

Companion Notes for MATH 229 Sections 12.1 and 12.2.

1. Answer the following questions for the functions

$$f(x) = x^4 - 8x^2 - 12$$

and

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

- (a) Find all critical points of this function.

- (b) Determine the intervals on which the function is increasing or decreasing.

- (c) Find all relative extrema of this function and determine whether they are maximums or minimums.

- (d) Find all points of inflection of this function.

- (e) Determine the intervals where the function is concave upward and concave downward.

- (f) Use the second derivative to determine whether the relative extrema are relative maximums or relative minimums.