events.		<ul style="list-style-type: none"> • To find experimental and theoretical probabilities (1.6) • To find the probabilities of dependent and independent events (9.7) 	

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Standard: 2.7. Probability and Predictions			
<p>C. Solve problems involving independent, simple and compound events. Make valid inferences, predications and arguments based on probability. (Grade 8)</p> <p>M11.E Data Analysis and Probability</p> <p>M11.E.3 Understand and/or apply basic concepts of probability or outcomes.</p> <p>M11.E.3.1 Apply probability and/or odds to practical situations.</p> <p>M11.E.4 Develop and/or evaluate inferences and predictions or draw conclusions based on data or data displays.</p> <p>M11.E.4.1 Make predictions using data displays and probability.</p>	<p>Find probabilities for independent, dependent or compound events and represent as a fraction, decimal or percent. (Reference 2.7.11.E) M11.E.3.1.1</p> <p>Estimate or calculate to make predictions based on a circle, line, bar graph or given situation. (2.7.8.E) M11.E.4.1.1</p>	<ul style="list-style-type: none"> • To make a probability distribution (12.1&12.2) (if time permits) • To find conditional probabilities (12.1&12.2) (if time permits) • To use formulas and tree diagrams (12.1&12.2) (if time permits) 	<p>Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice</p> <p>Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials</p> <p>Assessments: Publisher made Teacher made</p>

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Standard: 2.8 Algebra and Functions			
Enduring Understandings: Students will understand that: <ul style="list-style-type: none"> • Change is fundamental to understanding functions. • Numbers or objects that repeat in predictable ways can be described or generalized. • An operation can be undone by its inverse. • Rules of arithmetic and algebra can be used together with notions of equivalents to transform equations and inequalities so solutions can be found. • Mathematical situations can be represented using patterns, symbols, and rules to describe relationships. • Algebra solves real life problems when numbers are unknown. 		Essential Questions: <ol style="list-style-type: none"> 1. How can change be described mathematically? 2. How are patterns of change related to the behavior of functions? 3. How do mathematical models/representations shape our understanding of mathematics? 4. How can we use patterns, symbols, and rules to represent and describe mathematical relationships? 	
A. Analyze a given set of data for the existence of a pattern and represent the pattern algebraically and graphically. M11.D Algebraic Concepts M11.D.1 Demonstrate an understanding of patterns, relations and functions. M11.D.1.1 Analyze and/or use patterns or relations.	Determine if a relation is a function given a set of points or a graph. (2.8.11.A) M11.D.1.1.2	<ul style="list-style-type: none"> • To write and graph linear equations (2.2) • To write and interpret direct variation equations (2.3) • To write linear equations that model real world data (2.4) • To identify functions (2.1) 	Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials
B. Give examples of patterns that occur in data from other disciplines. M11.D Algebraic Concepts M11.D.3 Analyze change in various contexts. M11.D.3.1 Describe and/or determine change.	Determine how a change in one variable relates to a change in a second variable (e.g., $y=4/x$, if x doubles, what happens to y ?). (2.11.8.B) M11.D.3.1.2	<ul style="list-style-type: none"> • To write and interpret direct and inverse variation equations (2.3 & 9.2) 	Assessments: Publisher made Teacher made

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Standard: 2.8 Algebra and Functions			
<p>C. Use patterns, sequences and series to solve routine and non-routine problems.</p>		<ul style="list-style-type: none"> • To graph linear equations (2.2) • To write equations of lines (2.2) • To write linear equations that model real world data (2.4) • To solve a system of equations (3.2) • To solve a system of linear inequalities (3.3) • To solve problems with linear programming (3.4) • To organize data in matrices (4.1) (if time permits) • To solve systems of equations using matrices (4.7 & 4.8) (if time permits) 	<p>Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice</p> <p>Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials</p> <p>Assessments: Publisher made Teacher made</p>
<p>D. Formulate expressions, equations, inequalities, systems of equations, systems of inequalities and matrices to model routine and non-routine problem situations.</p> <p>M11.D Algebraic Concepts</p> <p>M11.D.2 Represent and/or analyze mathematical situations using numbers, symbols, words, tables and/or graphs.</p> <p>M11.D.2.1 Write, solve and/or graph linear equations and inequalities using various methods.</p>	<p>Identify or graph functions, linear equations or linear inequalities on a coordinate plane. (2.8.11.D) M11.D.2.1.2</p>	<ul style="list-style-type: none"> • To identify and graph the conic sections (10.2-Parabolas 10.3-circles 10.4-ellipses 10.5-hyperbolas) • To write linear equations that model real world data (2.4) • To solve a system of equations (3.2) • To solve a system of linear inequalities (3.3) 	

