Math-19 Homework #5

Reading

Please read sections 3.1 through 3.7, omitting 3.5, and do all concept problems in the posted sections on webassign.

Problems

1). Let $f(x) = 1 - 6x - x^2$.

   a). Convert the parabola to standard form.

   b). What are the coordinates of the vertex?

   c). What are the x-intercepts (if any)?

   d). What are the y-intercepts (if any)?

   e). What is the axis of symmetry?

   f). Sketch the parabola. Be sure to label the vertex and all intercepts!

   g). What is the domain?

   h). What is the range?

2). Let $p(x) = 10 - 49x + 80x^2 - 53x^3 + 20x^4 - 4x^5$. Factor completely. Use the results of the factoring and any y-intercepts to sketch the function. Be sure to label all intercepts!

3). For the previous problem, graph the function using your calculator. You will need to play with the window a bit so that you can see the important detail. Determine all local maxima/minima and attach screenshots.

4). Let:

$$f(x) = \frac{(2x^2 + 2x - 4)(x + 3)}{x^4 + 4x^3 + 3x^2}$$

   a). What are the zeros?

   b). What are the vertical asymptotes (if any)?

   c). What are the horizontal asymptotes (if any)?

   d). What is the end behavior as $x \to \infty$?

   e). What is the end behavior as $x \to -\infty$?

   f). What are the y-intercepts (if any)?

   g). Sketch the graph. Be sure to label all intercepts, asymptotes, and local extrema and show the proper end behavior. Note that you may need to use a calculator to determine the local extrema.

h). What is the domain?

i). What is the range?

5). Solve for x:

$$\frac{x+2}{x+3} < \frac{x-1}{x-2}$$

Remember to state the result in interval notation.