

# Algebra I

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Number, Number Sense and Operations</b>				
<b>Grade 8-10 Benchmarks: C. Apply properties of operations and the real number system and justify when they hold for a set of numbers.</b>				
<b>Content Organizer: Number and Number Systems</b>				
<b>Grade Level Indicator</b>	<b>OGT Competency Focus</b>	<b>Resources</b>	<b>Instructional Activities/Strategies</b>	<b>Assessment</b>
1. Identify and justify whether properties (closure, identity, inverse commutative and associative) hold for a given set and operations; e.g., even integers and multiplication.				

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# Algebra I

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<b>Content Standard: Number, Number Sense and Operations</b> <b>Grade 8-10 Benchmarks: E. Compare, order and determine equivalent forms of real numbers.</b> <b>Content Organizer: Number and Number Systems</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
2. Compare, order and determine equivalent forms for rational and irrational numbers.	<p># 1 Represent and use real numbers in a variety of equivalent forms. Understand the various forms of real numbers— fractions, percents, integers, exponential numbers, and scientific notation</p> <p>Compare and order numbers in various forms</p> <p>Determine an equivalent form for a given number</p> <p>Determine which numbers within a group are not equivalent</p> <p>Determine relative size or position on a number line</p> <p><b>Irrational numbers included-square roots and <math>\pi</math></b></p>			

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<b>Content Standard: Number, Number Sense and Operations</b> <b>Grade 8-10 Benchmarks: F. Explain the effects of operations on the magnitude of quantities.</b> <b>Content Organizer: Meaning of Operations</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
3. Explain the effects of operations such as multiplication or division, and of computing powers and roots on the magnitude of quantities.			(Middle school mathematics remediation) Have students practice written responses by answering the grade level indicator. Reinforce skill by using 2-point (short-answer) or 4-point (extended-response) rubric of OGT. Give students rubric to refer to while responding to the indicator. Remind students of 16 problem-solving strategies (should be on display in classroom)	Rubric for OGT Appendix p. 1

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<b>Content Standard: Number, Number Sense and Operations</b> <b>Grade 8-10 Benchmarks: G. Estimate, compute and solve problems involving real numbers, including ratio, proportion and percent, and explain solutions.</b> <b>Content Organizer: Computation and Estimation</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
4. Demonstrate fluency in computations using real numbers.	<p># 2 Estimate and compute with real numbers.</p> <p>Use decimals, fractions, percents, integers, exponential numbers and absolute values (also includes irrationals such as square roots and <math>\pi</math>)</p> <p>Perform computations in <u>problem-solving/real world context</u> (ex.-apply division to find unit price of items, justify purchase-solve problems in context)</p> <p>Estimate an approximate answer/reasonable result</p> <p>Computation using standard algorithms in isolation will not be assessed— problems will be in real-world type settings.</p>			

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<b>Content Standard: Number, Number Sense and Operations</b> <b>Grade 8-10 Benchmarks: I. Estimate, compute and solve problems involving scientific notation, square roots and numbers with integer exponents.</b> <b>Content Organizer: Computation and Estimation</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
5. Estimate the solutions for problem situations involving square and cube roots.	<p># 2 Estimate and compute with real numbers.</p> <p>Use decimals, fractions, percents, integers, exponential numbers and absolute values (also includes irrationals such as square roots and <math>\pi</math>)</p> <p>Perform computations in <u>problem—solving/real world context</u> (ex.-apply division to find unit price of items, justify purchase-solve problems in context)</p> <p>Estimate an approximate answer/reasonable result</p> <p>Computation using standard algorithms in isolation will not be assessed—problems will be in real-world type settings.</p>			

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<b>Content Standard: Measurement</b> <b>Grade 8-10 Benchmarks: D. Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates.</b> <i>Content Organizer: Measurement Units</i>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
1. Convert rates within the same measurement system; e.g., miles per hour to feet per second; kilometers per hour to meters per second.	<p># 11 Subscale: Geometry and Measurement</p> <p>Use measurement techniques including scale drawings, formulas and geometric relationships to find length, perimeter, area, surface area, and volume.</p> <p>Understand length, perimeter, circumference, area, surface area, and volume in simple geometric shapes/objects or combination of shapes</p> <p>Choose appropriate units of measure (length, area, and volume)</p> <p>Apply formulas</p> <p>Analyze effect of changing one dimension of a figure or of using different unit of measure</p> <p>Note: metric/customary units are used but no conversion between systems</p>			

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<b>Content Standard: Measurement</b> <b>Grade 8-10 Benchmarks: D. Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates.</b> <b>Content Organizer: Use Measurement Techniques and Tools</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
2. Use unit analysis to check computations involving measurement.	# 11 Subscale: Geometry and Measurement Use measurement techniques including scale drawings, formulas and geometric relationships to find length, perimeter, area, surface area, and volume.  Understand length, perimeter, circumference, area, surface area, and volume in simple geometric shapes/objects or combination of shapes  Choose appropriate units of measure (length, area, and volume)  Apply formulas  Analyze effect of changing one dimension of a figure or of using different unit of measure  Note: metric/customary units are used but not conversion between systems			

