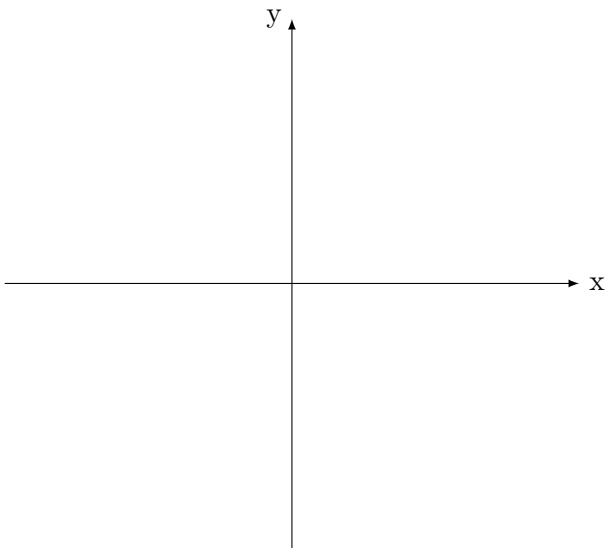
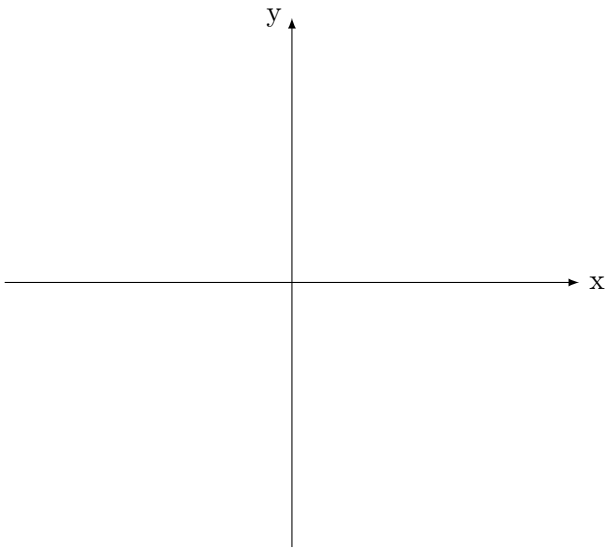
HOMEWORK DAY 20-21 – *Graphing functions §3.5*

1. For each of the following polynomial functions:
   (1) Graph the function using only the roots, multiplicity of the roots, and the behavior as $x \to \pm\infty$.
   (2) Find the coordinates of the local max/min and add them to the plot.
   (3) Find the coordinates of the inflection points and add them to the plot.
   (4) If the function is odd or even, make a note of it.

