

## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Number, Number Sense and Operations</b> <b>Grade 8-10 Benchmarks: D. Connect physical, verbal and symbolic representations of integers, rational numbers and irrational numbers.</b> <b>Content Organizer: Number and Number Systems</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
1. Connect physical, verbal and symbolic representations of irrational numbers; e.g., construct $\sqrt{2}$ as a hypotenuse or on a number line.	<p># 1 Subscale: Number and Numeracy</p> <p>Represent and use real numbers in a variety of equivalent forms.</p> <p>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>Irrational numbers included- square roots and <math>\pi</math></p>			

**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.**

## Integrated Mathematics II

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Course of Study

<b>Content Standard: Number, Number Sense and Operations</b> <b>Grade 8-10 Benchmarks: D. Connect physical, verbal and symbolic representations of integers, rational numbers and irrational numbers.</b> <b>Content Organizer: Meaning of Operations</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
2. Explain the meaning of the nth root.	<p># 1 Subscale: Number and Numeracy</p> <p>Represent and use real numbers in a variety of equivalent forms.</p> <p>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>Irrational numbers included- square roots and <math>\pi</math></p>			

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**Content Standard: Number, Number Sense and Operations**

**Grade 8-10 Benchmarks: None Grades 11-12 C. Apply factorials and exponents, including fractional exponents, to solve practical problems.**

**Content Organizer: Computation and Estimation**

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
3. Use factorial notation and computations to represent and solve problem situations involving arrangements.				

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Adams County/Ohio Valley  
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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
<p>4. Approximate the <math>n</math>th root of a given number greater than zero between consecutive integers when <math>n</math> is an integer; e.g., the 4<sup>th</sup> root of 50 is between 2 and 3.</p>	<p># 2 Subscale: Number &amp; Numeracy</p> <p>Estimate and compute with real number.</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><b>Computation using standard algorithms in isolation will not be assessed—problems will be in real-world type settings.</b></p>			

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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Measurement

**Grade 8-10 Benchmarks:** None **Grade 11-12 Benchmarks:** A. Explain differences among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations.

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

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
1. Explain how a small error in measurement may lead to a large error in calculated results.				

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Course of Study

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**Grade 8-10 Benchmarks:** None **Grade 11-12 Benchmarks:** A. Explain differences among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations.

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

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
2. Calculate relative error.				

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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Measurement

**Grade 8-10 Benchmarks:** None **Grade 11-12 Benchmarks:** A. Explain differences among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations.

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

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
3. Explain the difference between absolute error and relative error in measurement.				

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## Integrated Mathematics II

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**Content Standard:** Measurement  
**Grade 8-10 Benchmarks:** None **Grade 11-12 Benchmarks:** A. Explain differences among accuracy, precision and error, and describe how each of those can affect solutions in measurement situations.  
**Content Organizer:** Use Measurement Techniques and Tools

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
4. Give examples of how the same absolute error can be problematic in one situation but not in another; e.g., compare “accurate to the nearest foot” when measuring the height of a person versus when measuring the height of a mountain.				

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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
5. Determine the measures of central or inscribed angles and their associated major and minor arcs.	<p># 11 Subscale: Geometry &amp; Measurement</p> <p>use measurement techniques including scale drawings, formulas, 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><b>Note: metric/customary units are used but no conversion between systems.</b></p>			

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## Integrated Mathematics II

Adams County/Ohio Valley  
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<b>Content Standard: Geometry &amp; Spatial Sense</b> <b>Grade 8-10 Benchmarks: A. Formally define geometric figures.</b> <b>Content Organizer: Characteristics and Properties</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
<p>1. Formally define and explain key aspects geometric figures, including:</p> <ul style="list-style-type: none"> <li>(a) interior and exterior angles of polygons;</li> <li>(b) segments related to triangles (median, altitude, midsegment);</li> <li>(c) points of concurrency related to triangles (centroid, incenter, orthocenter, and circumcenter);</li> <li>(d) circles (radius, diameter, chord, circumference, major arc, minor arc, sector, segment, inscribed angle).</li> </ul>				

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<b>Grade 8-10 Benchmarks: A. Formally define geometric figures.</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>
2. Recognize and explain the necessity for certain terms to remain undefined, such as point, line and plane.				