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Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
3. Use the ratio of lengths in similar two-dimensional figures or three-dimensional objects to calculate the ratio of their areas or volumes respectively.	<p># 11 Subscale: Geometry and Measurement</p> <p>Use measurement techniques including scale drawings, formulas and geometric relationships to find length, perimeter, area, surface area, and volume.</p> <p>Understand length, perimeter, circumference, area, surface area, and volume in simple geometric shapes/objects or combination of shapes</p> <p>Choose appropriate units of measure (length, area, and volume)</p> <p>Apply formulas</p> <p>Analyze effect of changing one dimension of a figure or of using different unit of measure</p> <p>Note: metric/customary units are used but not conversion between systems</p>			

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Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
4. Use scale drawings and right triangle trigonometry to solve problems that include unknown distances and angle measures.	# 11 Subscale: Geometry and Measurement Use measurement techniques including scale drawings, formulas and geometric relationships to find length, perimeter, area, surface area, and volume.  Understand length, perimeter, circumference, area, surface area, and volume in simple geometric shapes/objects or combination of shapes  Choose appropriate units of measure (length, area, and volume)  Apply formulas  Analyze effect of changing one dimension of a figure or of using different unit of measure  Note: metric/customary units are used but not conversion between systems			

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**Content Standard: Measurement**

**Grade 8-10 Benchmarks: D. Use proportional reasoning and apply indirect measurement techniques, including right triangle trigonometry and properties of similar triangles, to solve problems involving measurements and rates.**

**Content Organizer: Use Measurement Techniques and Tools**

Objective(s)	Resources	Instructional Activities/Strategies	Assessment
<p>5. Solve problems involving unit conversion for situations involving distances, areas, volumes and rates within the same measurement system.</p>	<p># 11 Subscale: Geometry and Measurement</p> <p>Use measurement techniques including scale drawings, formulas and geometric relationships to find length, perimeter, area, surface area, and volume.</p> <p>Understand length, perimeter, circumference, area, surface area, and volume in simple geometric shapes/objects or combination of shapes</p> <p>Choose appropriate units of measure (length, area, and volume)</p> <p>Apply formulas</p> <p>Analyze effect of changing one dimension of a figure or of using different unit of measure</p> <p>Note: metric/customary units are used but not conversion between systems</p>		

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<b>Content Standard: Geometry and Spatial Sense</b>				
<b>Grade 8-10 Benchmarks: I. Use right triangle trigonometric relationships to determine lengths and angle measures.</b>				
<b>Content Organizer: Characteristics and Properties</b>				
<b>Grade Level Indicator</b>	<b>OGT Competency Focus</b>	<b>Resources</b>	<b>Instructional Activities/Strategies</b>	<b>Assessment</b>
1. Define the basic trigonometric ratios in right triangles: sine, cosine and tangent.				

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<b>Grade Level Indicator</b>	<b>OGT Competency Focus</b>	<b>Resources</b>	<b>Instructional Activities/Strategies</b>	<b>Assessment</b>
2. Apply proportions and right triangle trigonometric ratios to solve problems involving missing lengths and angle sizes in similar figures.				

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<b>Content Standard: Geometry and Spatial Sense</b> <b>Grade 8-10 Benchmarks: G. Prove or disprove conjectures and solve problems involving two-and three-dimensional objects represented within a coordinate system.</b> <b>Content Organizer: Visualization and Geometric Models</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
3. Analyze two-dimensional figures in a coordinate plane; e.g., use slope and distance formulas to show that a quadrilateral is a parallelogram.	Includes aspects of # 10 Subscale: Geometry and Measurement Apply visualization, spatial sense, and properties of two-dimensional figures and three-dimensional objects.  Understand geometric properties of two/three dimensional figures/objects  Apply visual estimation in real world context  Recognize/apply transformations (some may use coordinate plane)			

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<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: B. Identify and classify functions as linear or nonlinear, and contrast their properties from tables, graphs or equations.</b> <b>Content Organizer: Use Patterns, Relations, and Functions</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
1. Define function with ordered pairs in which each domain element is assigned exactly one range element.	<p># 7 Subscale: Algebra &amp; Functions Create and analyze graphs of linear and simple non-linear functions.</p> <p>Basic understanding of linear/non-linear functions</p> <p>Slope of a line, characteristics of graphs, differences between graphs of linear/non-linear functions</p> <p>Ex. Relate equation to its graph, graph to equation, recognize connection between slope and real-world situation</p> <p>Recognize/use equivalent ideas--zeros of functions, roots of equations, and/or solution of an equation</p> <p>Non-linear functions--recognize graphs (quadratics, exponential growth/decay)</p> <p>Interpret graphs</p> <p>Plot points--distinguish linear/non-linear relationships</p> <p>Note: Quadratic functions will have integer solutions</p>			

