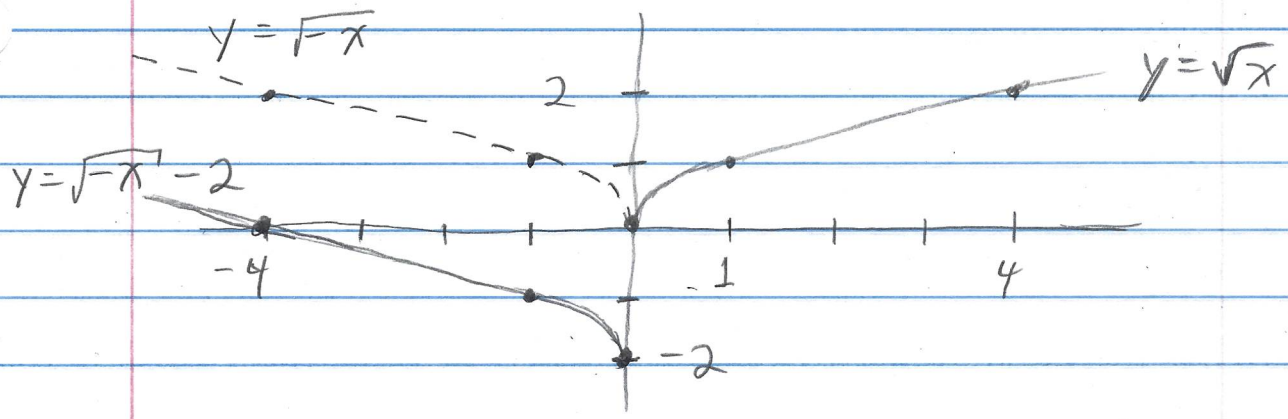
2.5.53

Exercise 2.5.53 Graph $h(x) = \sqrt{-x} - 2$. Start with the basic function $y = \sqrt{x}$ and show all steps. Find the domain and range.

Solution

Starting with $\sqrt{x}$, we introduce a reflection about the y-axis by replacing x with $-x$ to get the function $\sqrt{-x}$. Next we shift vertically down 2 units by adding $k = -2$ to the previous function to get $h(x) = \sqrt{-x} - 2$. Applying these two transformation to $y = \sqrt{x}$ we get:



We see from the graph that the domain is $(-\infty, 0]$ (we see this also from the requirement that we only take square roots of nonnegatives).
We see from the graph that there is a point of the form (x, y) on the graph for each $y \geq -2$. So the range is $[-2, \infty)$.

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