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Standard: 2.8 Algebra and Functions			
E. Use equations to represent curves (e.g., lines, circles, ellipses, parabolas, hyperbolas).		<ul style="list-style-type: none"> To classify a system as consistent, inconsistent, or dependent (3.1) 	Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials Assessments: Publisher made Teacher made
F. Identify whether systems of equations and inequalities are consistent or inconsistent. M11.D Algebraic Concepts M11.D.2 Represent and/or analyze mathematical situations using numbers, symbols, words, tables and/or graphs. M11.D.2.1 Write, solve and/or graph linear equations and inequalities using various methods. (References Grade 8)	Solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities). (2.8.8.F) M11.D.2.1.1	<ul style="list-style-type: none"> To solve a system of equations (3.2) To solve a system of linear inequalities (3.3) To solve problems with linear programming (3.4) To organize data in matrices (4.1) To solve systems of equations using matrices (4.7 & 4.8) (if time allows) Solve absolute value equations and inequalities (1.5) 	
G. Select and use an appropriate strategy to solve systems of equations and inequalities using graphing calculators, symbol manipulators, spreadsheets and other software. M11.D Algebraic Concepts M11.D.2 Represent and/or analyze mathematical situations using numbers, symbols, words, tables and/or graphs. M11.D.2.1 Write, solve and/or graph linear equations and inequalities using various methods.	Write and/or solve systems of equations using graphing, substitution and/or elimination (limit systems to 2 equations). (2.8.11.H) M11.D.2.1.4	<ul style="list-style-type: none"> To organize data in matrices (4.1) (if time allows) To add and subtract matrices (4.2) (if time allows) To solve matrix equations (4.2) Multiply a matrix by a scalar (4.3) (if time allows) Multiply two matrices (4.3) (if time allows) Solve systems of equations by graphing (3.1) Solve systems of equations by substitution and elimination (3.2) 	

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Standard: 2.8 Algebra and Functions			
H. Use matrices to organize and manipulate data, including matrix addition, subtraction, multiplication and scalar multiplication.		<ul style="list-style-type: none"> Solve systems of linear equations by graphing (3.1) Solving systems of linear inequalities by graphing (3.3) 	Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials
I. Demonstrate the connection between algebraic equations and inequalities and the geometry of relations in the coordinate plane. M11.D Algebraic Concepts M11.D.2 Represent and/or analyze mathematical situations using numbers, symbols, words, tables and/or graphs. M11.D.2.1 Write, solve and/or graph linear equations and inequalities using various methods. M11.D.3 Analyze change in various contexts. M11.D.3.1 Describe and/or determine change. M11.D.3.2 Compute and/or use the slope of a line.	Identify or graph functions, linear equations or linear inequalities on a coordinate plane. (2.8.11.J) M11.D.2.1.2 Write and/or solve systems of equations using graphing, substitution and/or elimination (limit systems to 2 equations). (2.8.11.J) M11.D.2.1.4 Identify, describe and/or use constant or varying rates of change. (2.8.8.J) M11.D.3.1.1 Apply the formula for the slope of a line to solve problems (formula given on reference sheet). (2.8.11.J) M11.D.3.2.1	<ul style="list-style-type: none"> To graph linear equations (2.2) Identify functions (2.1) To graph linear inequalities (2.7) To graph absolute value inequalities (2.7) Solve systems of equations by graphing (3.1) Solve systems of equations by substitution and elimination (3.2) To write equations of lines (2.2) To calculate the slope when given two points (2.2) 	Assessments: Publisher made Teacher made

