

Correction to lecture 4:

We considered the function $g(x) = \frac{1}{2}(-x-3)^2 - 2$.

If we write $f(x) = x^2$ we get $g(x) = \frac{1}{2}f(-x-3) - 2$.

We want to express $g(x)$ in terms of $f(x)$ using transformations, and hence sketch the graph of $g(x)$.

$f(x)$ parabola

$$f_1(x) = f(x) = x^2$$

$f(x+3)$ parabola shifted right by 3

$$f_2(x) = f_1(x-3) = (x-3)^2$$

$f(-x-3)$ horizontal flip

$$f_3(x) = f_2(-x) = (-x-3)^2$$

$\frac{1}{2}f(-x-3)$ vertical stretch by $\frac{1}{2}$

$$f_4(x) = \frac{1}{2}f_3(x) = \frac{1}{2}(-x-3)^2$$

$\frac{1}{2}f(-x-3) - 2$ vertical shift by -2

$$f_5(x) = f_4(x) - 2 = \frac{1}{2}(-x-3)^2 - 2$$

Picture:

