

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Number, Number Sense and Operations  
**Grade 11-12 Benchmarks:** E. Represent and compute with complex numbers.  
**Content Organizer:** Number and Number Systems

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
1. Determine what properties (closure, identity, inverse, commutative and associative) hold for operations with complex numbers.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

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

**Grade 11-12 Benchmarks:** 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
2. Apply combinations as a method to create coefficients for the Binomial Theorem, and make connections to everyday and workplace problem situations.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Measurement

**Grade 11-12 Benchmarks:** D. Solve problem situations involving derived measurements; e.g., density, acceleration.

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

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
1. Solve problems involving derived measurements; e.g., acceleration and pressure.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Measurement

**Grade 11-12 Benchmarks:** D. Solve problem situations involving derived measurements; e.g., density, acceleration.

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

Grade Level Indicator	OGT Competency	Resources	Instructional Activities/Strategies	Assessment
2. Use radian measures in the solution of problems involving angular velocity and acceleration.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Measurement

**Grade 11-12 Benchmarks:** C. Estimate and compute areas and volume in increasingly complex problem situations.

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

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
3. Apply informal concepts of successive approximation, upper and lower bounds, and limits in measurement situations; e.g., measurement of some quantities, such as volume of a cone, can be determined by sequences of increasingly accurate approximations.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Geometry and Spatial Sense

**Grade 11-12 Benchmarks:** B. Represent transformations within a coordinate system using vectors and matrices.

**Content Organizer:** Transformations and Symmetry

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
1. Use matrices to represent translations, reflections, rotations, dilations and their compositions.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Geometry and Spatial Sense

**Grade 11-12 Benchmarks:** A. Use trigonometric relationships to verify and determine solutions in problem situations.

**Content Organizer:** Transformations and Symmetry

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
2. Derive and apply the basic trigonometric identities; i.e., angle addition, angle subtraction, and double angle.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Geometry and Spatial Sense

**Grade 11-12 Benchmarks:** Use formal mathematical language and notation to represent ideas, to demonstrate relationships within and among representation systems, and to formulate generalizations.

**Content Organizer:** Visualization and Geometric Models

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
3. Relate graphical and algebraic representations of lines, simple curves and conic sections.				

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Adams County/Ohio Valley  
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**Content Standard:** Geometry and Spatial Sense

**Grade 11-12 Benchmarks:** Use formal mathematical language and notation to represent ideas, to demonstrate relationships within and among representation systems, and to formulate generalizations.

**Content Organizer:** Visualization and Geometric Models

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
4. Recognize and compare specific shapes and properties in multiple geometries; e.g., plane, spherical and hyperbolic.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Patterns, Functions and Algebra

**Grade 11-12 Benchmarks:** A. Analyze functions by investigating rates of change, intercepts, zeros, asymptotes, and local and global behavior.

**Content Organizer:** Use Patterns, Relations, and Functions

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
1. Analyze the behavior of arithmetic and geometric sequences and series as the number of terms increases.				

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**Content Standard:** Patterns, Functions and Algebra

**Grade 11-12 Benchmarks:** A. Analyze functions by investigating rates of change, intercepts, zeros, asymptotes, and local and global behavior.

**Content Organizer:** Use Patterns, Relations, and Functions

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
2. Translate between the numeric and symbolic form of a sequence or series.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Patterns, Functions and Algebra

**Grade 11-12 Benchmarks:** A. Analyze functions by investigating rates of change, intercepts, zeros, asymptotes, and local and global behavior.

**Content Organizer:** Use Patterns, Relations, and Functions

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
3. Describe and compare the characteristics of transcendental and periodic functions; e.g., general shape, number of roots, domain and range, asymptotic behavior, extrema, local and global behavior.				

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**Content Standard:** Patterns, Functions and Algebra

**Grade 11-12 Benchmarks:** A. Analyze functions by investigating rates of change, intercepts, zeros, asymptotes, and local and global behavior.

**Content Organizer:** Use Patterns, Relations, and Functions

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
4. Represent the inverse of a transcendental function symbolically.				