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<p>J. Select, justify and apply an appropriate technique to graph a linear function in two variables, including slope-intercept, x- and y-intercepts, graphing by transformations and the use of a graphing calculator.</p> <p>M11.D Algebraic Concepts</p> <p>M11.D.2 Represent and/or analyze mathematical situations using numbers, symbols, words, tables and/or graphs.</p> <p>M11.D.2.1 Write, solve and/or graph linear equations and inequalities using various methods.</p> <p>M11.D.4 Describe or use models to represent quantitative relationships.</p> <p>M11.D.4.1 Interpret and/or use linear, quadratic and/or exponential functions and their equations, graphs or tables.</p>	<p>Write, solve and/or apply a linear equation (including problem situations). (2.8.11.K) M11.D.2.1.3</p> <p>Match the graph of a given function to its table or equation. (2.8.11.K, 2.8.11.Q) M11.D.4.1.1</p>	<ul style="list-style-type: none"> • To write equations of lines in point slope, slope intercept, and standard form (2.2) • To calculate the slope when given two points (2.2) • Find equation of a line given two points. (2.2) • Find equation of a line given a point and a parallel or perpendicular line (2.2) • Write linear equation that model real-world data (2.4) • Make predictions from linear models (2.4) • Determine equations of trend lines (2.4) 	<p>Instructional Strategies:</p> <ul style="list-style-type: none"> Guided Practice Lecture Projects Group Work Discussion Independent Practice <p>Resources:</p> <ul style="list-style-type: none"> Textbook Publisher made supplemental materials Teacher made supplemental materials <p>Assessments:</p> <ul style="list-style-type: none"> Publisher made Teacher made

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Standard: 2.8 Algebra and Functions			
<p>K. Write the equation of a line when given the graph of the line, two points on the line, or the slope of the line and a point on the line.</p> <p>M11.D Algebraic Concepts</p> <p>M11.D.2 Represent and/or analyze mathematical situations using numbers, symbols, words, tables and/or graphs.</p> <p>M11.D.2.1 Write, solve and/or graph linear equations and inequalities using various methods.</p> <p>M11.D.3 Analyze change in various contexts.</p> <p>M11.D.3.2 Compute and/or use the slope of a line.</p>	<p>Write, solve and/or apply a linear equation (including problem situations). (2.8.11.L) M11.D.2.1.3</p> <p>Given the graph of the line, 2 points on the line, or the slope and a point on a line, write or identify the linear equation in point-slope, standard and/or slope-intercept form. (2.8.11.L) M11.D.3.2.2</p> <p>Compute the slope and/or y-intercept represented by a linear equation or graph. (2.8.11.L) M11.D.3.2.3</p>	<ul style="list-style-type: none"> • To write equations of lines in point slope, slope intercept, and standard form (2.2) • To calculate the slope when given two points (2.2) • Find equation of a line given two points. (2.2) • Find equation of a line given a point and a parallel or perpendicular line (2.2) • Write linear equation that model real-world data (2.4) • Make predictions from linear models (2.4) • Determine equations of trend lines (2.4) 	<p>Instructional Strategies:</p> <p>Guided Practice Lecture Projects Group Work Discussion Independent Practice</p> <p>Resources:</p> <p>Textbook Publisher made supplemental materials Teacher made supplemental materials</p> <p>Assessments:</p> <p>Publisher made Teacher made</p>
<p>L. Given a set of data points, write an equation for a line of best fit.</p> <p>M11.D Algebraic Concepts</p> <p>M11.D.2 Represent and/or analyze mathematical situations using numbers, symbols, words, tables and/or graphs.</p> <p>M11.D.2.1 Write, solve and/or graph linear equations and inequalities using various methods.</p>	<p>Solve quadratic equations using factoring (integers only – not including completing the square or the Quadratic Formula). (2.8.11.M) M11.D.2.1.5</p>	<ul style="list-style-type: none"> • To find common and binomial factors of quadratic expressions (5.4&5.5) • To factor special quadratic expressions (5.4&5.5) • To solve quadratic equations by factoring and by finding square roots (5.4&5.5) • To solve quadratic equations by graphing. (5.4&5.5) 	

