Some Sample Graphs

First consider $f(x) = x^2 - 3x + 2$ on $[-1,4]$

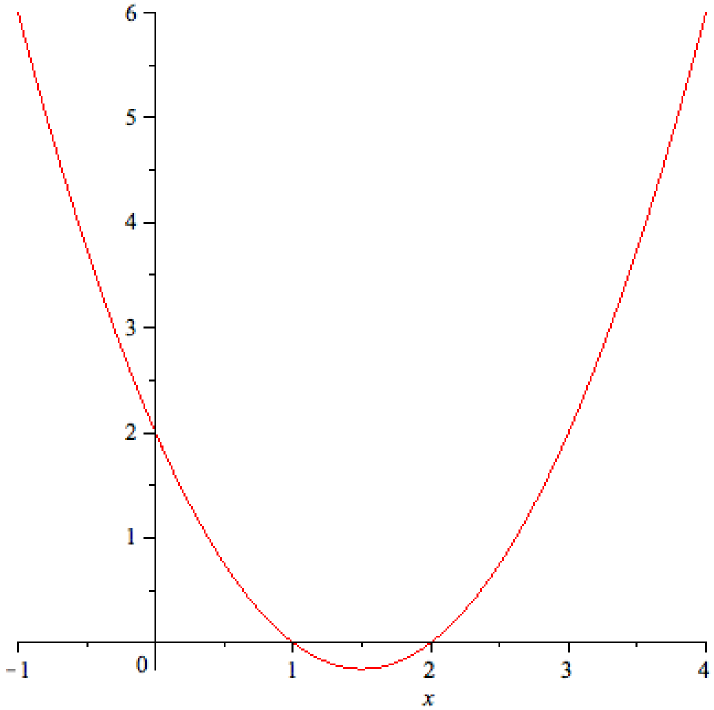

Figure 1: The graph of $f(x) = x^2 - 3x + 2$ on $[-1,4]$

This is made up of the "pure" quadratic x^2, the linear term $-3x$ and the constant term +2. The quadratic has the U shape that dominates the above figure, the linear term "shifts" this U shaped curve to the right and the constant term lifts the entire graph up. These constituents are shown below:

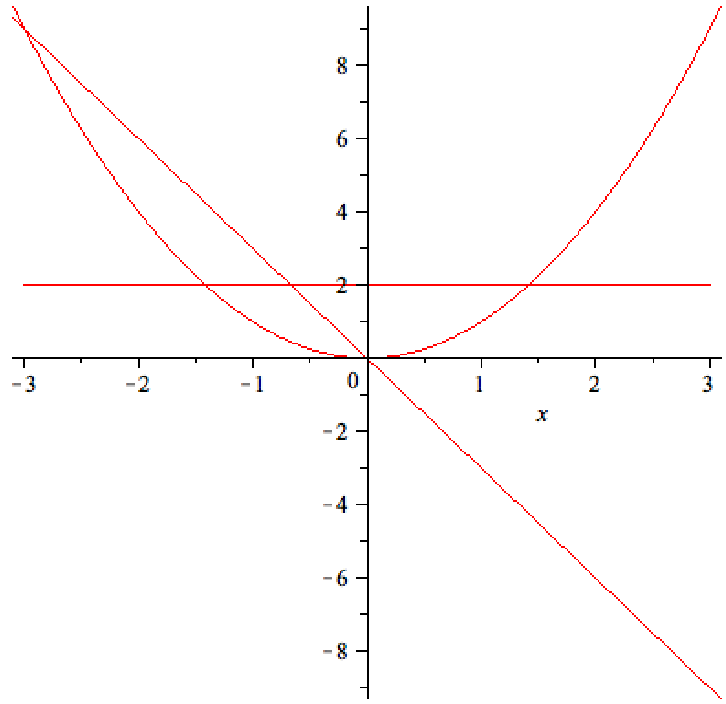

Figure 2: The graph of the components x^2, $-3x$, and 2 on [-3,3]

