

TRIGONOMETRY/CALCULUS

11-12

Adams County/Ohio Valley
Course of Study

Content Standard: Number, Number Sense/Operations

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-1. Determine what properties hold for matrix addition and matrix multiplication; e.g., use examples to show addition is commutative and when multiplication is not commutative.			

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Content Standard: Number, Number Sense/Operations

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-2. Determine what properties hold for vector addition and multiplication, and for scalar multiplication.			

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Content Standard: Number, Number Sense/Operations

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-4. Use matrices to represent given information in a problem situation.			

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Course of Study

Content Standard: Number, Number Sense/Operations

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-5. Model, using the coordinate plane, vector addition and scalar multiplication.			

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Content Standard: Number, Number Sense/Operations

Grade 11-12 Benchmarks:

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Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-6. Compute sums, differences and products of matrices using paper and pencil calculations for simple cases, and technology for more complicated cases.			

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Content Standard: Number, Number Sense/Operations
Grade 11-12 Benchmarks:
Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-9. Use vector addition and scalar multiplication to solve problems.			

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Content Standard: Number, Number Sense/Operations

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-3. Represent complex numbers on the complex plane.			

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Content Standard: Number, Number Sense/Operations

Grade 11-12 Benchmarks:

Content Organizer:

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11-7. Compute sums, differences, products and quotients of complex numbers.			

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Content Standard: Number, Number Sense/Operations
Grade 11-12 Benchmarks:
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Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-8. Use fractional and negative exponents as optional ways of representing and finding solutions for problem situations; e.g., $27^{2/3} = (27^{1/3})^2 = 9$.			

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Content Standard: Number, Number Sense/Operations

Grade 11-12 Benchmarks:

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

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Content Standard: Patterns, Functions and Algebra

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-7. Model and solve problems with matrices and Vectors.			

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Course of Study

Content Standard: Patterns, Functions and Algebra

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-8. Solve equations involving radical expressions and complex roots.			

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Course of Study

Content Standard: Patterns, Functions and Algebra

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-10. Describe the characteristics of conic sections.			

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Content Standard: Patterns, Functions and Algebra

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-11. Describe how a change in the value of a constant in an exponential, logarithmic or radical equation affects the graph of the equation.			

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Content Standard: Patterns, Functions and Algebra
Grade 11-12 Benchmarks:
Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-9. Solve 3 by 3 systems of linear equations by elimination and using technology, and interpret graphically what the solution means (a point, line, plane, or no solution).			

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Content Standard: Patterns, Functions and Algebra

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-3. Describe and compare the characteristics of the following families of functions: quadratics with complex roots, polynomials of any degree, logarithms, and rational functions; e.g., general shape, number of roots, domain and range, asymptotic behavior.			

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Content Standard: Patterns, Functions and Algebra

Grade 11-12 Benchmarks:

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11-4. Identify the maximum and minimum points of polynomial, rational and trigonometric functions graphically and with technology.			

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Content Standard: Patterns, Functions and Algebra

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-5. Identify families of functions with graphs that have rotation symmetry or reflection symmetry about the y-axis, x-axis or $y = x$.			

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Content Standard: Patterns, Functions and Algebra

Grade 11-12 Benchmarks:

Content Organizer:

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11-6. Represent the inverse of a function symbolically and graphically as a reflection about $y = x$.			

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Content Standard: Patterns, Functions and Algebra

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-1. Identify and describe problem situations involving an iterative process that can be represented as a recursive function; e.g., compound interest.			

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Content Standard: Patterns, Functions and Algebra

Grade 11-12 Benchmarks:

Content Organizer:

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11-2. Translate a recursive function into a closed form expression or formula for the n th term to solve a problem situation involving an iterative process; e.g., find the value of an annuity after 7 years.			

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

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-2. Represent translations using vectors.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Geometry/Spatial Sense

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-3. Describe multiplication of a vector and a scalar graphically and algebraically, and apply to problem situations.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Geometry/Spatial Sense

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
12-2. Derive and apply the basic trigonometric identities; i.e., angle addition, angle subtraction and double angle.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Geometry/Spatial Sense
Grade 11-12 Benchmarks:
Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
12-3. Relate graphical and algebraic representations of lines, simple curves and conic sections.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Geometry/Spatial Sense

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-4. Use trigonometric relationships to determine lengths and angle measures; i.e., Law of Sines and Law of Cosines.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Geometry/Spatial Sense
Grade 11-12 Benchmarks:
Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-1. Use polar coordinates to specify locations on a plane.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Geometry/Spatial Sense

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-5. Identify, sketch and classify the cross sections of three-dimensional objects.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Measurement

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-4. Calculate distances, areas, surface areas and volumes of composite three-dimensional objects to a specified number of significant digits.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Measurement

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-5. Solve real-world problems involving area, surface area, volume and density to a specified degree of precision.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Measurement

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
12-3. 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.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Measurement

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
12-2. Use radian measures in the solution of problems involving angular velocity and acceleration.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Measurement

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-2. Use radian and degree angle measures to solve problems and perform conversions as needed.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Measurement

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-3. Derive a formula for the surface area of a cone as a function of its slant height and the circumference of its base.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Measurement

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-1. Determine the number of significant digits in a measurement.			

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Course of Study

<u>Content Standard: Data Analysis</u> <u>Grade 11-12 Benchmarks:</u> <u>Content Organizer:</u>			
Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-1. Design a statistical experiment, survey or study for a problem; collect data for the problem; and interpret the data with appropriate graphical displays, descriptive statistics, concepts of variability, causation, correlation and standard deviation.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Data Analysis

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-2. Describe the role of randomization in a well-designed study, especially as compared to a convenience sample, and the generalization of results from each.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Data Analysis
Grade 11-12 Benchmarks:
Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-3. Describe how a linear transformation of univariate data affects range, mean, mode and median.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Data Analysis

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-4. Create a scatterplot of bivariate data, identify trends, and find a function to model the data.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Data Analysis

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-5. Use technology to find the Least Squares Regression Line, the regression coefficient, and the correlation coefficient for bivariate data with a linear trend, and interpret each of these statistics in the context of the problem situation.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Data Analysis

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-6. Use technology to compute the standard deviation for a set of data, and interpret standard deviation in relation to the context or problem situation.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Data Analysis

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-7. Describe the standard normal curve and its general properties, and answer questions dealing with data assumed to be normal.			

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Adams County/Ohio Valley
Course of Study

Content Standard: Data Analysis

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-8. Analyze and interpret univariate and bivariate data to identify patterns, note trends, draw conclusions, and make predictions.			

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Course of Study

Content Standard: Data Analysis

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-9. Evaluate validity of results in a study based on characteristics of the study design, including sampling method, summary statistics and data analysis techniques.			

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Adams County/Ohio Valley
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Content Standard: Data Analysis

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-10. Understand and use the concept of random variable, and compute and interpret the expected value for a random variable in simple cases.			

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Adams County/Ohio Valley
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Content Standard: Data Analysis

Grade 11-12 Benchmarks:

Content Organizer:

Grade level Indicator	Resources	Instructional Activities/Strategies	Assessment
11-11. Examine statements and decisions involving risk; e.g., insurance rates and medical decisions.			