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Standard: 2.8 Algebra and Functions			
M. Solve linear, quadratic and exponential equations both symbolically and graphically.		<ul style="list-style-type: none"> Throughout course 	Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials Assessments: Publisher made Teacher made
N. Determine the domain and range of a relation, given a graph or set of ordered pairs. M11.D Algebraic Concepts M11.D.1 Demonstrate an understanding of patterns, relations and functions. M11.D.1.1 Analyze and/or use patterns or relations.	Identify the domain, range or inverse of a relation (may be presented as ordered pairs or a table). (2.8.11.O) M11.D.1.1.3	<ul style="list-style-type: none"> To write and interpret direct and inverse variation equations (2.3 & 9.2) To identify the domain or range of a relation and a function (2.1) 	
O. Analyze a relation to determine whether a direct or inverse variation exists and represent it algebraically and graphically. M11.A Numbers and Operations M11.A.2 Understand the meanings of operations, use operations and understand how they relate to each other. M11.A.2.1 Apply ratio and/or proportion in problem-solving situations.	Solve problems using direct and inverse proportions. (2.8.11.P) M11.A.2.1.2 Identify and/or use proportional relationships in problem solving settings. (2.8.11.P) M11.A.2.1.3	<ul style="list-style-type: none"> To graph and identify functions (2.1) To solve a system of equations by graphing (3.1) To write and interpret direct and inverse variation equations (2.3 & 9.2) To identify quadratic functions and graphs (5.1) 	

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Standard: 2.8 Algebra and Functions			
<p>P. Represent functional relationships in tables charts and graphs.</p> <p>M11.D Algebraic Concepts</p> <p>M11.D.1 Demonstrate an understanding of patterns, relations and functions.</p> <p>M11.D.1.1 Analyze and/or use patterns or relations.</p> <p>M11.D.4 Describe or use models to represent quantitative relationships.</p> <p>M11.D.4.1 Interpret and/or use linear, quadratic and/or exponential functions and their equations, graphs or tables.</p>	<p>Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically. (2.8.11.Q) M11.D.1.1.1</p> <p>Match the graph of a given function to its table or equation. (2.8.11.K, 2.8.11.Q) M11.D.4.1.1</p>	<ul style="list-style-type: none"> • To graph and identify functions (2.1) • To graph absolute value functions (2.5) • To identify quadratic functions and graphs (5.1) • Model exponential growth and decay (8.1) 	<p>Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice</p> <p>Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials</p> <p>Assessments: Publisher made Teacher made</p>
<p>Q. Create and interpret functional models.</p>		<ul style="list-style-type: none"> • To graph and identify functions (2.1) • To graph linear equations (2.2) • To classify polynomials (6.1) • To simplify radical functions (7.1) • To write and evaluate exponential expressions (8.1) • To write and evaluate logarithmic expressions (8.3) 	

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Standard: 2.8 Algebra and Functions			
<p>R. Analyze properties and relationships of functions (e.g. linear, polynomial, rational, trigonometric, exponential, logarithmic)</p> <p>M11.D Algebraic Concepts</p> <p>M11.D.2 Represent and/or analyze mathematical situations using numbers, symbols, words, tables and/or graphs.</p> <p>M11.D.2.2 Simplify expressions involving polynomials.</p>	<p>Add, subtract and/or multiply polynomial expressions (express answers in simplest form – nothing larger than a binomial multiplied by a trinomial). (2.8.11.S)</p> <p>M11.D.2.2.1</p> <p>Factor algebraic expressions, including difference of squares and trinomials (trinomials limited to the form ax^2+bx+c where a is not equal to 0). (2.8.11.S)</p> <p>M11.D.2.2.2</p> <p>Simplify algebraic fractions. (2.8.11.S)</p> <p>M11.D.2.2.3</p>	<ul style="list-style-type: none"> • To evaluate algebraic expressions (1.2) • To graph and identify functions (2.1) • To graph linear equations (2.2) • To find common and binomial factors of quadratic expressions (5.4 & 5.5) • To factor special quadratic expressions (5.4 & 5.5) • To solve quadratic equations by factoring and by finding square roots (5.4 & 5.5) • To solve quadratic equations by graphing (5.4 & 5.5) • To classify polynomials (6.1) • To simplify radical functions (7.1) • To write and evaluate exponential expressions (8.1) • To write and evaluate logarithmic expressions (8.3) • To simplify rational expressions (9.4) • To simplify complex fractions (9.5) • Add, subtract, multiply, and divide rational expressions (9.4&9.5) 	<p>Instructional Strategies:</p> <ul style="list-style-type: none"> Guided Practice Lecture Projects Group Work Discussion Independent Practice <p>Resources:</p> <ul style="list-style-type: none"> Textbook Publisher made supplemental materials Teacher made supplemental materials <p>Assessments:</p> <ul style="list-style-type: none"> Publisher made Teacher made

