TOPICS and Concepts for the Math 116 (College Algebra) Challenge Exam

NOTE:

- A calculator, cell phone, translator, dictionary or any similar device is NEVER allowed.
- NO formulas will be given.
- The problems on the 'Samples' exam contains problems similar to, but not exactly like, problems on the actual Challenge Exam. Further, the Challenge Exam may contain problems that are not expressly shown on the 'Samples' Exam.' **STUDY !!**

The Challenge exam for Math 116 may include, but will not be limited to:

1. Know the difference and similarities between the set of Real Numbers and the set of Complex numbers.
2. Be able to express the answers to inequalities using interval and set-builder notation
3. Find the Domain of a rational function. Note: the function may contain radicals, absolute value and logarithms.
4. Find the composition of various functions. Be able to state the domain of the composition.
5. Solve rational and polynomial inequalities. Express you answer(s) in interval notation.
6. Simplify an expression involving logarithms.
7. Solve exponential and logarithmic equations, including, but not limited to, exponential grow and decay, logistic growth applications.
8. Perform Matrix arithmetic.
9. Solve a system of equations using Gaussian elimination.
10. Maximize (or minimize) profit (or loss) when given the constraint inequalities and the profit function.
11. Sketch the graph of a polynomial function, labeling the zeros and y-intercept. Be sure to identify 'extreme' (aka 'end') behavior, taking into account the multiplicity of the zeros.
12. Sketch the graph of a rational function. Show and label all asymptotes, zeros and y-intercepts.
13. Apply the Rational Zero Theorem, Descartes' rule of signs, synthetic division, basic factoring, and the quadratic formula to (a) completely factor a polynomial function, and/or (b) solve a polynomial equation over the real and/or complex number systems.
14. Graph a piece-wise function. Label the 'break' points.
15. Given the sketch of a function, sketch its transformation (vertical & horizontal stretch or shrink; vertical & horizontal shifts; reflection of x- and y-axes; the inverse).
16. Resolve a rational expression into its Partial Fractions.