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<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: C. Translate information from one representation (words, table, graph or equation) to another representation of a relation or function.</b> <b>Content Organizer: Use Patterns, Relations, and Functions</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
2. Generalize patterns using functions or relationships (linear, quadratic and exponential), freely translating among tabular, graphical and symbolic representations.	# 6 Subscale: Algebra and Functions Represent a mathematical relationship using a table, graph, symbols, and words, and describe how a change in the value of one variable affects the value of a related variable.  Translate among mathematical relationships in various forms  Analyze/represent mathematical relationships  Provide an example of a situation demonstrating a mathematical relationship  Identify missing number or point in a table, symbolic, or graphical representation  Identify how a change in one variable affects the value of another.			

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Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
3. Describe problem situations (linear, quadratic and exponential) by using tabular, graphical and symbolic representations.	<p># 7 Subscale: Algebra &amp; Functions</p> <p>Create and analyze graphs of linear and simple non-linear functions.</p> <p>*Basic understanding of linear/non-linear functions</p> <p>*Slope of a line, characteristics of graphs, differences between graphs of linear/non-linear functions</p> <p>*Ex. Relate equation to its graph, graph to equation, recognize connection between slope and real-world situation</p> <p>*Recognize/use equivalent ideas--zeros of functions, roots of equations, and/or solution of an equation</p> <p>*Non-linear functions--recognize graphs (quadratics, exponential growth/decay)</p> <p>*Interpret graphs</p> <p>*Plot points--distinguish linear/non-linear relationships</p> <p>Note: Quadratic functions will have integer solutions</p>			

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<b>Grade 8-10 Benchmarks:</b>				
<b>Content Organizer: Use Patterns, Relations, and Functions</b>				
<b>Grade Level Indicator</b>	<b>OGT Competency Focus</b>	<b>Resources</b>	<b>Instructional Activities/Strategies</b>	<b>Assessment</b>
4. Demonstrate the relationship among zeros of a function, roots of equations, and solutions of equations graphically and in words.				

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<b>Grade Level Indicator</b>	<b>OGT Competency Focus</b>	<b>Resources</b>	<b>Instructional Activities/Strategies</b>	<b>Assessment</b>
5. Describe and compare characteristics of the following families of functions: linear, quadratic and exponential; e.g., general shape, number of roots, domain, range, rate of change and maximum or minimum.				

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<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: F. Solve and graph linear equations and inequalities.</b> <b>Content Organizer: Use Algebraic Representations</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
6. Write and use equivalent forms of equations and inequalities in problem situations; e.g., changing a linear equation to the slope-intercept form.	# 5 Subscale: Algebra and Functions Use linear equations & inequalities.  Use algebraic equations and inequalities to solve problems  Equations and inequalities may involve whole numbers, decimals, fractions, and integers  Systems of equations will be limited to two variables  Formulate equations and inequalities to represent a problem situation, then solve			

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## Algebra I

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<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: D. Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.</b> <b>Content Organizer: Use Algebraic Representations</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
7. Use formulas to solve problems involving exponential growth and decay.	<p>Includes aspects of # 4 Subscale: Algebra and Functions Write, interpret, simplify, evaluate, and/or use algebraic expressions and formulas.</p> <p>Understand algebraic expressions/formulas</p> <p>Represent mathematical/real-world situations</p> <p>Algebraically construct/apply expressions /equations</p> <p>Identify meaning of expressions/formulas</p> <p>Apply order of operations and laws of exponents</p> <p>Includes aspects of # 6 Subscale: Algebra and Functions Represent a mathematical relationship using a table, graph, symbols, and words, and describe how a change in the value of one variable affects the value of a related variable.</p> <p>Translate among mathematical relationships in various forms</p> <p>Analyze/represent mathematical relationships</p> <p>Provide an example of a situation demonstrating a mathematical relationship</p> <p>Identify missing number or point in a table, symbolic, or graphical representation</p> <p>Identify how a change in one variable affects the value of another.</p>			

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Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
8. Find linear equations that represent lines that pass through a given set of ordered pairs, and find linear equations that represent lines parallel or perpendicular to a given line through a specific point.	<p># 5 Subscale: Algebra and Functions Use linear equations &amp; inequalities.</p> <p>Use algebraic equations and inequalities to solve problems</p> <p>Equations and inequalities may involve whole numbers, decimals, fractions, and integers</p> <p>Systems of equations will be limited to two variables</p> <p>Formulate equations and inequalities to represent a problem situation, then solve</p>			

