

Workshop Exercises: Maximum and Minimum Values

1. Find the critical numbers of the function.

a) $f(x) = 2x^3 + x^2 + 2x$.

b) $g(x) = x^{1/3} - x^{-2/3}$.

c) $f(x) = 2\cos(\theta) + \sin^2(\theta)$.

2. Find the absolute max/absolute min values of f on the given interval.

a) $f(t) = t\sqrt{4 - t^2}$, $-1 \leq t \leq 2$.

b) $g(t) = 2\cos(t) + \sin(2t)$, $0 \leq t \leq \frac{\pi}{2}$.

3. Prove that the function $f(x) = x^{101} + x^{51} + x + 1$ has neither a local maximum nor a local minimum.

4. Show that 5 is a critical number of the function $g(x) = 2 + (x - 5)^3$ but g does not have a local extreme value at 5.