

Homework 6

For the following functions find the critical points, find where the function is increasing and decreasing, identify if the critical points are maxima, minima or none, find the second order critical points, tell where the graph is concave up and where it is concave down, then sketch the graph.

(a) $f(x) = x^3$,

(b) $f(x) = \frac{1}{3}x^3 - 9x + 2$,

(c) $f(x) = x + \frac{1}{x}$,

(d) $f(x) = x \ln x$,

(e) $f(x) = x^4 + 6x^3 - 26x^2$,

(f) $f(x) = \frac{x}{x^2 + 1}$,

(g) $f(x) = e^x + e^{-x}$,

(h) $f(x) = \sin t + \cos t, \quad 0 \leq t \leq 2\pi$.