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<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: H. Solve systems of linear equations involving two variables graphically and symbolically.</b> <b>Content Organizer: Use Algebraic Representations</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
<p>9. Solve and interpret the meaning of 2 by 2 systems of linear equations graphically, by substitution and by elimination, with and without technology.</p>	<p>Includes aspects of # 5 Algebra and Functions Use linear equations and inequalities. Use algebraic equations and inequalities to solve problems</p> <p>Equations and inequalities may involve whole numbers, decimals, fractions, and integers</p> <p>Systems of equations will be limited to two variables</p> <p>Formulate equations and inequalities to represent a problem situation, then solve</p> <p>Includes aspects of # 6 Subscale: Algebra and Functions Represent a mathematical relationship using a table, graph, symbols, and words, and describe how a change in the value of one variable affects the value of a related variable.</p> <p>Translate among mathematical relationships in various forms</p> <p>Analyze/represent mathematical relationships</p> <p>Provide an example of a situation demonstrating a mathematical relationship</p> <p>Identify missing number or point in a table, symbolic, or graphical representation</p> <p>Identify how a change in one variable affects the value of another.</p>			

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<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: G. Solve quadratic equations with real roots by graphing, formula, and factoring.</b> <b>Content Organizer: Use Algebraic Representations</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
10. Solve quadratic equations with real roots by factoring, graphing, using the quadratic formula and with technology.	<p># 7 Subscale: Algebra &amp; Functions Create and analyze graphs of linear and simple non-linear functions.</p> <p>Basic understanding of linear/non-linear functions Slope of a line, characteristics of graphs, differences between graphs of linear/non-linear functions Ex. Relate equation to its graph, graph to equation, recognize connection between slope and real-world situation Recognize/use equivalent ideas--zeros of functions, roots of equations, and/or solution of an equation Non-linear functions--recognize graphs (quadratics, exponential growth/decay) Interpret graphs Plot points--distinguish linear/non-linear relationships</p> <p>Note: Quadratic functions will have integer solutions</p>			

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<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: D. Use algebraic representations, such as tables, graphs, expressions, functions and inequalities, to model and solve problem situations.</b> <b>Content Organizer: Use Algebraic Representations</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
11. Add, subtract, multiply and divide monomials and polynomials (division of polynomials by monomials only).	<p># 4 Subscale: Algebra and Functions</p> <p>Write, interpret, simplify, evaluate, and/or use algebraic expressions and formulas.</p> <p>Understand algebraic expressions/formulas</p> <p>Represent mathematical/real-world situations</p> <p>Algebraically construct/apply expressions /equations</p> <p>Identify meaning of expressions/formulas</p> <p>Apply order of operations and laws of exponent</p> <p># 6 Subscale: Algebra and Functions</p> <p>Represent a mathematical relationship using a table, graph, symbols, and words, and describe how a change in the value of one variable affects the value of a related variable.</p> <p>Translate among mathematical relationships in various forms</p> <p>Analyze/represent mathematical relationships</p> <p>Provide an example of a situation demonstrating a mathematical relationship</p> <p>Identify missing number or point in a table, symbolic, or graphical representation</p> <p>Identify how a change in one variable affects the value of another.</p>			

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Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
12. Simplify rational expressions by eliminating common factors and applying properties of integer exponents.	<p># 4 Subscale: Algebra and Functions Write, interpret, simplify, evaluate, and/or use algebraic expressions and formulas.</p> <p>Understand algebraic expressions/formulas</p> <p>Represent mathematical/real-world situations</p> <p>Algebraically construct/apply expressions /equations</p> <p>Identify meaning of expressions/formulas</p> <p>Apply order of operations and laws of exponent</p> <p># 6 Subscale: Algebra and Functions Represent a mathematical relationship using a table, graph, symbols, and words, and describe how a change in the value of one variable affects the value of a related variable.</p> <p>Translate among mathematical relationships in various forms</p> <p>Analyze/represent mathematical relationships</p> <p>Provide an example of a situation demonstrating a mathematical relationship</p> <p>Identify missing number or point in a table, symbolic, or graphical representation</p> <p>Identify how a change in one variable affects the value of another</p>			

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Adams County/Ohio Valley  
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<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: I. Model and solve problem situation involving direct and inverse variation.</b> <b>Content Organizer: Analyze Change</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
13. Model and solve problems involving direct and inverse variation using proportional reasoning.	# 6 Subscale: Algebra and Functions Represent a mathematical relationship using a table, graph, symbols, and words, and describe how a change in the value of one variable affects the value of a related variable.  Translate among mathematical relationships in various forms  Analyze/represent mathematical relationships  Provide an example of a situation demonstrating a mathematical relationship  Identify missing number or point in a table, symbolic, or graphical representation  Identify how a change in one variable affects the value of another.			