**Content Standard:** Patterns, Functions and Algebra

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Grade 11-12 Benchmarks: D. Apply algebraic methods to represent and generalize problem situations involving vectors and matrices.**

**Content Organizer: Use Algebraic Representations**

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
5. Set up and solve systems of equations, using matrices and graphs, with and without technology.				

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**Content Standard:** Patterns, Functions and Algebra

**Grade 11-12 Benchmarks:** A. Analyze functions by investigating rates of change, intercepts, zeros, asymptotes, and local and global behavior.

**Content Organizer:** Use Algebraic Representations

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
6. Make arguments about mathematical properties using mathematical induction.				

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Adams County/Ohio Valley  
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**Content Standard:** Patterns, Functions and Algebra

**Grade 11-12 Benchmarks:** A. Analyze functions by investigating rates of change, intercepts, zeros, asymptotes, and local and global behavior.

**Content Organizer:** Use Algebraic Representations

Grade Level Organizer	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
7. Make mathematical arguments using the concepts of limit.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
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**Content Standard:** Patterns, Functions and Algebra

**Grade 11-12 Benchmarks:** C. Use recursive functions to model and solve problems; e.g., home mortgages, annuities.

**Content Organizer:** Use Algebraic Representations

Grade Level Organizer	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
8. Compare estimates of the area under a curve over a bounded interval by partitioning the region with rectangles; e.g., make successive estimates using progressively smaller rectangles.				

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**Content Standard:** Patterns, Functions and Algebra

**Grade 11-12 Benchmarks:** A. Analyze functions by investigating rates of change, intercepts, zeros, asymptotes, and local and global behavior.

**Content Organizer:** Use Algebraic Representations

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
9. Translate freely between polar and Cartesian coordinate systems.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
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**Content Standard:** Patterns, Functions and Algebra

**Grade 11-12 Benchmarks:** A. Analyze functions by investigating rates of change, intercepts, zeros, asymptotes, and local and global behavior.

**Content Organizer:** Analyze Change

Grade Level Organizer	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
10. Use the concept of limit to find instantaneous rate of change for a point on a graph as the slope of a tangent at a point.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Data Analysis & Probability

**Grade 11-12 Benchmarks:** C. Connect statistical techniques to applications in workplace and consumer situations.

**Content Organizer:** Data Collection

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
1. Identify and use various sampling methods (voluntary response, convenience sample, random sample, stratified random sample, and census) in a study.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Data Analysis & Probability

**Grade 11-12 Benchmarks:** A. Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.

**Content Organizer:** Statistical Methods

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
2. Transfer bivariate data so it can be modeled by a function; e.g., use logarithms to allow nonlinear relationship to be modeled by linear function.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Data Analysis & Probability

**Grade 11-12 Benchmarks:** B. Use descriptive statistics to analyze and summarize data, including measures of center, dispersion, correlation and variability.

**Content Organizer:** Statistical Methods

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
3. Describe the shape and find all summary statistics for a set of univariate data, and describe how a linear transformation affects shape, center and spread.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Data Analysis & Probability

**Grade 11-12 Benchmarks:** A. Create and analyze tabular and graphical displays of data using appropriate tools, including spreadsheets and graphing calculators.

**Content Organizer:** Statistical Methods

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
4. Apply the concept of a random variable to generate and interpret probability distributions, including binomial, normal and uniform.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

**Content Standard:** Data Analysis & Probability

**Grade 11-12 Benchmarks:** C. Connect statistical techniques to applications in workplace and consumer situations.

**Content Organizer:** Statistical Methods

Grade Level Indicator	OGT Competency Focus	Resources	Instructional Activities/Strategies	Assessment
5. Use sampling distributions as the basis for informal inference.				

## Mathematics – Grade 12

Adams County/Ohio Valley  
Course of Study

<b>Content Standard: Data Analysis &amp; Probability</b>				
<b>Grade 11-12 Benchmarks: None</b>				
<b>Content Organizer: Probability</b>				
<b>Grade Level Indicator</b>	<b>OGT Competency Focus</b>	<b>Resources</b>	<b>Instructional Activities/Strategies</b>	<b>Assessment</b>
6. Use theoretical or experimental probability, including simulations, to determine probabilities in real-world problem situations involving uncertainty, such as mutually exclusive events, complementary events, and conditional probability.				