Consider the cubic function $f(x)=x^3$ on $[-4,4]$

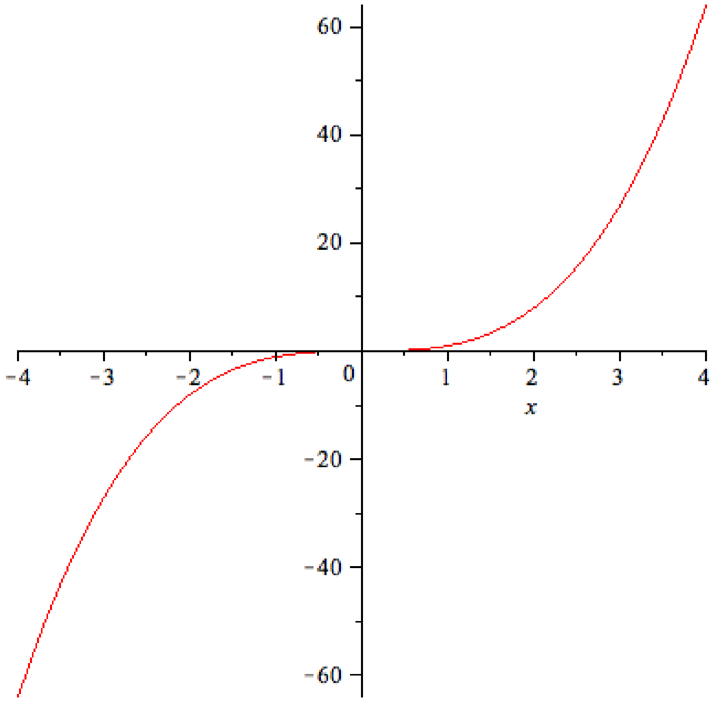

Figure 3: The graph of $f(x)=x^3$ on $[-4,4]$

We mentioned before that this was 1-1 and this is obvious from the graph above. What happens, though, when we add extra components such as a quadratic term, a linear term, and a constant term? We show this below for the cubic function $f(x)=x^3-5x^2+6x-1$ on $[-1,4]$.

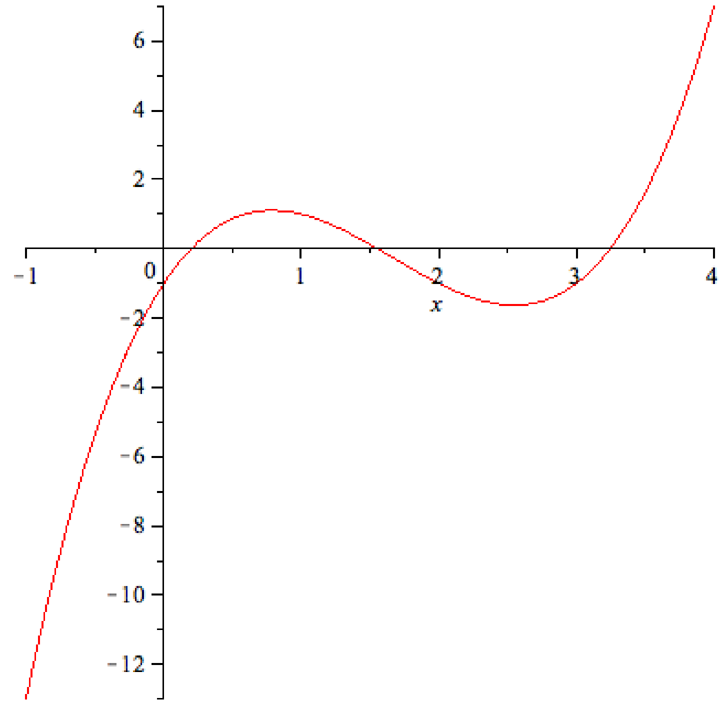

Figure 4: The graph of $f(x)=x^3-5x^2+6x-1$ on $[-1,4]$

The effect of the quadratic and linear terms is to cause the graph to first “overshoot” and then “undershoot” for small $f(x)$ as you traverse across the interval. This changes the cubic from being a pure 1-1 cubic function to beiung a many to one generic cubic function.