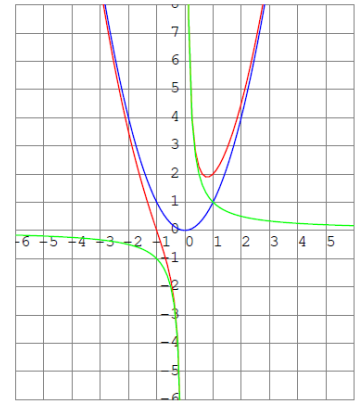


4. Adding Graphs

Now that we know how to draw a lot of basic graphs and how to use transformations, we can draw more complicated graphs — that is, graphs that we get by adding two functions. For example, if we want to draw a graph of a function $y = x^2 + \frac{1}{x}$

We can carefully examine two separate graphs of $y = x^2$ (blue) and $y = \frac{1}{x}$ (green), and then see what happens if one adds these two graphs (red) by adding their y-values for every x.



Homework problems

Instructions: Please always write solutions on a *separate sheet of paper*. Solutions should include explanations. I want to see more than just an answer: I also want to see how you arrived at this answer and some justification for why this is indeed the answer. So **please include sufficient explanations**, which should be clearly written so that I can read them and follow your arguments.

ALL GRAPHS/POINTS/FIGURES SHOULD BE DRAWN BY YOU - NOT PRINTED! USE QUADRILE PAPER!

- Graph $x^2 = 4y$. What is the focus, directrix, and vertex of the parabola?
- Sketch the following functions by first drawing the graph of each addend function and then adding the y-values for a few x-values. (Review your class notes)
 - $y = |x| + |x + 1|$
 - $y = |x - 1| + |x + 1|$
 - $y = |x - 1| - |x + 1|$
 - $|y| = x$ (Hint: what is the domain/range of this function?)
- Sketch the following functions by first drawing the graph of each addend function and then adding the y-values for a few x-values.
 - $y = x + \frac{1}{|x|}$
 - $y = \sqrt{x} + \frac{1}{x}$
 - $y = x - \frac{1}{x^2}$
- Find all intersection points of the parabola $y = x^2$ and the circle with a radius $\sqrt{6}$ and center at (0,4).