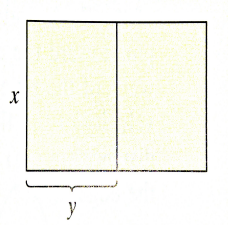
3.1, #54: Two chicken coops are to be built adjacent to one another using 120 feet of fencing.



(a) What dimensions should be used to maximize the area of an individual coop?

(b) What is the maximum area of an individual coop?

3.2, #20: Determine the leading term and the end behavior for $q(x) = -5x^4(2-x)^3(2x+5)$.

3.2, #23, 26, 30, 34: For the polynomials below, find their zeroes, state their multiplicities, and state whether each zero is a "touch point" or "cross point."

(a) $f(x) = x^3 + 2x^2 - 25x - 50$.

(b) $k(x) = -6x^3 + 26x^2 - 28x$.

(c) $q(x) = -2x^4(x+1)^3(x-2)^2$

(d) $d(x) = [x - (2 - \sqrt{11})][x - (2 + \sqrt{11})]$

Theorem 0.1 [Intermediate Value Theorem] *Suppose that $f(x)$ is a polynomial and that $a < b$. If $f(a)$ and $f(b)$ have opposite signs, then f has at least one zero on $[a, b]$.*

3.2, #39: Determine whether the Intermediate Value Theorem guarantees that $f(x) = 2x^3 - 7x^2 - 14x + 30$ has a zero on each of the following intervals:

(a) $[1, 2]$.

(b) $[3, 4]$.

Example: Determine the intervals on which each function is positive and the intervals on which they're negative. Then, give a crude sketch of their graphs.

(a). $f(x) = (x-4)(x+7)(x-1)$

Done in lecture.

(b). $g(x) = (4-x)(x+7)(x-1)$

(c). $h(x) = (x-4)(x+7)^2(x-1)$

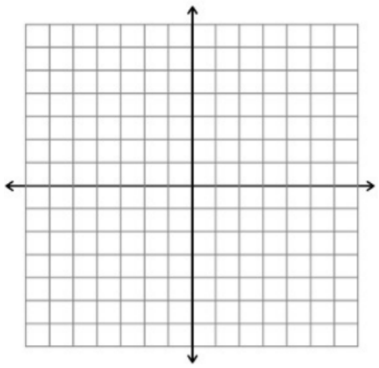
(d). $j(x) = (x-4)(x+7)^3(x-1)$

(e). $k(x) = -2(x-4)(x+7)^3(x-1)$.

3.2, #68: Sketch a graph of the function $q(x) = 9x^5 + 18x^4 - 4x^3 - 8x^2$.

* Room for scratch work to prepare:

* Sketch the graph below.



3.2, #72: Sketch a graph of the function $h(x) = -x^4 + 10x^2 - 9$.

* Room for scratch work to prepare:

* Sketch the graph below.