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<b>Content Standard: Geometry &amp; Spatial Sense</b> <b>Grade 8-10 Benchmarks: H. Establish the validity of conjectures about geometric objects, their properties and relationships by counter-example, inductive and deductive reasoning, and critiquing arguments made by others.</b> <b>Content Organizer: Characteristics and Properties</b>				
Grade Level Organizer	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
<p>3. Make, test and establish the validity of conjectures about geometric properties and relationships using counterexample, inductive and deductive reasoning, and paragraph or two-column proof, including:</p> <ul style="list-style-type: none"> <li>(a) prove the Pythagorean Theorem;</li> <li>(b) prove theorems involving triangle similarity and congruence;</li> <li>(c) prove theorems involving properties of lines, angles, triangles and quadrilaterals;</li> <li>(d) test a conjecture using basic constructions made with a compass and straightedge or technology.</li> </ul>				

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<b>Content Standard: Geometry &amp; Spatial Sense</b> <b>Grade 8-10 Benchmarks: E. Draw and construct representations of two-and three-dimensional geometric objects using a variety of tools such as straightedge, compass and technology. E. Estimate &amp; compute various attributes, including length, angle measure, area, surface area &amp; volume, to a specified level of precision.</b> <b>Content Organizer: Spatial Relationships</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
4. Construct right triangles, equilateral triangles, parallelograms, trapezoids, rectangles, rhombuses, squares and kites, using compass and straightedge or dynamic geometry software.	Includes aspects of measurement. # 11 Subscale: Geometry & Measurement Use measurement techniques including scale drawings, formulas, 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  <b>Note: metric/customary units are used but no conversion between systems</b>			

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Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
5. Construct congruent or similar figures using tools, such as compass, straightedge, and protractor or dynamic geometry software.	Includes aspects of measurement # 11 Subscale: Geometry & Measurement Use measurement techniques including scale drawings, formulas, 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  <b>Note: metric/customary units are used but no conversion between systems</b>			

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<b>Content Standard: Geometry &amp; Spatial Sense</b>				
<b>Grade 8-10 Benchmarks: A. Formally define geometric figures.</b>				
<b>Content Organizer: Transformation and Symmetry</b>				
<b>Grade Level Indicator</b>	<b>OGT Competency Focus</b>	<b>Resources</b>	<b>Instructional Activities/Strategies</b>	<b>Assessment</b>
6. Identify the reflection and rotation symmetries of two- and three-dimensional figures.				

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<b>Content Standard: Geometry &amp; Spatial Sense</b> <b>Grade 8-10 Benchmarks: E. Draw and construct representations of two-and three-dimensional geometric objects using a variety of tools such as straightedge, compass and technology. E. Estimate &amp; compute various attributes, including length, angle measure, area, surface area &amp; volume, to a specified level of precision.</b> <b>Content Organizer: Transformation and Symmetry</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
7. Perform reflections and rotations using compass and straightedge constructions and dynamic geometry software.	<p># 11 Subscale: Geometry &amp; Includes aspects of measurement. Measurement Use measurement techniques including scale drawings, formulas, 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><b>Note: metric/customary units are used but no conversion between systems</b></p>			

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## Integrated Mathematics II

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<b>Content Standard: Geometry &amp; Spatial Sense</b> <b>Grade 8-10 Benchmarks: F. Represent and model transformations in a coordinate plane and describe the results. G. Prove or disprove conjectures &amp; solve problems involving 2 &amp; 3 dimensional objects represented within a coordinate system.</b> <b>Content Organizer: Transformation and Symmetry</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
8. Derive coordinate rules for translations, reflections, and rotations of geometric figures in the coordinate plane.	Includes aspects of measurement # 10 Subscale: Geometry & Measurement Apply visualization spatial sense, and properties of two-dimensional figures and three-dimensional objects.  Understand geometric properties of two/three dimensional figures/objects  Recognize/use geometric properties  Classify objects by properties  Apply visual estimation in real-world context  Recognize/apply transformations. (some may use coordinate plane)			

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**Content Organizer:** Transformation and Symmetry

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
<p>9. Show and describe the results of combinations of translations, reflections and rotations (compositions); e.g., perform compositions and specify the result of a composition as the outcome of a single motion, when applicable.</p>	<p># 10 Subscale: Geometry &amp; Measurement                      Apply visualization spatial sense, and properties of two-dimensional figures and three-dimensional objects.</p> <p>Understand geometric properties of two/three dimensional figures/objects</p> <p>Recognize/use geometric properties</p> <p>Classify objects by properties</p> <p>Apply visual estimation in real-world context</p> <p>Recognize/apply transformations. (some may use coordinate plane)</p>			

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## Integrated Mathematics II