**Mathematical Processes Standard – Students use mathematical processes and knowledge to solve problems. Students apply problem-solving and decision-making techniques, and communicate mathematical ideas. Mathematical processes are used in all content areas and should be incorporated within instruction and assessment of the content-specific standards and benchmarks.**

# Algebra I

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: I. Model and solve problem situation involving direct and inverse variation.</b> <b>Content Organizer: Analyze Change</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
14. Describe the relationship between slope and the graph of a direct variation and inverse variation.	# 6 Subscale: Algebra and Functions Represent a mathematical relationship using a table, graph, symbols, and words, and describe how a change in the value of one variable affects the value of a related variable.  Translate among mathematical relationships in various forms  Analyze/represent mathematical relationships  Provide an example of a situation demonstrating a mathematical relationship  Identify missing number or point in a table, symbolic, or graphical representation  Identify how a change in one variable affects the value of another.			

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# Algebra I

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: J. Describe and interpret rates of change from graphical and numerical data.</b> <b>Content Organizer: Analyze Change</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
15. Describe how a change in the value of a constant in a linear or quadratic equation affects the related graphs.	Includes aspects of # 6 Subscale: Algebra and Functions Represent a mathematical relationship using a table, graph, symbols, and words, and describe how a change in the value of one variable affects the value of a related variable.  Translate among mathematical relationships in various forms  Analyze/represent mathematical relationships  Provide an example of a situation demonstrating a mathematical relationship  Identify missing number or point in a table, symbolic, or graphical representation  Identify how a change in one variable affects the value of another.			

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## Algebra I

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: H. Solve systems of linear equations involving two variables graphically and symbolically.</b> <b>Content Organizer: Use Algebraic Representations</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
9. Solve and interpret the meaning of 2 by 2 systems of linear equations graphically, by substitution and by elimination, with and without technology.	<p>Includes aspects of # 5 Algebra and Functions Use linear equations &amp; inequalities.</p> <p>Use algebraic equations and inequalities to solve problems</p> <p>Equations and inequalities may involve whole numbers, decimals, fractions, and integers</p> <p>Systems of equations will be limited to two variables</p> <p>Formulate equations and inequalities to represent a problem situation, then solve</p>			

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# Algebra I

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: C. Translate information from one representation (words, table, graph or equation) to another representation of a relation or function.</b> <b>Content Organizer: Use Patterns, Relations, and Functions</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
<p>2. Generalize patterns using functions or relationships (linear, quadratic and exponential), freely translating among tabular, graphical and symbolic representations.</p>	<p># 6 Subscale: Algebra and Functions Represent a mathematical relationship using a table, graph, symbols, and words, and describe how a change in the value of one variable affects the value of a related variable.</p> <p>Percents may include consumer applications- discounts, interests, gratuities (ex.-Successive percentage reductions-find sale price of item with 50% mark down and additional 20% off)</p> <p>Scale drawings</p> <p>Recognize/use multiple representations for situations with percents (25% reduction-same as 75% of original price)</p> <p>Apply distance formula (<math>d=rt</math>) Common units of measure (Know basic conversion facts for units of measure-length, capacity, weight, time within U.S. standard/metric systems-facts will not be on reference sheets)</p>			

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# Algebra I

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: I. Model and solve problem situation involving direct and inverse variation.</b> <b>Content Organizer: Analyze Change</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
13. Model and solve problems involving direct and inverse variation using proportional reasoning.	<p># 6 Subscale: Algebra and Functions</p> <p><b>Represent a mathematical relationship using a table, graph, symbols, and words, and describe how a change in the value of one variable affects the value of a related variable.</b></p> <p>Percents may include consumer applications-discounts, interests, gratuities (ex.-Successive percentage reductions-find sale price of item with 50% mark down and additional20% off)</p> <p>Scale drawings</p> <p>Recognize/use multiple representations for situations with percents (25% reduction-same as 75% of original price)</p> <p>Apply distance formula (<math>d=rt</math>)</p> <p>Common units of measure (Know basic conversion facts for units of measure-length, capacity, weight, time within U.S. standard/metric systems-facts will not be on reference sheets)</p>			

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## Algebra I

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: I. Model and solve problem situation involving direct and inverse variation.</b> <b>Content Organizer: Analyze Change</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
14. Describe the relationship between slope and the graph of a direct variation and inverse variation.	<p># 6 Subscale: Algebra and Functions</p> <p><b>Represent a mathematical relationship using a table, graph, symbols, and words, and describe how a change in the value of one variable affects the value of a related variable.</b></p> <p>Percents may include consumer applications-discounts, interests, gratuities (ex.-Successive percentage reductions-find sale price of item with 50% mark down and additional20% off)</p> <p>Scale drawings</p> <p>Recognize/use multiple representations for situations with percents (25% reduction-same as 75% of original price)</p> <p>Apply distance formula (<math>d=rt</math>)</p> <p>Common units of measure (Know basic conversion facts for units of measure-length, capacity, weight, time within U.S. standard/metric systems-facts will not be on reference sheets)</p>			

