W E S T   S H O R E   S C H O O L   D I S T R I C T
# AP Calculus BC Learning Module 1

| Title of Module | Mathematical Review | Grade Level | 11-12 |
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| Curriculum Area | Mathematics | Time Frame | 5 days |

## Desired Results

### Best Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure (Deductive Reasoning)
8. Look for and express regularity in repeated reasoning.

### Transfer Goals

Students will be able to independently use their learning to...

- Connect old problem solving techniques to curriculum.
- Connect material to real world applications.
- Create viable mathematical arguments and use them to critique the arguments of fellow classmates.

### Key Learnings/Big Ideas

Students will review fundamental terms and concepts from the courses prior to calculus.

### Content and Reading and Writing Standards

Content standards
**CC.2.2.HS.D.3**
Extend the knowledge of arithmetic operations and apply to polynomials.
**CC.2.2.HS.D.10**
Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.
**CC.2.2.HS.C.1**
Use the concept and notation of functions to interpret and apply them in terms of their context.
**CC.2.2.HS.C.2**
Graph and analyze functions and use their properties to make connections between the different representations.
**CC.2.2.HS.C.4**
Interpret the effects transformations have on functions and find the inverses of functions.
**CC.2.2.HS.C.5**
Construct and compare linear, quadratic, and exponential models to solve problems.
**CC.2.2.HS.C.7**
Apply radian measure of an angle and the unit circle to analyze the trigonometric functions.
**CC.2.2.HS.C.9**

| Prove the Pythagorean identity and use it to calculate trigonometric ratios. **CC.2.4.HS.B.3** Analyze linear models to make interpretations based on the data. |
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| **Essential Questions** | **Vocabulary (Best Practices)** Utilize concepts & competencies to add to vocabulary |
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| **Unit EQ:** What ways can the relationship between variables be described? <br><br> **LEQ:** <br>1. What is represented by the incremental change of two variables in a relation? <br>2. How can you tell if a relation is a function? <br>3. What are the graphical and numerical differences between growth and decay functions? <br>4. How do you convert a parametric equation into a Cartesian equation? <br>5. How do you determine a function's inverse? <br>6. What is the difference between algebraic and trigonometric functions | Line <br>Increments <br>Slope <br>Parallel <br>Perpendicular <br>Range <br>Domain <br>Open/Closed Function <br>Even/Odd Function <br>Composite Functions <br>Exponential Function <br>Logarithmic Function <br>Natural Logarithm <br>Parametric Equation <br>Relation <br>Parameter <br>One-to-one function <br>Inverse <br>Identity <br>Trigonometric Function <br>Graph <br>Grapher Utility <br>Boundary <br>Growth vs. Decay Function <br>The number $e$ <br>Continuous Compounding <br>Radian vs. Degree <br>Periodicity |

| **Concepts** Students will know… | **Skills/Competencies (I Can…) Based on LEQs** Students will be able to… |
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| 1. Use increments to calculate slopes. <br>2. Write equations/sketch graphs given specific information. <br>3. Identify relationships between parallel and perpendicular lines based on slopes. <br>4. Identify domain/range of a function. <br>5. Recognize even and odd functions. <br>6. Write and evaluate compositions of two functions. <br><br>7. Determine the domain, range, and graph of an exponential function. <br>8. Solve problems involving exponential growth and decay. <br>9. Graph curves that are described using parametric equations <br>10. Find parameterizations of circles, ellipses, and line | 1. I can use increments to calculate slopes. <br>2. I can write equations and/or sketch graphs given specific information. <br>3. I can identify relationships between parallel and perpendicular lines based on slopes. <br>4. I can identify the domain and range of a function <br>5. I can recognize even and odd functions. <br>6. I can write and evaluate compositions of two functions. <br>7. I can determine the domain, range, and graph of an exponential function. <br>8. I can solve problems involving exponential growth and decay. <br>9. I can graph curves that are described using parametric equations. <br>10. I can find parameterizations of circles, ellipses, |

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| segments<br>11. Identify a one-to-one function<br>12. Determine algebraic and graphical representations of a function and its inverse<br>13. Use parametric equations to graph inverse functions<br><br>14. Apply the properties of logarithms<br>15. Convert between radians and degrees<br>16. Find values of trigonometric functions<br>17. Use inverse trig functions to solve problems | and line segments.<br>11. I can identify a one-to-one function.<br>12. I can determine algebraic and graphical representations of a function and find its inverse.<br>13. I can use parametric equations to graph inverse functions.<br>14. I can apply the properties of logarithms.<br>15. I can convert between radians and degrees.<br>16. I can find values of trigonometric functions.<br>17. I can use inverse trig functions to solve problems. |

Assessment Evidence

| **Formative Assessment** |
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| Questioning, Think Pair Share, Graphic Organizers, Visual Representations. |

| **Summative Assessment** |
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| Common Assessments |

| **Best Instructional Practices** |
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| Activating Strategies<br>Extended Thinking<br>Summarizing<br>Vocabulary in Context<br>Advance Organizers<br>Non-verbal Representation<br>Integration of Webb's Depth<br>Integration of 21st Century Skills<br>Reading and writing across disciplines<br>Rigor and Relevance |

Resources

| **Student** | **Teacher** |
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| Finney, Demana, Waits, Kennedy. Calculus (4th edition). Prentice Hall. | Finney, Demana, Waits, Kennedy. Calculus (4th edition). Prentice Hall.<br><br>Online materials provided by textbook publisher. |