SI Session: March, 24th & 26th, 2009
Tuesdays: 3:30 PM – 5:00 PM
Thursdays: 1:30 PM – 3:00 PM
& 3:30 PM – 5:00 PM
Room 1245 SNAD

Prof. Stockton : Calculus I
Spring 2009
SI Leader : Neil Jody

[1] For each of the following functions, find the open intervals on which the function is increasing or decreasing, and find the relative extrema.

(a) $f(x) = x^{2/3}(16 - x^2)$

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

(c) $f(x) = \dfrac{12x}{x^2 + 4}$

[2] For each of the following functions, find the intervals on which the function is concave up or down, and identify any inflection points.

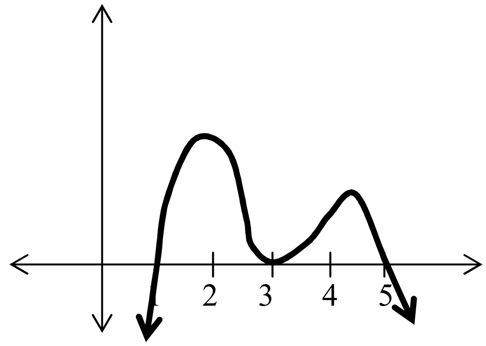
(a) $f(x) = -2x^4 + 8x^3$

(b) $g(x) = 3x^5 + 10x^4 - 7$

(c) $h(x) = 3x^4 + 2x^3 - 12x^2 + 3x - 2$

[3] The graph of the *derivative* of a function *f* is given below. Use the graph to determine each of the following:

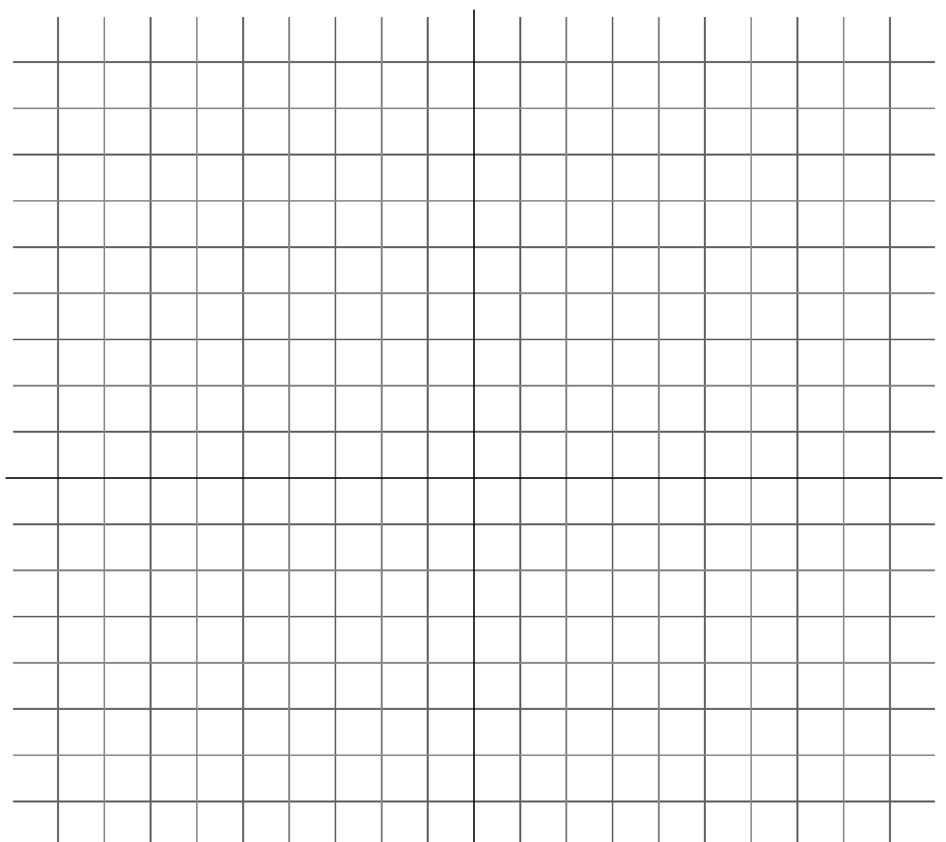
(a) the relative maxima of *f*
(b) the relative minima of *f*



[4] Sketch the graph of a function *f* that satisfies the following conditions:

- *f* is increasing on $(-\infty,-2)$ and $(1,\infty)$; *f* is decreasing on $(-2,1)$
- *f* is concave down on $(-\infty,-1)$ and concave up on $(-1,\infty)$
- the graph of *f* is everywhere smooth

Be sure to label any inflection points.



[5] Find the oblique asymptote for the following functions.

(a) $f(x) = \dfrac{x^2 - 6x + 12}{x - 4}$

(b) $f(x) = \dfrac{x^3 - 4x^2}{x^2 - x - 12}$

[6] As sand leaks out of a hole in a container, it forms a conical pile whose height is always equal to its radius. If the height of the pile is increasing at a rate of 6 in/min, find the rate at which the sand is leaking out when the height is 10 inches.