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## Algebra I

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: J. Describe and interpret rates of change from graphical and numerical data.</b> <b>Content Organizer: Analyze Change</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
15. Describe how a change in the value of a constant in a linear or quadratic equation affects the related graphs.	<p># 7 Subscale: Algebra &amp; Functions Create and analyze graphs of linear and simple non-linear functions.</p> <p>Basic understanding of linear/non-linear functions</p> <p>Slope of a line, characteristics of graphs, differences between graphs of linear/non-linear functions</p> <p>Ex. Relate equation to its graph, graph to equation, recognize connection between slope and real-world situation</p> <p>Recognize/use equivalent ideas--zeros of functions, roots of equations, and/or solution of an equation</p> <p>Non-linear functions--recognize graphs (quadratics, exponential growth/decay)</p> <p>Interpret graphs</p> <p>Plot points--distinguish linear/non-linear relationships</p> <p>Note: Quadratic functions will have integer solutions</p>			

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## Algebra I

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Data Analysis &amp; Probability</b> <b>Grade 8-10 Benchmarks: A. Create, interpret and use graphical displays and statistical measures to describe data; e.g., box-and-whisker plots, histogram, scatterplots, measures of center and variability.</b> <b>Content Organizer: Data Collection</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
1. Classify data as univariate (single variable) or bivariate (two variables), and as quantitative (measurement) or qualitative (categorical) data.	<p># 12 Subscale: Data Analysis and Probability</p> <p>Create, interpret and/or analyze tables, charts, and graphs involving data.</p> <p>Interpret/analyze information from visual representations-- line, bar, circle graphs, histograms, stem and leaf, box and whisker, scatter plots, charts, and tables.</p> <p>Identify patterns/trends and draw conclusions.</p> <p>Select appropriate kind of graph, determine suitable scale, create appropriate display of given data.</p>	<p><b>I. Primary Resource</b>  <i>Contemporary Mathematics in Context</i> (Core-Plus Book IA)  <i>Reference and Practice Book</i> (pp. 44-50)            Unit 1: Lesson 1: (pp. 2-13)            Teacher Resource Masters - Recommend using # 1 and 2.            Lesson 3: (pp. 47-73)            Web Site (p. 48)  <a href="http://www.cdc.gov/growthcharts/">www.cdc.gov/growthcharts/</a> (Box and Whisker) (Histograms)            Teacher Resource: Masters 9a, 9b, 11a, 11b (pp. 20-35)</p> <p><b>II. Secondary Resources</b>            TI-83 Plus graphing calculator – Investigation 2 Producing Plots With Technology (pp. 19-23)            Core-Plus text</p> <p>Group Work Instructions/ Criteria / Evaluation Form (Appendix pp.1-3)            Rubrics for the Ohio Graduation Test (Appendix p. 4)</p>	<p><b>I. Primary Resource</b>  <i>Reference and Practice Book</i> – Before beginning each unit, review middle school mathematics strand to determine areas of student strengths and weaknesses. Use “Check Your Understanding 5.1-5.3” to determine student understanding for this strand.            Determine among multiple group options which method best matches the specific activity. Spend ample time on Investigation I-2 (pp. 3-14) to ensure students understand group dynamics and the difference between a strong and weak written response. Question students about amount of group work previously experienced. Use OGT rubric for short/extended responses.</p> <p><b>II. Secondary Resources</b>            Use TV Presenters with graphing calculator use to provide students a visual self-check for errors.</p> <p>Vocabulary Check: Knowledge of vocabulary is understood to mean a student can apply the definition to a specific problem.            Interquartile Range (IQR)            Variability  <u>Mean Absolute Deviations (MAD)</u>            Range            Inequality            Standard Deviation            Students should have 9a-b as a reference sheet in their notebooks. (Appendix (p. 5) Page protector is recommended.            Use table and graphs to find association between two variables (bivariate).</p>	<p><i>I. Primary Resource</i>            Remediation Assessment            “Check Your Understanding 5.1-5.3”</p> <p>Summative Assessment – See page 2 – Data Analysis Curriculum Guide</p>

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## Algebra I

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Data Analysis &amp; Probability</b> <b>Grade 8-10 Benchmarks: A. Create, interpret and use graphical displays and statistical measures to describe data; e.g., box-and-whisker plots, histogram, scatterplots, measures of center and variability.</b> <b>Content Organizer: Data Collection</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
2. Create a scatterplot for a set of bivariate data, sketch the line of best fit, and interpret the slope of the line of best fit.	<p># 12 Subscale: Data Analysis and Probability Create, interpret and/or analyze tables, charts, and graphs involving data.</p> <p>Interpret/analyze information from visual representations-- line, bar, circle graphs, histograms, stem and leaf, box and whisker, scatter plots, charts, and tables.</p> <p>Identify patterns/trends and draw conclusions.</p> <p>Select appropriate kind of graph, determine suitable scale, create appropriate display of given data</p>	<p><b>I. Primary Resource</b>  <i>Contemporary Mathematics in Context</i>-Core-Plus Book A            Unit 1            Lesson 4 (pp. 73-74) (scatterplot)            Teacher Resource Master 36-44  <a href="http://www.cdc.gov/growthcharts/">www.cdc.gov/growthcharts/</a></p> <p>MOREs            M- 1 through 5 (pp. 85-89) for concept of “centroid”</p>	<p>Student will:</p> <p>Use “tools” to collect and record data            Students or teacher may go to web site to copy larger chart shown on page 48 of textbook.</p> <p>Use data from local newspaper or magazine</p> <p>Write explanation of the problems.            Use OGT rubric as criteria.</p>	<p><b>I. Primary Resource</b>            Pages 11a-b in            Teaching Resource            Masters Unit 1            “Patterns in Data” (p. 20) after finishing section on histograms.</p> <p>Criteria:            1. Label axis            2. Scale on axis            3. Neatness            4. Interpret results</p>

