

# Fayette County Public Schools

## Pre-Calculus “Big Rocks”

This document is a list of “big ideas” essential to mastery of grade-level content and is not to be interpreted as a complete list of all topics to be taught.

Content vocabulary should be an emphasis.

Math Practice Standards should be embedded throughout.

1. Analyzing Functions: sketch and identify graphs, find domain, range, intercepts, and symmetry, determine if a function is even or odd or neither, evaluate and perform operations with functions (including composition and inverse), verify an inverse by composition, restrict a domain, so a function has an inverse.
2. Polynomial Functions: review quadratic functions, perform operations with complex numbers, divide polynomials to factor and find roots, find the number and type of solutions, sketch and analyze polynomial graphs.
3. Rational Functions: find domain and asymptotes, sketch the graph of the function, recognize and find partial fraction decompositions of rational expressions.
4. Exponential/Logarithmic Functions: evaluate and graph functions, use log properties to write in another base, evaluate, expand and condense log expressions. Solve exponential and log equations, and use exp/log equations to model real-world situations.
5. Trigonometry: convert between radian and degree measure, use the unit circle to evaluate trig functions, evaluate trig functions of any angle, use fundamental identities to evaluate trig functions, graph trig functions, evaluate and graph inverse trig functions (including composition of functions).
6. Analytic Trigonometry: continue to evaluate trig functions using identities, verify identities, solve trig equations, use formulas (sum and difference, double angle, half-angle, etc.) to rewrite and evaluate trig functions.
7. Applications of Trigonometry: solve oblique triangle with the Law of Sines and the Law of Cosines, find areas of oblique triangles, write vectors in component form perform vector operations, find direction angles of vectors, find angle between two vectors, multiply divide find powers and  $n^{\text{th}}$  roots of complex numbers written in trig form.
8. Limits: evaluate simple limits with tables, graphs, and direct substitution, evaluate limits at infinity, use limits to find graph asymptotes.
9. Polar Graphing: convert from polar to rectangular coordinates and vice versa. graph points and equations in polar form, rewrite a set of parametric equations as a rectangular equation.

The following topics should be taught **only if there is extra time at the end of the course after other topics have been completed.**

- Sequences and Series (**required content** for Algebra 2, but you may need to review as daily warm-ups if you have juniors taking the ACT): write terms and sums of sequences (including arithmetic and geometric), find the sum of an infinite geometric series, and solve real-world problems using sequences and series.
- Probability (**required content** for Algebra 2, but you may need to review as daily warm-ups if you have juniors taking the ACT): use Binomial Theorem and Pascal's Triangle to find binomial coefficients and expansions, solve counting problems with the Fundamental Counting Principle, permutations, and combinations, and find probabilities of events and their complements.
- Convergence and Power Series (This is part of Calculus BC. There is time to teach in the BC course.)  
Determine if a series converges or diverges using the ratio test, find an interval of convergence, use a power series to evaluate a trig or exponential expression, and use Euler's Formula to evaluate expressions.
- Parametric Graphing (This is part of Calculus BC. There is time to teach in the BC course.)  
Graph parametric equations, find a set of parametric equations for a graph.