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<b>Content Standard: Geometry &amp; Spatial Sense</b> <b>Grade 8-10 Benchmarks: A. Formally define geometric figures. C. Recognize and apply angle relationships in situations involving intersecting lines, perpendicular lines and parallel lines. H. Establish the validity of conjectures about geometric objects, their properties and relationships by counter-example, inductive and deductive reasoning, and critiquing arguments made by others.</b> <b>Content Organizer: Visualization and Geometric Models</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
10. Solve problems involving chords, radii, and arcs within the same circle.	<p># 8 Subscale: Geometry &amp; Measurement</p> <p>Apply angle relationships to situations involving intersecting lines, perpendicular lines, and parallel lines.</p> <p>Demonstrate understanding of geometry of lines and angles in context of mathematical or real-world situations.</p> <p>Solve problems involving lines and angles (interior, vertical, complementary, supplementary, exterior)</p> <p>Emphasis on plane geometry-coordinate geometry may be included.</p> <p>Application of basic angle relationships (ex. Sum of angles of a triangle)</p> <p>Angles measures will be in degrees and limited to whole numbers.</p>			

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## Integrated Mathematics II

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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	<b><i>OGT Competency Focus</i></b>	Resources	Instructional Activities/Strategies	Assessment
1. Define function formally and with $f(x)$ notation.	<p># 7 Subscale: Algebra &amp; Function 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><b>Note: Quadratic functions will have integer solutions</b></p>			

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Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
2. Describe and compare characteristics of the following families of functions: square root, cubic, absolute value basic trigonometric functions; e.g., general shape, possible number of roots, domain and range.	# 7 Subscale: Algebra & Function Create and analyze graphs of linear and simple non-linear functions.  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  <b>Note: Quadratic functions will have integer solutions</b>			

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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

<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
<p>3. Solve equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height.</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 Set-up/solve problems using rates, ratios, proportions, percents, in problem-solving/real-world context (may require multiple steps)</p>			

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Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
4. Use algebraic representations and functions to describe and generalize geometric properties and relationships.	# 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 Set-up/solve problems using rates, ratios, proportions, percents, in problem-solving/real-world context (may require multiple steps)			

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Grade Level Organizer	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
5. Solve simple linear and nonlinear equations and inequalities having square roots as coefficients and solutions.	<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 Set-up/solve problems using rates, ratios, proportions, percents, in problem-solving/real-world context (may require multiple steps)</p>			

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Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
6. Solve equations and inequalities having rational expressions as coefficients and solutions.	<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 Set-up/solve problems using rates, ratios, proportions, percents, in problem-solving/real-world context (may require multiple steps)</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
7. Solve systems of linear inequalities.	<p># 5 Subscale: Algebra &amp; 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> <p>Also 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>			

**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.**

## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

<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
8. Graph the quadratic relationship that defines circles.	<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><b>Note: Quadratic functions will have integer solutions</b></p>			

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## Integrated Mathematics II

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: Use Algebraic Representations</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
<p>9. Recognize and explain that the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals.</p>	<p>Also 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 Set-up/solve problems using rates, ratios, proportions, percents, in problem-solving/real-world context (may require multiple steps)</p>			

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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: F. Solve and graph linear equations and inequalities. 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 real-world problems that can be modeled using linear, quadratic, exponential, or square root functions.	<p># 5 Subscale: Algebra &amp; 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> <p># 7 Subscale: Algebra &amp; Functions Create and analyze graphs of linear and simple non-linear functions.</p>			

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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

<b>Content Standard:</b> Patterns, Functions and Algebra <b>Grade 8-10 Benchmarks:</b> H. Solve systems of linear equations involving two variables graphically and symbolically. <b>Content Organizer:</b> Use Algebraic Representations				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
11. Solve real-world problems that can be modeled, using systems of linear equations and inequalities.	<p># 5 Subscale: Algebra &amp; 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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## Integrated Mathematics II

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
12. Describe the relationship between slope of a line through the origin and the tangent function of the angle created by the line and the positive x-axis.	# 7 Subscale: Algebra & Functions Create and analyze graphs of linear and simple non-linear functions. 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 Set-up/solve problems using rates, ratios, proportions, percents, in problem-solving/real-world context (may require multiple steps)			

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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

<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
3. Solve equations and formulas for a specified variable; e.g., express the base of a triangle in terms of the area and height.	<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>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>)</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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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

<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
4. Use algebraic representations and functions to describe and generalize geometric properties and relationships.	<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>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>)</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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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

<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 Organizer	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
5. Solve simple linear and nonlinear equations and inequalities having square roots as coefficients and solutions.	<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)                      Scale drawings                      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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Adams County/Ohio Valley  
Course of Study

<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
6. Solve equations and inequalities having rational expressions as coefficients and solutions.	<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>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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## Integrated Mathematics II

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
7. Solve systems of linear inequalities.	<p># 5 Subscale: Algebra &amp; Functions Use linear equations &amp; inequalities.</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>			

