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 $\dfrac{b - a}{\sqrt{1 - a^2}} < \sin^{-1} b - \sin^{-1} a < \dfrac{b - a}{\sqrt{1 - b^2}} \; (0 < b < 1)$

5. Using Taylor's theorem expand $5 + x^2 - 4x^4 + 3x^7$ in powers of $(x - 1)$.