

Calculus I Final Review

Local Extreme Values, Concavity, l'Hospital's Rule, and Optimization

1. Find the intervals on which $f(x) = 6x^4 - 16x^3 + 1$ is increasing or decreasing, and find the local maximum and minimum values of f .
2. For $0 \leq x \leq \pi$, find the intervals on which $f(x) = \sin^2 x - \cos 2x$ is concave upward or concave downward, and find the inflection points of f .
3. Find $\lim_{x \rightarrow 0} \frac{x3^x}{3^x - 1}$.
4. If 1200 cm^2 of material is available to make a box with a square base and an open top, find the largest possible volume of the box.