

**School District of Loyal**  
**DC PreCalculus - Trigonometry**  
**Grade: 11-12**  
**Student Learning Targets**



| <b>Class: DC Precalculus - Trigonometry</b>           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <b>Students who demonstrate understanding can:</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>NTC Competency</b>                                 | <b>Student Learning Targets:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Define the trigonometric functions</b>             | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>• Solve problems involving special right triangles.</li> <li>• Use trigonometric functions defined by using a point on the terminal side of an angle.</li> <li>• Use the trigonometric functions defined on the basis of a right triangle.</li> <li>• Prove simple trigonometric identities.</li> <li>• Use degree-measures of angles including decimals as well as minutes and seconds.</li> </ul>                                                                                                                               |
| <b>Use radian measures of angles</b>                  | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>• Use the concept of a reference angle.</li> <li>• Relate radian measures to real numbers.</li> <li>• Convert between radian measures and degree measures of angles.</li> <li>• Find exact and approximate values of angles described in radians.</li> <li>• Use trigonometric functions defined for the unit circle.</li> <li>• Use the concept arc length and area of a sector.</li> <li>• Use the concepts of linear velocity and angular velocity.</li> <li>• Convert between linear velocity and angular velocity</li> </ul> |
| <b>Define the inverse of a trigonometric function</b> | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>• Relate the inverse of trigonometric functions to the functions themselves.</li> <li>• Identify domains and ranges of inverses of trigonometric functions.</li> <li>• Sketch graphs of the inverse of trigonometric functions.</li> <li>• Evaluate the inverse of trigonometric function for given values of the domain.</li> <li>• Find inverse trigonometric function values, with and without a calculator.</li> </ul>                                                                                                        |

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| <p><b>Interpret graphs of trigonometric functions</b></p>                   | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Use basic graphs of trigonometric functions.</li> <li>● Identify domains and ranges of trigonometric functions using correct notation.</li> <li>● Identify undefined and restricted values for each basic trigonometric function.</li> <li>● Use concept of amplitude, period, and phase shift related to the graphs of trigonometric functions</li> </ul>                                                                                                                                |
| <p><b>Graph equations of basic and modified trigonometric functions</b></p> | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Sketch graphs of one period of basic trigonometric functions clearly and accurately.</li> <li>● Graph equations of trigonometric functions with variations in amplitude and/or period and with/without phase shifts.</li> <li>● Find equations from graphs of trigonometric functions.</li> </ul>                                                                                                                                                                                         |
| <p><b>Apply new trigonometric identities</b></p>                            | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Use sum and difference formulas to evaluate trigonometric function of angles.</li> <li>● Use sum and difference formulas to prove other identities.</li> <li>● Use double-angle and half-angle formulas to evaluate trigonometric functions of angles</li> <li>● Use double-angle and half-angle formulas to prove other identities.</li> <li>● Use sum-to-product and product-to-sum formulas to prove other identities.</li> </ul>                                                      |
| <p><b>Solve trigonometric equations</b></p>                                 | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Use algebraic techniques and trigonometric identities to solve equations involving trigonometric expressions of a single angle</li> <li>● Use algebraic techniques and trigonometric identities to solve equations involving trigonometric functions of multiple angles</li> </ul>                                                                                                                                                                                                        |
| <p><b>Perform vector operations</b></p>                                     | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Define a vector algebraically.</li> <li>● Define unit vectors <math>i</math> and <math>j</math>.</li> <li>● Identify the horizontal and vertical components of a vector.</li> <li>● Find the magnitude of a vector.</li> <li>● Add and subtract algebraic vectors.</li> <li>● Perform scalar multiplication of vectors.</li> <li>● Obtain dot product of vectors.</li> <li>● Determine if two vectors are perpendicular or not.</li> <li>● Find the angle between two vectors.</li> </ul> |

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| <p><b>Solve oblique triangles</b></p>                                                 | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Use the Law of Sines, the Law of Cosines, and properties of triangles to solve oblique triangles</li> <li>● Calculate areas of oblique triangles using formulas that involve trigonometric functions</li> <li>● Calculate areas of oblique triangles for which the lengths of all sides are known.</li> <li>● Solve application problems by solving oblique triangles.</li> </ul>                                                                                                |
| <p><b>Use trigonometry in vector applications</b></p>                                 | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Find the resultant of the combination of vectors.</li> <li>● Apply trigonometry to vector applications such as physics or engineering.</li> </ul>                                                                                                                                                                                                                                                                                                                                |
| <p><b>Perform operations with parametric equations</b></p>                            | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Eliminate the parameter from a pair of parametric equations.</li> <li>● Sketch the graphs which result from eliminating the parameter from a pair of parametric equations</li> </ul>                                                                                                                                                                                                                                                                                             |
| <p><b>Relate the polar coordinate system to the rectangular coordinate system</b></p> | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Represent a point on the plane in both rectangular and polar coordinates.</li> <li>● Convert an equation in polar coordinates to rectangular coordinates and vice versa.</li> </ul>                                                                                                                                                                                                                                                                                              |
| <p><b>Perform operations with complex numbers in trigonometric form</b></p>           | <p><b>Students will be able to:</b></p> <ul style="list-style-type: none"> <li>● Transform complex numbers from rectangular form to trigonometric form and vice versa</li> <li>● Graph complex numbers in trigonometric form and rectangular form.</li> <li>● Find products and quotients of complex numbers written in trigonometric form.</li> <li>● Find powers and roots of complex numbers written in trigonometric form.</li> <li>● Summarize DeMoivre's theorem.</li> <li>● Use DeMoivre's theorem to find powers and roots of complex numbers.</li> </ul> |