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## Algebra I

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Data Analysis &amp; Probability</b> <b>Grade 8-10 Benchmarks: A. Create, interpret and use graphical displays and statistical measures to describe data; e.g., box-and-whisker plots, histogram, scatterplots, measures of center and variability.</b> <b>Content Organizer: Statistical Methods</b>				
Grade Level Indicator	OGT competency Focus	Resources	Instructional Activities/Strategies	Assessment
3. Analyze and interpret frequency distributions based on spread, symmetry, skewness, clusters and outliers.	<p># 12 Subscale: Data Analysis and Probability</p> <p>Create, interpret and/or analyze tables, charts, and graphs involving data.</p> <p>Interpret/analyze information from visual representations-- line, bar, circle graphs, histograms, stem and leaf, box and whisker, scatter plots, charts, and tables.</p> <p>Identify patterns/trends and draw conclusions.</p> <p>Select appropriate kind of graph, determine suitable scale, create appropriate display of given data</p>	<p><b>I. Primary Resource</b>  <i>Contemporary Mathematics in Context</i>            Core-Plus Book A Unit 1 “Patterns in Data”            Lesson 1 (pp. 2-13) Exploring Data            Teacher Resource Masters 1-7            Lesson 2 Shapes and Centers (pp. 14-46)            Teacher Resource Masters- Recommend 9a-b and 11a-b            Lesson 3 Variability (pp. 47-73)            Teacher Resource Masters – 20-35</p> <p><u>MORE</u> Core-Plus Text  <u>Modeling</u> – <u>Organizing</u> – <u>Reflection</u> – <u>Extending</u></p> <p>Suggested Problems            M-2 (p. 24)            O-2 through 5 (pp. 27-28)            M-2 (p. 39)            O-1 through 4 (pp. 43-44)            R-3 and 4 (p. 44)            E-2 (pp. 44-45)            M-1 and 2 (pp. 55-56) Homework suggestion            O-2 and 3 (p. 60)            R-5 (p. 61)            E-4 (p. 62) Outlier definition (DFN)            M-2 and 4 (pp. 68-70)            E (p. 73) Symbol</p>	<p>Vocabulary for Unit 1- Knowledge understood to be application level, not rote memory.            “Plots” Scatter, line, stem and leaf, box and whisker            Measure of center            Distribution            Skew            Symmetry            Min /Max (Minimum / Maximum)            Centered            Gaps            Outlier            Histogram            Percentile            Seven number summary            Min, -Q1, Q2 (median), Q3, Max</p> <p>Students can choose one of three assessment strategies:            Draw a picture:            Write a definition with application example.            Act it out.            If students have difficulty understanding “skewness,” use the cheer “Lean to the left, lean to the right, stand up, sit down, fight, fight, fight.” Insert the word “skew” for “lean.” Stand up is “normal.”</p>	<p><i>I. Primary Resource</i>            Quizzes            O – 1 and 4 (p. 71)            E – 1 (p. 72)            O – 1 (p.89)</p> <p>Lesson Quiz 2-4 Form A &amp; B (pp. 1-18)</p> <p>In-class exam Form A or B (pp. 19-28)</p> <p>Optional take-home (pp. 29-34)</p> <p>Optional project – (pp. 35-38)</p> <p>Homework (teacher discretion) see <u>MOREs</u> through Unit 1</p> <p>Teacher-made quiz on seven number summary (range, IQR)</p> <p>Teacher Resource Master 11a-b for summative (Unit Test) evaluation</p>

