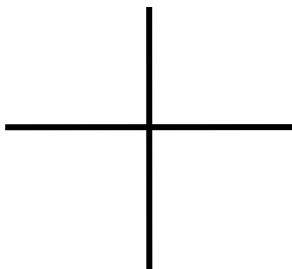
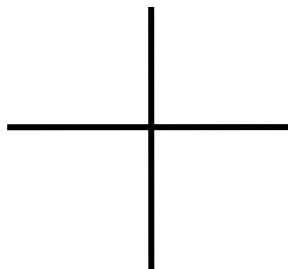


1. (5 pts) For each of the following polynomials, draw the end behavior on the graph.

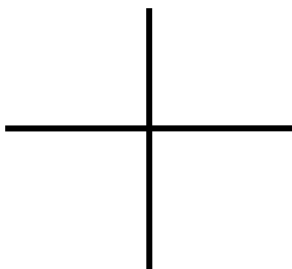
a. $p(x) = -2x^6 + 5x^4 - 4x^3 + 2x - 5$



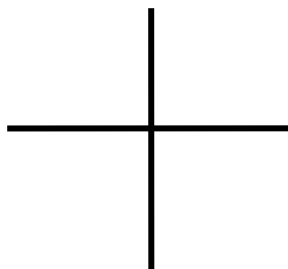
b. $g(x) = 3x^4 - 5x^2 + 7x - 2$



c. $h(x) = 4x^3 + 2x^2 - 8x + 1$



d. $f(x) = -4x^5 - 3x^4 + 2x + 7$



Let $f(x) = x^5 - 7x^4 + 17x^3 - 11x^2 - 16x + 20$ for problems 2 - 5.

2. (5 pts) What does Descartes Rule of Signs tell you about this function?

3. (5 pts) Use the Rational Zeros (Roots) Theorem to list the possible rational zeros of f .

4. (10 pts) Find all real and complex zeros of $f(x) = x^5 - 7x^4 + 17x^3 - 11x^2 - 16x + 20$, using the rational zero candidates you have from the previous problem. Put your work NEATLY in the space below. This means doing your work on separate paper and transferring it to the space, below, after you've eliminated the bad guesses. No credit for sloppy work.

5. Now that you've done all the prep work, write f in factored form, in two ways:

a. (5 pts) Factor it over the REAL number field (Entails an *irreducible quadratic* factor.).

b. (5 pts) Factor it over the COMPLEX number field. (Always *linear* factors.).

6. (5 pts) Sketch the graph of

$$g(x) = (x+1)^2(x-2)(x-3)(x+5) = x^5 + 2x^4 - 18x^3 - 8x^2 + 41x + 30,$$

showing all intercepts. My main issue with x -intercepts is getting the touch/cross bits correct.

7. (10 pts) Sketch the graph of $h(x) = \frac{(x+1)^2(x-2)^2}{(x-3)(x+5)(x-2)} = \frac{x^4 - 2x^3 - 3x^2 + 4x + 4}{x^3 - 19x + 30}$, showing all asymptotes, intercepts and holes. Notice right off that it is not in lowest terms.