Analysis of Functions
Course Number 1201310
**KEY TERMINOLOGY OF THE CURRICULUM MAP**

**Unit/Organizing Principle:** the overarching organizational structure used to group content and concepts within the curriculum map

**Pacing:** the recommended time period within the year for instruction related to the essential questions to occur

**Essential Questions:** the overarching question(s) that will serve to guide instruction and push students to higher levels of thinking; essential questions should guide students to the heart of the content

**Measurement Topics:** a list of the major underlying concepts covered in the development of the essential questions

- Right Triangle Trigonometry
- Trigonometric Functions & The Cartesian Plane
- Analytic Trigonometry
- Equations
- Inequalities
- Functions and their Graphs
- Polynomials Functions
- Rational Functions
- Exponential & Logarithmic Functions
- Systems of Equations & Inequalities

**Learning Targets/Skills:** the content knowledge, processes and enabling skills that will ensure successful mastery of the essential questions

**Benchmarks:** the Next Generation Sunshine State Standards

**Academic Language:** the content vocabulary and other key terms and phrases with which students should be familiar and that support mastery of the learning targets, skills and essential questions

**Activities and Resources:** a listing of available, high quality and appropriate materials, strategies, lessons, textbooks, videos and other media sources that are aligned with the learning targets, skills and essential questions; developed to save teachers time when planning for instruction

**Assessment:** a list of required formative assessments as well as suggested assessments that are available to use as formative or summative assessments
# UNIT/ORGANIZING PRINCIPLE: Trigonometric Functions

**PACING:** 48 days

## ESSENTIAL QUESTIONS:
- Can students use the unit circle to evaluate trigonometric expression of any angle?
- Can students convert between degree and radian measures?
- Do students understand the connection between right triangle trigonometry and the unit circle?
- Can students solve problems involving right triangle trigonometry?
- Can students define and graph trigonometric functions with and without technology?
- Can students use trigonometric functions to model and solve real-life problems?
- Can students use the trigonometric identities to simplify trigonometric expressions, verify trigonometric identities and solve trigonometric equations?

<table>
<thead>
<tr>
<th>MEASUREMENT TOPICS</th>
<th>LEARNING TARGETS/SKILLS</th>
<th>BENCHMARKS</th>
<th>ACADEMIC LANGUAGE</th>
</tr>
</thead>
</table>
| **Right Triangle Trigonometry** | - Define and use the trigonometric ratios (sine, cosine, tangent, cotangent, secant, cosecant) in terms of angles of right triangles.  
- Find approximate values of trigonometric and inverse trigonometric functions using appropriate technology. | MA.912.T.2.1 | Line, Line Segment, Ray  
Initial Side, Terminal Side  
Right, Acute, Obtuse  
Complementary, Supplementary  
Equilateral, Isosceles  
Hypotenuse, Quadrantal  
Coterminal  
Reference Angle, Central Angle  
Radian  
Arc Length  
Circular Sector  
Linear and Angular Speed  
Trigonometric Functions  
Unit Circle  
Periodic Function  
Sinusoidal Amplitude  
Harmonic Motion  
Asymptote |
| **Trigonometric Functions and their Graphs** | - Convert between degree and radian measures.  
- Solve real-world problems involving applications of trigonometric functions using graphing technology when appropriate.  
- Define and graph trigonometric functions using domain, range, intercepts, period, amplitude, phase shift, vertical shift, and asymptotes with and without the use of graphing technology.  
- Define and graph inverse trigonometric relations and functions. | MA.912.T.1.1  
MA.912.T.1.8  
MA.912.T.1.6  
MA.912.T.1.7 | |
| **Analytic Trigonometry** | - Define and use the trigonometric ratios (sine, cosine, tangent, cotangent, secant, cosecant) in terms of angles of right triangles.  
Use identities to simplify trigonometric expressions.  
Verify trigonometric identities. | MA.912.T.2.1 | |

