GENERAL INFORMATION

Course Number: 1206330

Course Path: Section: Grades PreK to 12 Education Courses » Grade Group: Grades 9 to 12 and Adult Education Courses » Subject: Mathematics » SubSubject: Geometry »

Course Title: Analytic Geometry
Course Section: Grades PreK to 12 Education Courses

Abbreviated Title: ANLY GEO
Number of Credits: Half credit (.5)

Course Length: Semester
Course Type: Core
Course Level: 3
Course Status: State Board Approved

RELATED BENCHMARKS (18):

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Descriptor</th>
<th>Cognitive Complexity</th>
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</thead>
<tbody>
<tr>
<td>LA.1112.1.6.1</td>
<td>The student will use new vocabulary that is introduced and taught directly;</td>
<td>Moderate</td>
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<tr>
<td>LA.1112.1.7.1</td>
<td>The student will use background knowledge of subject and related content areas, prereading strategies (e.g., previewing, discussing, generating questions), text features, and text structure to make and confirm complex predictions of content, purpose, and organization of a reading selection;</td>
<td>Moderate</td>
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<tr>
<td>LA.1112.1.7.4</td>
<td>The student will identify cause-and-effect relationships in text;</td>
<td>Moderate</td>
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<tr>
<td>LA.1112.3.1.2</td>
<td>The student will prewrite by making a plan for writing that addresses purpose, audience, a controlling idea, logical sequence, and time frame for completion; and</td>
<td>Moderate</td>
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<tr>
<td>LA.1112.3.1.3</td>
<td>The student will prewrite by using organizational strategies and tools (e.g., technology, spreadsheet, outline, chart, table, graph, Venn Diagram, web, story map, plot pyramid) to develop a personal organizational style.</td>
<td>Moderate</td>
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<tr>
<td>LA.1112.3.2.2</td>
<td>The student will draft writing by establishing a logical organizational pattern with supporting details that are substantial, specific, and relevant; and</td>
<td>Moderate</td>
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<tr>
<td>MA.912.A.4.5</td>
<td>Graph polynomial functions with and without technology and describe end behavior.</td>
<td>Moderate</td>
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</table>
MA.912.A.4.8 Describe the relationships among the solutions of an equation, the zeros of a function, the x-intercepts of a graph, and the factors of a polynomial expression with and without technology.

MA.912.A.4.9 Use graphing technology to find approximate solutions for polynomial equations.

MA.912.A.5.6 Identify removable and non-removable discontinuities, and vertical, horizontal, and oblique asymptotes of a graph of a rational function, find the zeros, and graph the function.

MA.912.A.8.7 Solve applications of exponential growth and decay.

MA.912.A.9.1 Write the equations of conic sections in standard form and general form, in order to identify the conic section and to find its geometric properties (foci, asymptotes, eccentricity, etc.).

MA.912.A.9.2 Graph conic sections with and without using graphing technology.

MA.912.A.9.3 Solve real-world problems involving conic sections.

MA.912.D.6.4 Use methods of direct and indirect proof and determine whether a short proof is logically valid.

MA.912.D.10.1 Sketch the graph of a curve in the plane represented parametrically, indicating the direction of motion.

MA.912.D.10.2 Convert from a parametric representation of a plane curve to a rectangular equation and vice-versa.

MA.912.D.10.3 Use parametric equations to model applications of motion in the plane.

**RELATED GLOSSARY TERM DEFINITIONS (24)**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tr>
<td>Approximate</td>
<td>A number or measurement that is close to or near its exact value.</td>
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<tr>
<td>Asymptote</td>
<td>A straight line associated with a curve such that as a point moves along an infinite branch of the curve the distance from the point to the line approaches zero and the slope of the curve at the point approaches the slope of the line.</td>
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<tr>
<td>Axes</td>
<td>The horizontal and vertical number lines used in a coordinate plane system.</td>
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<tr>
<td>Constant</td>
<td>Any value that does not change.</td>
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<tr>
<td>End behavior</td>
<td>A function's value for extreme values of its independent variable.</td>
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<tr>
<td>Equation</td>
<td>A mathematical sentence stating that the two expressions have the same value. Also read the definition of equality.</td>
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<tr>
<td>Expression</td>
<td>A mathematical phrase that contains variables, functions, numbers, and/or operations. An expression does not contain equal or inequality signs.</td>
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Factor  A number or expression that is multiplied by one or more other numbers or expressions to yield a product.

Independent variable  Dependent and independent variables refer to values that change in relationship to each other. The dependent variables are those that are observed to change in response to the independent variables. The independent variables are those that are deliberately manipulated to invoke a change in the dependent variables.

Length  A one-dimensional measure that is the measurable property of line segments.

Model  To represent a mathematical situation with manipulatives (objects), pictures, numbers or symbols.

Oblique  Tilted at an angle; neither vertical nor horizontal.

Plane  An infinite two-dimensional geometric surface defined by three non-linear points or two distance parallel or intersecting lines.

Point  A specific location in space that has no discernable length or width.

Proof  A logical argument that demonstrates the truth of a given statement. In a formal proof, each step can be justified with a reason; such as a given, a definition, an axiom, or a previously proven property or theorem. A mathematical statement that has been proven is called a theorem.

Real-world problem  A problem that is an application of a mathematical concept in a real-life situation.

Representations  Physical objects, drawings, charts, words, graphs, and symbols that help students communicate their thinking.

Variable  Any symbol, usually a letter, which could represent a number. A variable might vary as in $f(x) = 2x + 1$, or a variable might be fixed as in $2x + 1 = 5$.

Conic section  The family of curves including circles, ellipses, parabolas, and hyperbolas. All of these geometric figures may be obtained by the intersection of a double cone with a plane. All conic sections have equations of the form $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$.

Eccentricity  A number that indicates how drawn out or attenuated a conic section is. Eccentricity is represented by the letter $e$ (no relation to $e = 2.718...$). The eccentricity can be interpreted as the fraction of the distance along the half of the major axis at which the focus lies. Here, $c$ = the distance from the center to a focus, $a$ = the distance of the half of the major axis.

Ellipse  For two given points, the foci, an ellipse is the locus of points such that the sum of the distance to each focus is constant. An ellipse has two axis of symmetry. The longer is called major axis
and the shorter is called minor axis. The equation for an
horizontal ellipse with center \((h, k)\) is \(\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1\), where \(a\) and \(b\) are
real numbers and \(a\) is half of the major axis and \(b\) is half of the
minor axis. Note that if \(a = b\), it is a circle.

**Function**
A relation in which each value of \(x\) is paired with a unique value of \(y\). More formally, a function from \(A\) to \(B\) is a relation \(f\) such
that every \(a \in A\) is uniquely associated with an object
\(F(a) \in B\).

**Polynomial**
The sum or difference of terms which have variables raised to
positive integer powers and which have coefficients that may be
real or complex. Examples: \(5x^3 - 2x^2 + x\), \(13\), \(x^2y^3 + xy\), and
\((1 + i)a^2 + ib^2\). Standard form for a polynomial in one variable:
\(a_nx^n + a_{n-1}x^{n-1} + ... + a_2x^2 + a_1x + a_0\)
Even though the prefix poly- means many, the word polynomial
refers to polynomials with 1 term (monomials), 2 terms
(binomials), 3 terms, (trinomials), etc.

**Velocity**
The rate of change of the position of an object with respect to
time.