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Standard: 2.9 Geometry			
Enduring Understandings: Students will understand that: <ul style="list-style-type: none"> • Two- and three-dimensional objects can be described, classified, and analyzed by their attributes. • An object in a plane or in space can be oriented in an infinite number of ways while maintaining its size or shape. • An object's location on a plane or in space can be described quantitatively. • Linear measure, area, and volume are fundamentally different but may be related to one another in ways that permit calculation of one given the other. • Reasoning allows us to make conjectures and prove conjectures. • Trigonometry is using the relationships between the sides and the angles of triangles to solve problems. 		Essential Questions: <ol style="list-style-type: none"> 1. How measurement and counting are related? 2. How does what we measure affect how we measure? 3. How can space be defined through numbers/measurement? 4. Why do we compare, contrast, and classify objects? 5. How do decomposing and recomposing shapes help us build our understanding of mathematics? 6. How can transformations be described mathematically? 7. How are solving and proving different? 8. How are showing and explaining different? 9. How do you know when you have proven something? 10. What is trigonometry? How does it help us? 	
G. Solve problems using analytic geometry. M11.C Geometry M11.C.3 Locate points or describe relationships using the coordinate plane. M11.C.3.1 Solve problems using analytic geometry.	Calculate the distance and/or mid-point between 2 points on a number line or on a coordinate plane (formula provided on the reference sheet). (2.9.11.G) M11.C.3.1.1 Relate slope to perpendicularity and/or parallelism (limit to linear algebraic expressions; slope formula provided on the reference sheet). (2.9.11.G) M11.C.3.1.2	*Calculate the distance and midpoint between two points (Drop In Chapter 10) *Write the equation of a line using the slope of a perpendicular or parallel line (2.2)	Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials Assessments: Publisher made Teacher made

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Standard: 2.11 Concepts of Calculus			
Enduring Understandings: Students will understand that: <ul style="list-style-type: none"> • Calculus would not be possible without the concept of the limit. • Limits allow us to divide by zero and sum infinite values. 		Essential Questions: <ol style="list-style-type: none"> 1. Why is the limit necessary to determine continuity? 2. How is the limit used to determine asymptotes? 3. When does a limit not exist? 	
A. Determine maximum and minimum values of a function over a specified interval.		Find the max and min values of quadratic functions (5.2)	Instructional Strategies: Guided Practice Lecture Projects Group Work Discussion Independent Practice Resources: Textbook Publisher made supplemental materials Teacher made supplemental materials Assessments: Publisher made Teacher made
B. Interpret maximum and minimum values in problem situations.		Find the max and min values of quadratic functions (5.2)	
C. Graph and interpret rates of growth/decay.		To model exponential growth and decay (8.1)	
D. Determine sums of finite sequences of numbers and infinite geometric series.		Find the sum of an arithmetic series(11.2) (if time permits) Find the sum of a geometric series (11.4) (if time permits) Find the sum of an infinite geometric series (11.4) (if time permits)	
E. Estimate areas under curves using sequences of areas.		To find the area under a curve (11.6) (if time permits)	

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