MT-151 Calculus-1

Equations and inequalities: solving linear and quadratic equations, linear inequalities. Division of polynomials: synthetic division, roots of a polynomial, rational roots, relations, descartes rule of signs, solutions of equations with absolute value sign, solution of linear and non-linear inequalities with absolute value sign. Functions and graphs: domain and range of a function, polynomial, rational, piecewise defined functions, absolute value function, and evaluation of such functions. Operations with functions: sum, product, quotient and composition. Graphs of functions: linear, quadratic, piecewise defined functions. Limits and continuity: limit of a function, graphical approach, properties of limits, theorems of limits, limits of polynomials, rational and transcendental functions, limits at infinity, infinite limits, one-sided limits, continuity. Derivatives: definition, techniques of differentiation, derivatives of polynomials and rational, exponential, logarithmic and trigonometric functions, the chain rule, implicit differentiation, rates of change in natural and social sciences, related rates, linear approximations and differentials, higher derivatives, Leibnitz's theorem. Applications of derivatives: increasing and decreasing functions, relative extrema and optimization, first derivative test for relative extrema, convexity and point of inflection, the second derivative test for extrema, curve sketching, mean value theorems, indeterminate forms and L'Hopital's rule, inverse functions and their derivatives. Integration: integrals, Riemann sums and the definite integral, properties of integral, the fundamental theorem of calculus, the substitution rule.

Recommended Books:

1. "Calculus", Thomas, Addison Wesley Publishing Company,11th Edition, 2005.
2. "Calculus", H. Anton, I. Bevens, S. Davis, John Wiley & Sons, 8th Edition, 2005.
3. "Calculus Single and Multivariable", Hughes-Hallett, Gleason, McCallum, John Wiley & Sons, 3rd Edition, 2002.