

# FUTURES HIGH SCHOOL

## CURRICULUM MAP FOR PRECALCULUS

*If you don't know the destination, then any road will do."*

| MONTH            | CONTENT   | POWER STANDARDS  | ASSESSMENTS  |
|------------------|---|--|--|
| <b>September</b> | Unit #1 – Radians, Degrees, the Unit Circle, and Basic Trig Ratios<br>Unit #2 – Inverse Trig Ratios and Basic Trig Identities | <p style="text-align: center;"><b>CA Trigonometry Standards</b></p> <p><b>1.0:</b> Students understand the notion of angle and how to measure it, in both degrees and radians. They can convert between degrees and radians.</p> <p><b>2.0:</b> Students know the definition of sine and cosine as <math>y</math>- and <math>x</math>-coordinates of points on the unit circle and are familiar with the graphs of the sine and cosine functions.</p> <p><b>3.0:</b> Students know the identity <math>\cos^2(x) + \sin^2(x) = 1</math>.</p> <p><b>5.0:</b> Students know the definitions of the tangent and cotangent functions and can graph them.</p> <p><b>6.0:</b> Students know the definitions of the secant and cosecant functions and can graph them.</p> <p><b>8.0:</b> Students know the definitions of the inverse trigonometric functions and can graph the functions.</p> | Unit #1 and Unit #2 Tests<br>Formative Assessments |
| <b>October</b>   | Unit #3 – Measuring Trig and Inverse Trig Ratios<br>Unit #4 – Graphs of Trig Functions  | <p style="text-align: center;"><b>CA Trigonometry Standards</b></p> <p><b>4.0:</b> Students graph functions of the form <math>f(t) = A \sin(Bt + C)</math> or <math>f(t) = A \cos(Bt + C)</math> and interpret <math>A</math>, <math>B</math>, and <math>C</math> in terms of amplitude, frequency, period, and phase shift.</p> <p><b>5.0:</b> Students know the definitions of the tangent and cotangent functions and can graph them.</p> <p><b>6.0:</b> Students know the definitions of the secant and cosecant functions and can graph them.</p> <p><b>8.0:</b> Students know the definitions of the inverse trigonometric functions and can graph the functions.</p> <p><b>9.0:</b> Students compute, by hand, the values of the trigonometric functions and the inverse trigonometric functions at various standard points.</p>  | Unit #3 and Unit #4 Tests<br>Formative Assessments |

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| <b>November</b> | Unit #5 – Advanced Trig Identities  | <p style="text-align: center;"><b><u>CA Trigonometry Standards</u></b></p> <p><b>10.0:</b> Students demonstrate an understanding of the addition formulas for sines and cosines and their proofs and can use those formulas to prove and/or simplify other trigonometric identities.</p> <p><b>11.0:</b> Students demonstrate an understanding of half-angle and double-angle formulas for sines and cosines and can use those formulas to prove and/or simplify other trigonometric identities.</p>   | Unit #5 Test<br>Formative Assessments                            |
| <b>December</b> | Unit #6 – Laws of Sines and Cosines | <p style="text-align: center;"><b><u>CA Trigonometry Standards</u></b></p> <p><b>12.0:</b> Students use trigonometry to determine unknown sides or angles in right triangles.</p> <p><b>13.0:</b> Students know the law of sines and the law of cosines and apply those laws to solve problems.</p> <p><b>19.0:</b> Students are adept at using trigonometry in a variety of applications and word problems.</p> <p style="text-align: center;"><b><u>CA Math Analysis Standards</u></b></p> <p><b>3.0:</b> Students can give proofs of various formulas by using the technique of mathematical induction.</p> | Unit #6 Test<br>Formative Assessments<br>Semester One Final Exam |

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| <b>January</b>  | Unit #7 – Polar Coordinates   | <p style="text-align: center;"><b><u>CA Trigonometry Standards</u></b></p> <p><b>15.0:</b> Students are familiar with polar coordinates. In particular, they can determine polar coordinates of a point given in rectangular coordinates and vice versa.</p> <p><b>16.0:</b> Students represent equations given in rectangular coordinates in terms of polar coordinates.</p> <p><b>17.0:</b> Students are familiar with complex numbers. They can represent a complex number in polar form and know how to multiply complex numbers in their polar form.</p> <p><b>18.0:</b> Students know DeMoivre's theorem and can give <math>n</math>th roots of a complex number given in polar form.</p> <p style="text-align: center;"><b><u>CA Math Analysis Standards</u></b></p> <p><b>1.0:</b> Students are familiar with, and can apply, polar coordinates and vectors in the plane. In particular, they can translate between polar and rectangular coordinates and can interpret polar coordinates and vectors graphically.</p> <p><b>2.0:</b> Students are adept at the arithmetic of complex numbers. They can use the trigonometric form of complex numbers and understand that a function of a complex variable can be viewed as a function of two real variables. They know the proof of DeMoivre's theorem.</p> | Unit #7 Test<br>Formative Assessments              |
| <b>February</b> | Unit #8 – Fundamental Theorem of Algebra<br>Unit #9 – Characteristics of Rational Functions | <p style="text-align: center;"><b><u>CA Math Analysis Standards</u></b></p> <p><b>4.0:</b> Students know the statement of, and can apply, the fundamental theorem of algebra.</p> <p><b>6.0:</b> Students find the roots and poles of a rational function and can graph the function and locate its asymptotes.</p>  | Unit #8 and Unit #9 Tests<br>Formative Assessments |

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| <b>March</b> | Unit #10 – Limits                                   | <p style="text-align: center;"><b><u>CA Math Analysis Standard</u></b></p> <p><b>8.0:</b> Students are familiar with the notion of the limit of a sequence and the limit of a function as the independent variable approaches a number or infinity. They determine whether certain sequences converge or diverge.</p> | Unit #10 Test<br>Formative Assessments                       |
| <b>April</b> | Unit #11 – Limits of Summations (Basic Integration) | <p style="text-align: center;"><b><u>CA Math Analysis Standard</u></b></p> <p><b>8.0:</b> Students are familiar with the notion of the limit of a sequence and the limit of a function as the independent variable approaches a number or infinity. They determine whether certain sequences converge or diverge.</p> | Unit #11 Test<br>Formative Assessments                       |
| <b>May</b>   | Unit #12 – The Tangent Line and Derivatives         | <p style="text-align: center;"><b><u>CA Trigonometry Standard</u></b></p> <p><b>7.0:</b> Students know that the tangent of the angle that a line makes with the <math>x</math>-axis is equal to the slope of the line.</p>  | Unit #12 Test<br>Formative Assessments<br>Semester Two Final |