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## Algebra I

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Data Analysis &amp; Probability</b> <b>Grade 8-10 Benchmarks: E. Evaluate the validity of claims and predictions that are based on data by examining the appropriateness of the data collection and analysis.</b> <b>Content Organizer: Statistical Methods</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
<p>4. Describe and compare various types of studies (survey, observation, experiment), and identify possible misuses of statistical data.</p> <p>6. Make inferences about relationships in bivariate data, and recognize the difference between evidence of relationship (correlation) and causation</p>	<p>Includes aspects of # 13 Subscale: Data Analysis and Probability choose and apply measures of central tendency ( mean, median, and mode) and variability (range and visual displays of information.</p> <p>Understand mean, median, mode, and range</p> <p>Describe data using measures of central tendency or range</p> <p>Determine which measure (central tendency) gives the best description</p> <p>Describe variability</p> <p>Draw line to represent trend in scatter plot</p>	<p><b>I. Primary Reference</b>  <b>Contemporary Mathematics in Context</b> Core-Plus Book I A            Unit 1 “Exploring Data”            Lesson 2 Shapes and Centers (pp. 14-46)            Measure of center (mean, mode, median)            Teacher Resource: Master 18-19            Lesson 3 Variability (pp. 47-73)</p>	<p><b>I. Primary Resource</b>            Review measure of center (mean, mode, median) range</p> <p>Students must understand and calculate interquartile range (IQR)</p> <p>List seven number summary</p> <ol style="list-style-type: none"> <li>1. Minimum</li> <li>2. Q1</li> <li>3. Median</li> <li>4. Q3</li> <li>5. Maximum</li> <li>6. Range</li> <li>7. IQR</li> </ol>	<p><i>Teacher-constructed test on mean, mode, median and range</i></p> <p>Test of finding seven number summary from various graphs and plots</p> <p>-line plot            -scatterplot            -histogram            -box-and-whisker</p>

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# Algebra I

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Data Analysis &amp; Probability</b>				
<b>Grade 8-10 Benchmarks: G. Describe sampling methods and analyze the effects of method chosen on how well the resulting sample represents the population.</b>				
<b>Content Organizer: Statistical Methods</b>				
<b>Grade Level Indicator</b>	<b>OGT Competency Focus</b>	<b>Resources</b>	<b>Instructional Activities/Strategies</b>	<b>Assessment</b>
5. Describe characteristics and limitations of sampling methods, and analyze the effects of random versus biased sampling; e.g., determine and justify whether the sample is likely to be representative of the population.				

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## Algebra I

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Data Analysis &amp; Probability</b> <b>Grade 8-10 Benchmarks: H. Use counting techniques, such as permutations and combinations, to determine the total number of options and possible outcomes.</b> <b>Content Organizer: Probability</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
7. Use counting techniques and the Fundamental Counting principle to determine the total number of possible outcomes for mathematical situations.	# 14 Subscale: Data Analysis and probability Represent and interpret the possible outcomes for a mathematical situation and calculation probability.  Basic concepts of probability  Use counting procedures-- listing, ordering, tree diagrams. multiplication principle  Solve problems--simple or compound events, complementary probabilities, independent and simple dependent events  Compare experimental/theoretical Probabilities  Determine sample space			

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# Algebra I

Adams County/Ohio Valley  
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<b>Content Standard: Data Analysis &amp; Probability</b> <b>Grade 8-10 Benchmarks: I. Design an experiment to test a theoretical probability, and record and explain results.</b> <b>Content Organizer: Probability</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
8. Describe, create and analyze a sample space and use it to calculate probability.	<p># 14 Subscale: Data Analysis and probability Represent and interpret the possible outcomes for a mathematical situation and calculation probability.</p> <p>Basic concepts of probability</p> <p>Use counting procedures-- listing, ordering, tree diagrams. multiplication principle</p> <p>Solve problems--simple or compound events, complementary probabilities, independent and simple dependent events</p> <p>Compare experimental/theoretical Probabilities</p> <p>Determine sample space</p>			

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## Algebra I

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<b>Content Standard: Data Analysis &amp; Probability</b> <b>Grade 8-10 Benchmarks: J. Compute probabilities of compound events, independent events, and simple dependent events.</b> <b>Content Organizer: Probability</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
9. Identify situations involving independent and dependent events, and explain differences between, and common misconceptions about, probabilities associated with those events.	# 14 Subscale: Data Analysis and probability Represent and interpret the possible outcomes for a mathematical situation and calculation probability.  Basic concepts of probability  Use counting procedures-- listing, ordering, tree diagrams. multiplication principle  Solve problems--simple or compound events, complementary probabilities, independent and simple dependent events  Compare experimental/theoretical Probabilities  Determine sample space			

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## Algebra I

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<b>Content Standard: Data Analysis &amp; Probability</b> <b>Grade 8-10 Benchmarks: K. Make predictions based on theoretical probabilities and experimental results.</b> <b>Content Organizer: Probability</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
10. Use theoretical and experimental probability, including simulations or random numbers, to estimate probabilities and to solve problems dealing with uncertainty; e.g., compound events, independent events, simple dependent events.	# 14 Subscale: Data Analysis and probability Represent and interpret the possible outcomes for a mathematical situation and calculation probability.  Basic concepts of probability  Use counting procedures-- listing, ordering, tree diagrams. multiplication principle  Solve problems--simple or compound events, complementary probabilities, independent and simple dependent events  Compare experimental/theoretical Probabilities  Determine sample space			

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