Mathematics Department  
Volusia County Schools  
Revision 8-01-12
**UNIT/ORGANIZING PRINCIPLE:** Equations and Inequalities

**PACING:** 35 days

**ESSENTIAL QUESTIONS:** Can students use equations and inequalities, and their graphs to model real-world situations? (equations include, but are not limited to, linear, rational, quadratic, cubic, radical, absolute value)

<table>
<thead>
<tr>
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</tr>
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<tbody>
<tr>
<td>Equations &amp; Inequalities</td>
<td>The student will:</td>
<td>MA.912.A.2.6</td>
<td>Solution Root Interest Principal Perfect Square Completing the Square Quadratic Radical Equation Extraneous Compound Inequality Interval Notation Zeros Test Intervals Absolute Value</td>
</tr>
<tr>
<td></td>
<td>• Identify and graph common functions (including but not limited to linear, rational, quadratic, cubic, radical, absolute value).</td>
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</tr>
<tr>
<td></td>
<td>• Create a graph to represent a real-world situation.</td>
<td>MA.912.A.2.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Interpret a graph representing a real world situation.</td>
<td>MA.912.A.2.2</td>
<td></td>
</tr>
</tbody>
</table>

Make sense of problems and persevere in solving them.

- MACC.K12.MP.1
- Reason abstractly and quantitatively.

- MACC.K12.MP.2
- Construct viable arguments and critique the reasoning of others.

- MACC.K12.MP.3
- Model with mathematics.

- MACC.K12.MP.4
- Use appropriate tools strategically.

- MACC.K12.MP.5
- Attend to precision.

- MACC.K12.MP.6
- Look for and make use of structure.

- MACC.K12.MP.7
- Look for and express regularity in repeated reasoning.

- MACC.K12.MP.8
<table>
<thead>
<tr>
<th>UNIT/ORGANIZING PRINCIPLE: Functions and their Graphs</th>
<th>PACING: 19 days</th>
</tr>
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<tbody>
<tr>
<td>ESSENTIAL QUESTIONS: Can students identify the domain and range from a relation, equation, or graph? Can students manipulate functions through transformations, operations, and compositions?</td>
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<th>ACADEMIC LANGUAGE</th>
</tr>
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<tbody>
<tr>
<td>Functions and their Graphs</td>
<td>The student will:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Create a graph to represent a real-world situation.</td>
<td>MA.912.A.2.1</td>
<td>Relation Domain &amp; Range Dependent &amp; Independent Variables Vertical Lines Test Constant Function Identity Function Square Function Even &amp; Odd Functions Secant Continuous Discontinuous Transformations Stretching &amp; Compressing Composition One-to-one Function</td>
<td></td>
</tr>
<tr>
<td>• Interpret a graph representing a real-world situation.</td>
<td>MA.912.A.2.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Determine the domain and range of a function.</td>
<td>MA.912.A.2.4</td>
<td></td>
<td></td>
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<tr>
<td>• Identify and graph common functions (including but not limited to linear, rational, quadratic, cubic, radical, absolute value).</td>
<td>MA.912.A.2.6</td>
<td></td>
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<tr>
<td>• Describe and graph transformations of functions.</td>
<td>MA.912.A.2.10</td>
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<tr>
<td>• Solve problems involving functions and their inverses.</td>
<td>MA.912.A.2.11</td>
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<tr>
<td>• Solve real-world problems involving relations and functions.</td>
<td>MA.912.A.2.13</td>
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<tr>
<th>UNIT/ORGANIZING PRINCIPLE: Polynomial and Rational Functions</th>
<th>PACING: 31 days</th>
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</thead>
</table>
| ESSENTIAL QUESTIONS: | Can students find the roots of a polynomial equation using different methods?  
Can students graph polynomial equations?  
Can students perform operations on complex numbers? |
| MEASUREMENT TOPICS | LEARNING TARGETS/SKILLS | BENCHMARKS | ACADEMIC LANGUAGE |
| Polynomial Functions | The student will:  
- Graph polynomial functions with and without technology and describe end behavior. | MA.912.A.4.5 | Parabola  
- Vertex  
- Axis of Symmetry  
- Degree  
- Continuous  
- Smooth  
- Dividend  
- Quotient  
- Remainder  
- Remainder Theorem  
- Factor Theorem  
- Descartes’ Rule of Signs  
- The Fundamental Theorem of Algebra |
|  | - Use theorems of polynomials end behavior to find zeros of a polynomial function. | MA.912.A.4.6 |  |
|  | - Write a polynomial equation for a given set of real and/or complex roots. | MA.912.A.4.7 |  |
|  | - 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.4.8 |  |
|  | - Use graphing technology to find approximate solutions for polynomial equations. | MA.912.A.4.9 |  |
|  | - Use polynomial equations to solve real-world problems. | MA.912.A.4.10 |  |

