

CURRICULUM MAP

SUBJECT: PreCalculus GRADE: 11/12

| DAYS | ESSENTIAL QUESTION | CONTENT (CHAPTER/UNIT DESCRIPTION/ACTIVITIES * indicates honors sections only | SKILLS (STANDARDS/LEARNING OUTCOMES) | MATERIALS/ RESOURCES (PRECALCULUS 4 TH edition, Larson/Hostetler) | ASSESSMENT (Objective/Subjective) *indicates honors sections only |
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| 10 | What <i>patterns</i> are created by exponents, radicals, polynomials and rational expressions? | -Simplify exponents, radicals and polynomials into equivalent forms -Combine expressions to create new patterns -Factor to create equivalent expressions of the patterns | All.N.2 Simplify numerical expressions with powers and roots, including fractional and negative exponents. | Text P.2 | Quiz on exponents and radicals Quiz on factoring |
| 7 | How are patterns used to solve problems? | -Solve equations and inequalities with linear, quadratic, absolute value and radical patterns expressed as an equation. | All.P.8 Solve a variety of equations and inequalities using algebraic, graphical, and numerical methods, including the quadratic formula. | P.3,P.4, P.5, P.6 | Quiz on solving equations. Quiz on solving inequalities. Test on exponents, radicals, polynomial, equations, expressions and inequalities and factoring. |
| 8 | When can a pattern be called a function? | -Identify and create functions with words, tables, graphs and equations. -Use function notation to | All.P.6 Given algebraic, numeric and/or graphical representations, recognize functions as polynomial, | 1.1,1.2,1.3,1.4 | Quiz on functions |

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| | | describe a pattern | rational, logarithmic, or exponential. | | |
| 3 | How is math used to model the patterns in the world around us? | -Create and apply models for direct, indirect and joint variation | | 1.7 | Quiz on modeling with direct, indirect and joint variation |
| 2 | What functions create parabolic patterns? | -Identify, manipulate, describe and apply parabolic patterns created by quadratic functions | All.P.8 Solve a variety of equations and inequalities using algebraic, graphical and numerical methods, including the quadratic formula. | 2.1 | Quiz on patterns and zeroes of polynomials including quadratics. |
| 4.5 | What controls the pattern created by a polynomial? | -Use leading coefficients, degree and zeros of a polynomial to analyze and sketch polynomials -Create and analyze patterns by dividing polynomials | PC.P.2 Relate the number of roots of a polynomial to its degree. Solve quadratic equations with complex coefficients. | 2.2,2.3,2.4 | |
| 3 | How can we describe and use the square root of a negative number? | -Define, manipulate and combine imaginary and complex numbers. | All.N.1 Define complex numbers (e.g., $a + bi$) and operations on them, in particular, addition, subtraction, multiplication, and division. | 2.5 | Quiz on complex numbers and Fundamental Theorem of Algebra. Test on quadratic, polynomial, fractional and higher order functions and applications to the fundamental theorem of Algebra and <u>partial fraction</u> |
| 2 | How does everything we have learned apply to the Fundamental Theorem of | -Identify and apply existence theorems, linear factorization theorem and Fundamental Theorem of Algebra. -Determine the number, nature and value of roots of a | PC.P.2 Relate the number of roots of a polynomial to its degree. Solve quadratic equations with complex coefficients. | 2.6 | |

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| | Algebra? | polynomial. | | | <u>decomposition*</u> |
| 5 | How do we determine the characteristics of a rational function? | -Find domain and asymptotes -Sketch a rational function -Write a rational function as a sum of rational functions. | All.P.5 Perform operations on functions, including composition. Find inverses of functions. | 2.7,2.8 of text | |
| 4 | How do we model exponential growth and decay? | -Evaluate and graph exponential functions -Define the number e and evaluate and graph natural exponential functions - Use exponential equations to solve application problems including interest, growth and decay. | All.P.11 Solve everyday problems that can be modeled using polynomial, rational, exponential, logarithmic and step functions, absolute values, and square roots. Apply appropriate graphical, tabular, or symbolic methods to the solution. Include growth and decay. | 3.1,3.5 | Popcorn lab activity for exponential decay. Quiz on exponential functions. |
| 6 | What is a logarithm? | -Convert between logarithmic and exponential functions -Evaluate, graph and solve logarithmic equations. -Learn and apply properties of logarithms -Use logarithmic equations to solve application problems including compound interest, decibels and Richter scale. | All.P.10 Use symbolic, numeric, and graphical methods to solve systems of equations and/or inequalities involving algebraic, exponential, and logarithmic expressions. Describe the relationships among the methods. | 3.2, 3.3 3.4,3.5 | Quiz on logarithmic function. Test on exponential and logarithmic functions. |
| 4 | How do we express the size of an | -Convert between degrees in decimal and DMS form and radians. | PC.M.1 Describe the relationship between degree and radian measures, and use | 4.1 | Quiz on angle measure and right triangle trig |

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| | angle? | <ul style="list-style-type: none"> -Find arc length -Find linear speed of an object traveling in circular motion -Find coterminal angles and reference angles | radian measure in the solution of problems, in particular problems involving angular velocity and acceleration. | | <p>functions.</p> <p>Height of a Flag Pole Activity.</p> |
| 8 | How do we use trigonometry to solve problems? | <ul style="list-style-type: none"> -Know the six trigonometric functions and fundamental identities -Use special triangles and/or a calculator to evaluate trig functions in the coordinate plane -Solve problems using bearings. <ul style="list-style-type: none"> - Apply the Law of Sines and Law of Cosines to solve problems - Find areas of oblique triangles | PC.P.3 Demonstrate an understanding of the trigonometric functions (sine, cosine, tangent, cosecant, secant and cotangent). Relate the functions to their geometric definitions. | 4.2,4.3,6.1,6.2 | <p>Quiz on unit circle.</p> <p>Pacing Off Triangles Lab (weather permitting)</p> <p>Quiz on bearings Law of Sines, Law of Cosines.</p> |
| 4 | How are the curves representing trigonometric functions created? | <ul style="list-style-type: none"> -Graph trigonometric functions and their translations. -Model a problem using a trigonometric function | 12.G.1 Define the sine, cosine, and tangent of an acute angle. Apply to the solution of problems. | 4.5,4.6 | <p>Spaghetti Trigonometry Activity</p> <p>Harmonic Motion of a Slinky Activity</p> |
| 4 | How can side lengths be used to find an angle? | -Evaluate and apply inverse trigonometric functions. | 12.P.5 Perform operations on functions, including composition. Find inverses of functions. | 4.7 | <p>Quiz on trig graphs and inverse functions</p> <p>Test on trig functions and graphs and their inverses, angle</p> |

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| | | | | | measure and applications. |
| 12 | How many ways can a particular trigonometric relationship be written? | -Apply and verify trigonometric identities -Solve trigonometric equations | PC.P.4 Explain the identity $\sin^2 x + \cos^2 x = 1$. Relate the identity to the Pythagorean theorem. | 4.3,5.1,5.2,5.3,5.4 | Quiz on using and verifying trig identities. Quiz on solving trig equations. |