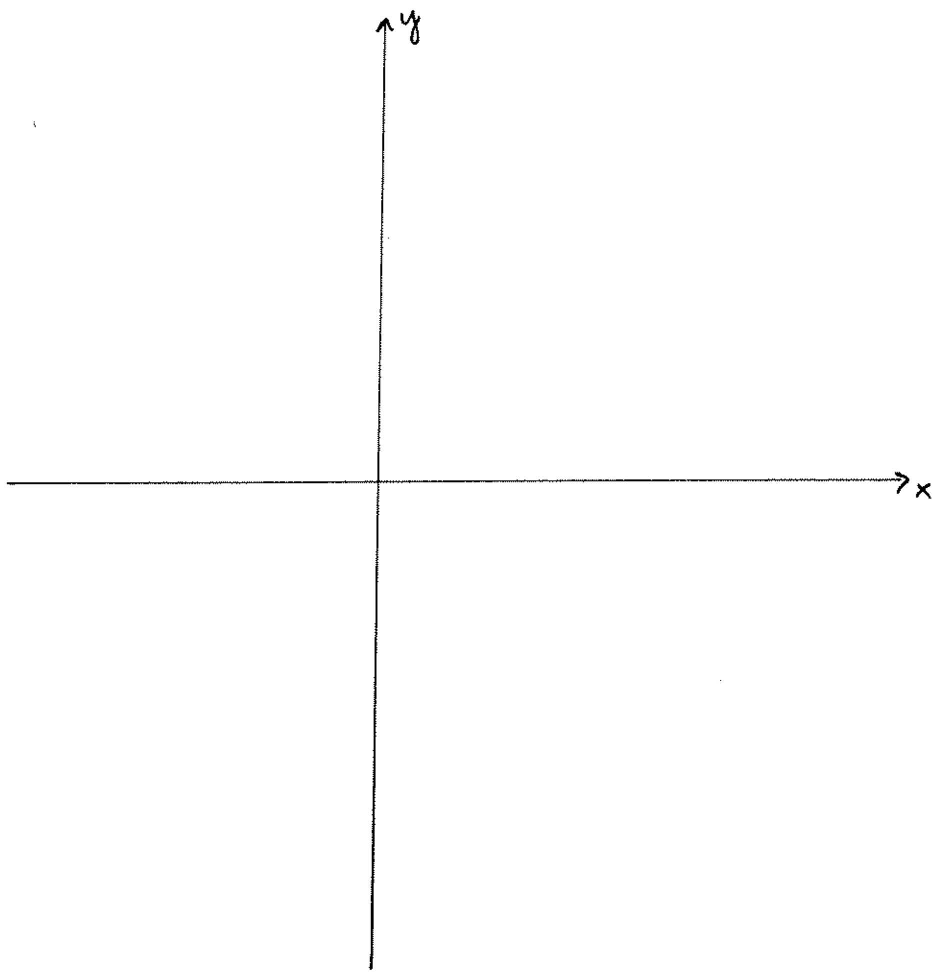
Math 1210-2
Monday 10/22
§3.3-3.4 (webworks is up. Start it now if you haven't already, since it covers §3.1-3.5)

§3.3: We were discussing local extrema, inc, dec, CU, CD, 1st & 2nd deriv. test.
A good way to pick up & review the discussion is to redo completely the final example from Tues 10/16. (which we were part way through).

Exercise 1: Consider $g(x) = x^4 - 2x^3$, $-\infty < x < \infty$.
Find all critical pts (& classify), intervals of inc/dec, CU/CD, inflection points.
Then plot the graph $y = x^4 - 2x^3$, using appropriate scales for the x & y axes.



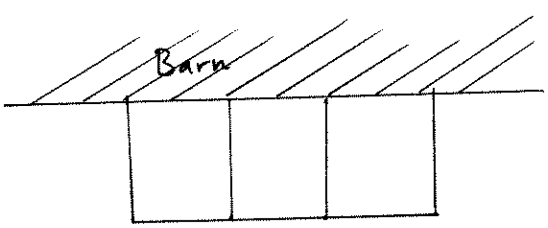
§3.4 Practical max/min problems. (We need not use all our tools to answer these questions, just enough of them to get the job done.)

Exercise 2

2a) For a fixed perimeter K, which rectangle of dimensions x and y encloses the largest area?

steps

2b) Farmer Sally wishes to make 3 identical pens, with 120 linear feet of fencing, (total) as shown in the diagram. What dimensions for the total enclosure make the area of the pen as large as possible? (the barn wall is used for one side)



(top view)

Exercise 3 (Example 4 page 169) Suppose that a fish swims upstream with a velocity v relative to the water, and that the river current has velocity $-v_c$ (in the opposite direction to the fish).

The energy expended by the fish to travel a distance d up the river is proportional to the time it takes to travel this distance and the cube of the fish's velocity (relative to the water).

What is the velocity v that minimizes the energy expended in swimming this distance? (do fish actually swim at this speed?)