

## AP Pre-Cal AP Exam possible concepts (Will be added to over time)

### **Must knows:**

1. Exponential rules (solve  $8^x = \frac{1}{4}$ )
2. Relationship between  $e$  and  $\ln$
3. Logs and their properties
4. Sinusoidal (graphs of sine, cosine, cosecant, and secant – Period, amplitude, shifting), writing equation given a graph
5. Tangent and cotangent graphs (periods, vertical asymptotes)
6. Solving trig functions (isolate the trig function 1<sup>st</sup>, then think backwards on the unit circle, factoring.
7. Trig identities (Pythagorean, reciprocal, co-function, double angle, etc., etc. )
8. Relative extrema, concavity (from a graph or a table), point of inflection
9. Rational functions, asymptotes (vertical, horizontal, slant), Removable discontinuity (holes), end behavior (limit notation)
10. Exponential Functions (growth/decay)  $Final = Initial(1 \pm r)^t$ , finding equation of
11. Conversion between polar to rectangular and rectangular to polar
12. Graphing polar using a table of values, recognizing polar graphs from the different forms  
( $a < b$  – Limacon w/ inner loop,  $a = b$  - Cardioid,  $a > b$  Dimpled and Convex limacon, circles, and roses)
13. Differentiating between linear, quadratic, or exponential given table of values
14. Composite functions  $(f \circ g) = f(g(x))$ , or  $(g \circ f) = g(f(x))$
15. Properties of odd and even functions
16. The inverse of a function  $f^{-1}(x)$  and properties of
17. Binomial Expansion  $(x + y)^m$
18. Translations, dilation  $g(x) = a f(x - h) + k$
19. Variation (directly and inversely)
20. Residual plots (what does a bigger residual imply?)
21. Regression plots (what does a higher correlation coefficient (r-value) imply?)
22. Systems (point of intersection between  $f(x)$  and  $g(x)$  by setting the functions equal to one another)
23.  $S = r\theta$  (relates the arc length to the radius and the central angle)