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MACC.K12.MP.1  
MACC.K12.MP.2  
MACC.K12.MP.3  
MACC.K12.MP.4  
MACC.K12.MP.5  
MACC.K12.MP.6  
MACC.K12.MP.7  
MACC.K12.MP.8
## UNIT/ORGANIZING PRINCIPLE: Polynomial and Rational Functions (continued)

### ESSENTIAL QUESTIONS:

<table>
<thead>
<tr>
<th>MEASUREMENT TOPICS</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Rational Functions</strong></td>
<td>• Use theorems of polynomials end behavior to find zeros of a polynomial function.</td>
<td>MA.912.A.4.6</td>
<td>Rational Function Asymptotes Continuous Discontinuous</td>
</tr>
<tr>
<td></td>
<td>• Write a polynomial equation for a given set of real and/or complex roots.</td>
<td>MA.912.A.4.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 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.</td>
<td>MA.912.A.4.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 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.</td>
<td>MA.912.A.5.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Solve real-world problems involving rational equations (mixture, distance, work, interest, and ratio).</td>
<td>MA.912.A.5.7</td>
<td></td>
</tr>
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### UNIT/ORGANIZING PRINCIPLE: Exponential and Logarithmic Functions

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<tr>
<th>ESSENTIAL QUESTIONS:</th>
<th>Can students graph, manipulate, and determine the domain and range of an exponential and logarithmic function? Can students solve exponential and logarithmic equations using the properties of logarithms?</th>
</tr>
</thead>
</table>

### MEASUREMENT TOPICS

<table>
<thead>
<tr>
<th>THE STUDENT WILL:</th>
<th>LEARNING TARGETS/SKILLS</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Exponential &amp; Logarithmic Functions</td>
<td>- Graph exponential and logarithmic functions.</td>
<td>MA.912.A.8.3</td>
<td>Transcendental Natural Base Exponential Function Logarithmic Common Logarithmic Natural Logarithmic Change-of-base Extraneous Solution Exponential Growth Exponential Decay</td>
</tr>
<tr>
<td></td>
<td>- Solve applications of exponential growth and decay.</td>
<td>MA.912.A.8.7</td>
<td></td>
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### UNIT/ORGANIZING PRINCIPLE: Systems of Linear Equations and Inequalities

**PACING:** 10 days

### ESSENTIAL QUESTIONS:
Can students solve real-world problems involving systems of equations and inequalities using different methods?

<table>
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<tbody>
<tr>
<td>Systems of Linear Equations and Inequalities</td>
<td>Create a graph to represent a real-world situation.</td>
<td>MA.912.A.2.1</td>
<td>System of Linear Equations</td>
</tr>
<tr>
<td></td>
<td>Interpret a graph representing a real world situation.</td>
<td>MA.912.A.2.2</td>
<td>Independent Dependent Inconsistent Solution Set</td>
</tr>
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**ACADEMIC LANGUAGE**

- MACC.K12.MP.1
- MACC.K12.MP.2
- MACC.K12.MP.3
- MACC.K12.MP.4
- MACC.K12.MP.5
- MACC.K12.MP.6
- MACC.K12.MP.7
- MACC.K12.MP.8