

# Linear Transformations of Graphs

- > restart :
- > L := 10 : # plot boundaries

***b(x) is the base function.***

- > b := x → x<sup>3</sup> :

***h(x) is the linear transform on the input to b(x), it affects the graph horizontally, thus h(x).***

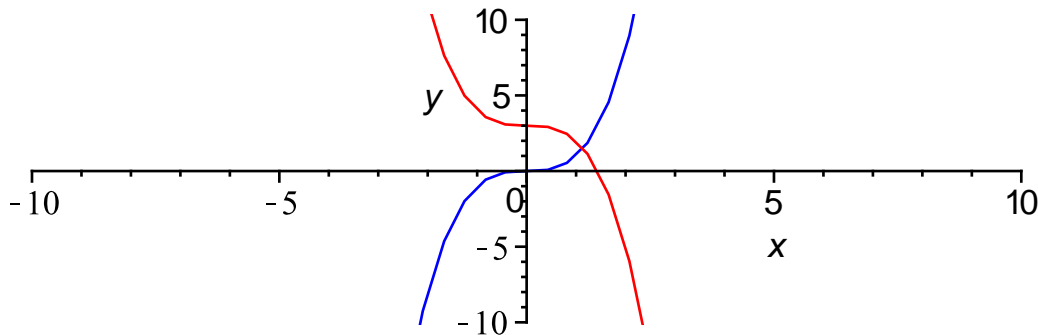
- > h := x →  $\frac{-1}{2}(x + 3)$  :

***v(x) is the linear transformation on the output of b(x), it affects the graph vertically, thus v(x).***

- > v := x → -x + 3 :

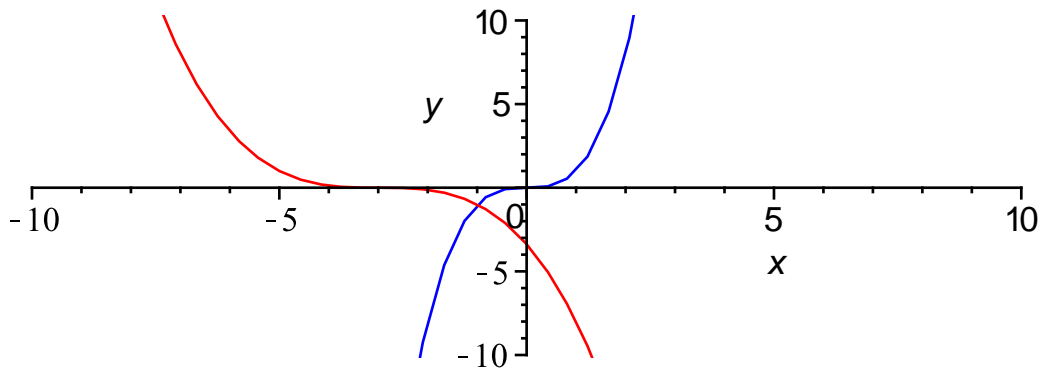
***Plot the base function b(x) in blue and the transformed function v(b(x)) in red (this is the intuitive transform)***

- > plot([b(x), v(b(x))], x=-L..L, y=-L..L, color=[blue, red])



***Plot the base function b(x) in blue and the transformed function b(h(x)) in red (this is the counter-intuitive transform)***

- > plot([b(x), b(h(x))], x=-L..L, y=-L..L, color=[blue, red])



***Now plot the base function b(x) in blue and v(b(h(x))) in red, this is the entire function***

- > plot([b(x), v(b(h(x)))] , x=-L..L, y=-L..L, color=[blue, red])

