Math 230 - Calculus II - Concepts List

I. **Derivatives and Integrals**
- (a) Derivative and Integral of the natural logarithm (general logarithms)
- (b) Logarithmic Differentiation
- (c) Solving word problems involving logarithms
- (d) Derivative and Integral of an exponential function (general exponential functions)
- (e) Solving word problems involving exponential functions (growth and decay)
- (f) Inverse functions and their derivatives
- (g) Inverse trig functions
- (h) L'Hopital's Rule and know the different indeterminate forms
  - (i) $\frac{0}{0}$
  - (ii) $\frac{\infty}{\infty}$
  - (iii) 1^{∞}
  - (iv) 0^0
  - (v) ∞^0
  - (vi) $\infty - \infty$

II. **Application of Integrals**
- (a) Find the area between curves (in terms of x)
- (b) Find the area between curves (in terms of y)
- (c) Find the volume of a solid by slicing
- (d) Find the volume of a solid of revolution (washer method) in x
- (e) Find the volume of a solid of revolution (washer method) in y
- (f) Find the volume of a solid of revolution (cylindrical method) in x
- (g) Find the volume of a solid of revolution (cylindrical method) in y
- (h) Find arclength
- (i) Find the surface area of a solid of revolution

III. **Techniques of Integration**
- (a) Substitution
- (b) Integration by Parts
- (c) Powers of trig functions
- (d) trigonometric substitutions
- (e) Partial Fractions
- (f) Improper Integrals
- (g) Approximte Integration
  - (i) Left Hand Endpoint Method
  - (ii) Right Hand Endpoint Method
  - (iii) Midpoint Method
  - (iv) Trapezoidal Method
  - (v) Simpson's Method

IV. **Sequences and Series**
- (a) Working with infinite sequences
- (b) Working with infinite series
- (c) Convergence of an infinite series by the following:
  a. Integral Test

b. Direct Comparison
c. Limit Comparison
d. Alternating Series
e. Ratio Test
f. Root Test

(d) Determine absolute or conditional convergence
(e) Find the radius and interval of convergence
(f) Power Series
(g) Representations of functions using power series
(h) Taylor Polynomials
(i) Taylor Series, Maclauran Series