Linear Transformations of Graphs

- $b(x)$ is the base function.
- $h(x)$ is the linear transform on the input to $b(x)$, it affects the graph horizontally, thus $h(x)$.
- $v(x)$ is the linear transformation on the output of $b(x)$, it affects the graph vertically, thus $v(x)$.

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

```
restart:
L := 10: # plot boundaries
b(x) := x -> x^3:
h(x) := x -> -1/2*(x + 3):
v(x) := x -> -x + 3:

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])
```