   (a) $f(x) = x^4 - 8x^2$

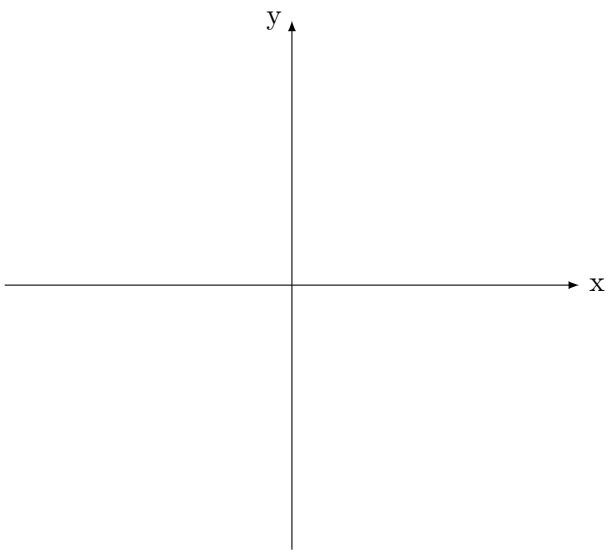


   (b) $f(x) = 3x^2 - x^3$

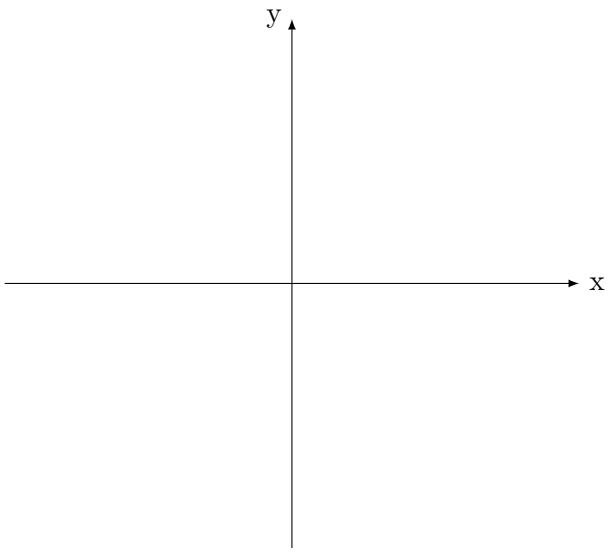


2. For the following rational functions:
   (1) First sketch a rough graph of the function using superposition of simple functions.
   (2) Find the coordinates of the local max/min using f' and add them to the plot.
   (3) Find the coordinates of all inflection points using f'' and add them to the plot.

   (a) $f(x) = x + \dfrac{1}{x}\ , \quad x > 0$

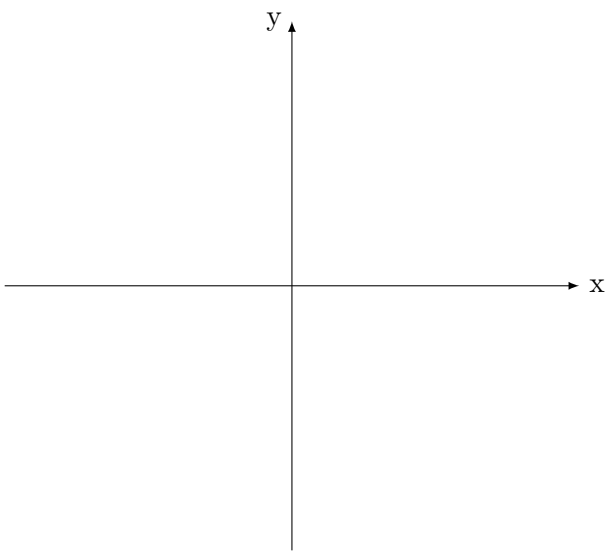


   (b) $f(x) = x + \dfrac{1}{x^2}\ , \quad x > 0$

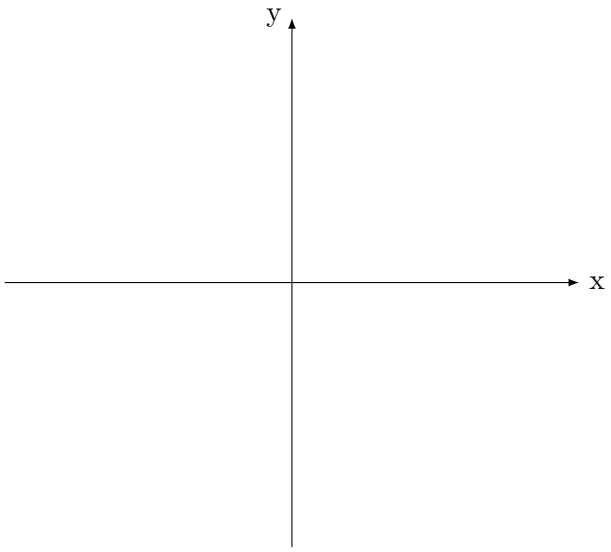


3. For each of these problems, sketch a graph clearly showing domain, asymptotes, intercepts (if they can be easily found), local maxima/minima and inflection points.

   (a) $f(x) = 2x^3 - 3x^2 - 12x + 2$



(b) $f(x) = \dfrac{x}{x^2 + 9}$



Note: You need to explain why the value you found is the absolute maximum or minimum.

4. §3.7: 2

5. §3.7: 9

6. Assume that if the price of a certain book is p dollars, then it will sell x copies where $x = 7000(1 - p/35)$. Suppose the cost of producing those x copies is $15000 + 2.5x$ dollars. Finally, assume that the company will not sell this book for more than \$35. Determine the price for the book that will maximize profit.

7. §3.7: 10

8. §3.7: 20

9. §3.7: 21

10. §3.7: 51