Math 113 worksheet: polynomials and rational functions   DUE _____

For #1 through #5, set your graphing calculator window to $[-10, 10, 1]$ by $[-50, 50, 5]$.

1. For $f(x) = 0.1x(x+5)(x-5)$ state the degree, the behavior at the ends, and the x-intercepts.
   Use your graphing calculator to draw the graph, and sketch what you see in the box.
   Did you see the end-behavior and x-intercepts you expected?

2. For $f(x) = 0.1x(x+5)(x-5)^2$ state the degree, the behavior at the ends, and the x-intercepts.
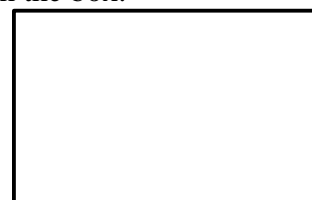   Use your graphing calculator to draw the graph, and sketch what you see in the box.
   Describe the behavior of the graph in the neighborhood surrounding $x = 5$.

3. For $f(x) = 0.1x(x+5)(x-5)^3$ state the degree, the behavior at the ends, and the x-intercepts.
   Use your graphing calculator to draw the graph, and sketch what you see in the box.
   Describe the behavior of the graph in the neighborhood surrounding $x = 5$.
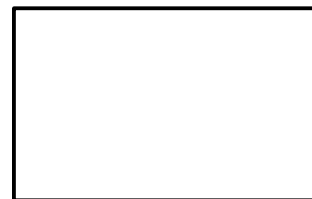
4. Predict the end-behavior and behavior at $x = 0$ for $f(x) = 0.1x^2(x+5)(x-5)$.
   Use your graphing calculator to confirm your prediction. Sketch what you see in the box.

5. Predict the end-behavior and behavior at $x = 0$ for $f(x) = 0.1x^3(x+5)(x-5)$.
   Use your graphing calculator to confirm your prediction. Sketch what you see in the box.

For #6 through #10, set your graphing calculator window to standard.
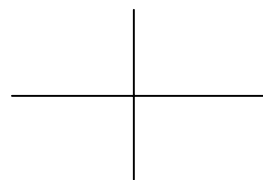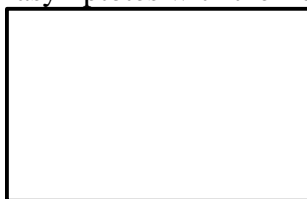
6. Use your graphing calculator to draw the graph of $f(x) = \dfrac{1}{x^2 + x - 20}$ and sketch the result in the box.

You'll note that a graphing calculator does a very poor job on this one. Use what you know about rational functions to sketch the graph properly on the axes. Label all asymptotes with their equations.
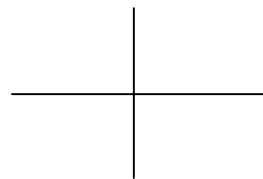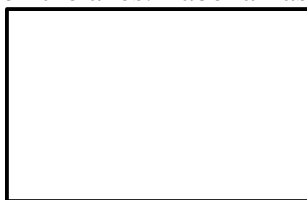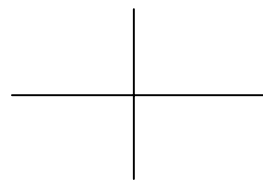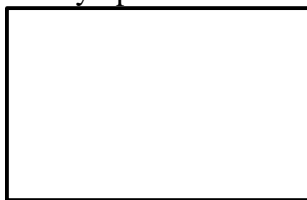
7. Use your graphing calculator to draw the graph of $f(x) = \dfrac{x}{x^2 + x - 20}$ and sketch the result in the box.

This one is a little better, but still lacks some resolution. Use what you know about rational functions to sketch the graph properly on the axes. Label all asymptotes with their equations.
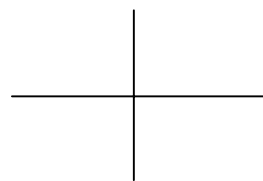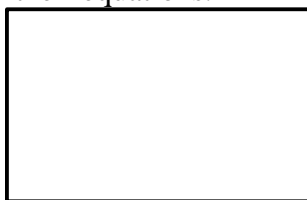
8. Use your graphing calculator to draw the graph of $f(x) = \dfrac{x^2}{x^2 + x - 20}$ and sketch the result in the box.

This one is even better than #7, but is still difficult to read. Use what you know about rational functions to sketch the graph properly on the axes. Label all asymptotes with their equations.

9. Use your graphing calculator to draw the graph of $f(x) = \dfrac{3x^2}{x^2 + x - 20}$ and sketch the result in the box.

How is this one different from #8? Use what you know about rational functions to sketch the graph properly on the axes. Label all asymptotes with their equations.

10. Use your graphing calculator to draw the graph of $f(x) = \dfrac{3x^3}{x^2 + x - 20}$ and sketch the result in the box.

How is this one different from #9? Use what you know about rational functions to sketch the graph properly on the axes. Label all asymptotes with their equations.