MATH LAB TUTOR APPLICATION TEST REVIEW SHEET
(Lower Division)

We don't expect you to have a complete or perfect understanding of all the concepts listed below. A basic understanding of each principle will suffice.

Algebra and Trigonometry
- Basic trig identities
- Unit circle (evaluating trig functions for a given angle)
- Finding the domain and range of a function
- Factoring
- Solving for roots / zeros of functions
- Complex numbers (i)
- Basic graphs
  - Linear equations (lines)
  - Quadratic functions
  - Logarithmic functions
  - Exponential functions
  - Trigonometric graphs
- Finding the inverse of a function
- Logarithmic and exponential functions
- Inequalities
- Systems of equations
- One-to-one functions
- Basic probability
- Polynomial long division
- Completing the square
- Series and sequences
  - Calculating the n\textsuperscript{th} term
  - Calculating the sum of the first n terms
- Arithmetic, geometric, and recursive

Calculus and Analysis
- Definition of a limit
- Definition of a derivative (in terms of a limit)
- Differentiating and integrating basic functions:
  - Trig functions
  - Polynomials
  - Logarithms
  - Exponentials
- Special rules for derivatives:
  - Implicit differentiation
  - The chain rule
  - Product rule, quotient rule, etc.
- Related rates [in word problems]
- Optimization (finding the max. or min.)
- Calculating the volume of rotated regions (using Shell or Disk integrating techniques)
- Calculating surface area of rotated curves
- Calculating the length of a curve (of Cartesian or Parametric equations)
- Finding the area between two curves
- Integration techniques:
  - U-substitution
  - Integration by parts
  - Trigonometric substitution
  - Partial fraction decomposition
- Different coordinate systems:
  - Cartesian
  - Parametric
  - Polar
- Series
  - Definitions of convergence and divergence
  - Different tests for convergence or divergence
  - Taylor series
  - Power series
  - Calculating work or fluid density

There is a sheet containing various trigonometric functions, formulas, etc, and another sheet containing common derivatives and integrals. Both can be found at [https://math.byu.edu/home/mathlab](https://math.byu.edu/home/mathlab) under "Handouts & Practice Exams".