Pre-Calculus Big Rocks

1. Analyzing Functions: sketch and identify **graph families**, find domain range intercepts and symmetry, evaluate and perform operations with functions (including composition and inverse).

2. Polynomial Functions:**(overlap with algebra 2)** 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: **(overlap with algebra 2)** find domain and asymptotes, sketch the graph of the function, recognize and find partial fraction decompositions of rational expressions.

4. Exponential/Logarithmic Functions: **(focus on e and ln, $y = ae^{bx}$)** 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 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^{th} roots of complex numbers written in trig form.

8. Sequences and Series: write terms and sums of sequences (including arithmetic and geometric), find sum of an infinite geometric series, and **solve real world problems using sequences and series.**

9. Probability: 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.

10. **Conics: graph conic sections and their transformations, recognize conics from equations.**

11. **Matrices/Systems: perform operations with matrices (multiply, inverse, determinant, inverse), solve systems with matrices.**

12. **(If time)** Limits: evaluate simple limits with tables, graphs, and direct substitution, evaluate limits at infinity, 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.

13. **(If time)** Parametric/Polar Graphing: rewrite a set of parametric equations as a rectangular equation, graph parametric equations, find a set of parametric equations for a graph, graph points and equations in polar form, and convert from polar to rectangular form and vice versa.