

Progressive Education Society's
Modern College of Arts, Science and Commerce (Autonomous),
Shivajinagar, Pune - 5

Department of Mathematics
FYBSc(Semester I)19ScMatU103

Based on Differential Calculus
Subject : Mathematics Practical-I (19ScMatU103)
Practical Incharge: Rima Ahuja
Practical 10:Mean Value Theorem

1. Find the intervals on which $f(x) = -x^3 + 12x + 5$, $x \in (-3, 3)$ is decreasing or increasing.
2. Find the intervals on which $f(x) = x^5 - 5x^4 + 5x^3 - 1$, $x \in \mathbb{R}$ is decreasing or increasing.
3. Verify Rolle's mean value theorem and find c for $f(x) = x(x - 2)e^x$ on $[0, 2]$.
4. Prove that $\frac{b - a}{\sqrt{1 - a^2}} < \sin^{-1} b - \sin^{-1} a < \frac{b - a}{\sqrt{1 - b^2}}$ ($0 < b < 1$)
5. Using Taylor's theorem expand $5 + x^2 - 4x^4 + 3x^7$ in powers of $(x - 1)$.