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## Integrated Mathematics II

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
7. Solve systems of linear inequalities.	# 5 Subscale: Algebra & Functions Use linear equations & inequalities. # 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. 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) Scale drawings Recognize/use multiple representations for situations with percents (25% reduction-same as 75% of original price) Apply distance formula ( $d=rt$ ) 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)			

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## Integrated Mathematics II

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: Use Algebraic Representations</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
9. Recognize and explain that the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals.	<p># 6 Subscale: Algebra and Functions (Continued)</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>)</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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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: Use Algebraic Representations</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
9. Recognize and explain that the slopes of parallel lines are equal and the slopes of perpendicular lines are negative reciprocals.	<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><b>Note: Quadratic functions will have integer solutions</b></p>			

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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Patterns, Functions and Algebra</b> <b>Grade 8-10 Benchmarks: F. Solve and graph linear equations and inequalities. 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 real-world problems that can be modeled using linear, quadratic, exponential, or square root functions.	<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><b>Note: Quadratic functions will have integer solutions</b></p>			

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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
12. Describe the relationship between slope of a line through the origin and the tangent function of the angle created by the line and the positive x-axis.	<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 additional20% off)</p> <p>Scale drawings Recognize/use multiple representations for situations with percents (25% reduction- same as 75% of original price) 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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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Data Analysis &amp; Probability</b> <b>Grade 8-10 Benchmarks: C. Compare the characteristics of the mean, median and mode for a given set of data, and explain which measure of center best represents the data.</b> <b>Content Organizer: Data Collection</b>				
Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
1. Describe measures of center and the range verbally, graphically and algebraically.	# 13 Subscale: Data Analysis & Probability Choose and apply measures of central tendency (mean, median, and mode) and variability (range & visual displays of information).  Understand mean, median, mode, and range  Describe data using measures of central tendency or range  Determine which measure (central tendency) gives best description  Draw line to represent trend in scatter plot			

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## Integrated Mathematics II

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
<p>2. Represent and analyze bivariate data using appropriate graphical displays (scatterplots, parallel box-and-whisker plots, histograms with more than one set of data, tables, charts, spreadsheets) with and without technology.</p>	<p># 12 Subscale: Data Analysis &amp; 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, draw conclusions.</p> <p>Select appropriate kind of graph, determine suitable scale, create appropriate display of given data.</p>			

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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

<b><u>Content Standard: Data Analysis &amp; Probability</u></b> <b><u>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.</u></b> <b><u>Content Organizer: Data Collection</u></b>				
Grade Level Indicator	OGT Competency focus	Resources	Instructional Activities/Strategies	Assessment
3. Display bivariate data where at least one variable is categorical.	<p># 12 Subscale: Data Analysis &amp; 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, draw conclusions.</p> <p>Select appropriate kind of graph, determine suitable scale, create appropriate display of given data.</p>			

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## Integrated Mathematics II

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
4. Identify outliers on a data display; e.g., use interquartile range to identify outliers on a box-and-whisker plot.	<p># 12 Subscale: Data Analysis &amp; 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, draw conclusions.</p> <p>Select appropriate kind of graph, determine suitable scale, create appropriate display of given data.</p>			

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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Data Analysis & Probability

**Grade 8-10 Benchmarks:** G. Describe sampling methods and analyze the effects of method chosen on how well the resulting sample represents the population.

**Content Organizer:** Statistical Methods

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
5. Provide examples and explain how a statistic may or may not be an attribute of the entire population; e.g., intentional or unintentional bias may be present.				

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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

**Content Standard: Data Analysis & Probability**  
**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. D. Find, use and interpret measures of center and spread, such as mean and quartiles, and use those measures to compare and draw conclusions about sets of data.**  
**Content Organizer: Statistical Methods**

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
<p>6. Interpret the relationship between two variables using multiple graphical displays and statistical measures; e.g., scatterplots, parallel box-and-whisker plots, and measures of center and spread.</p>	<p># 12 Subscale: Data Analysis &amp; 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, draw conclusions.</p> <p>Select appropriate kind of graph, determine suitable scale, create appropriate display of given data.</p>			

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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

<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
7. Model problems dealing with uncertainty with area models (geometric probability).	# 14 Subscale: Data Analysis & Probability Represent and interpret the possible outcomes for a mathematical situation and calculate probabilities.  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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## Integrated Mathematics II

Adams County/Ohio Valley  
Course of Study

<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
8. Differentiate and explain the relationship between the probability of an event and the odds of an event, and compute one given the other.	# 14 Subscale: Data Analysis & Probability Represent and interpret the possible outcomes for a mathematical situation and calculate probabilities.  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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