

Office hour on Saturday at 2:30-3:30pm (use same link as for class).

Find examshop website and try a few exam problems from Math 105, midterm 1.

Up to and including chapter 5.

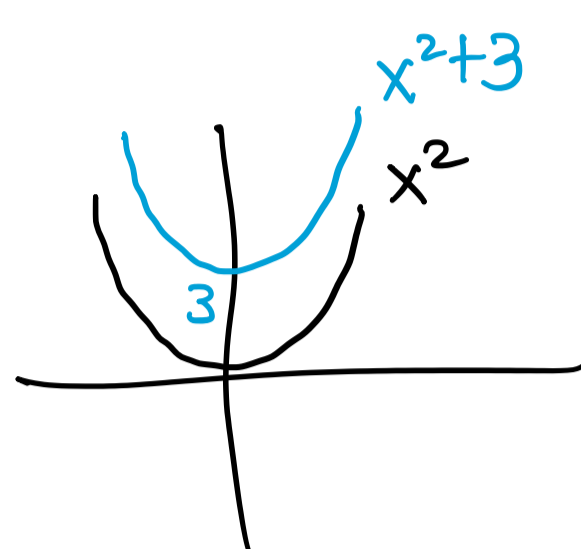
Translations of a function $f(x)$ in the form

$$y = f(x-h) + k$$

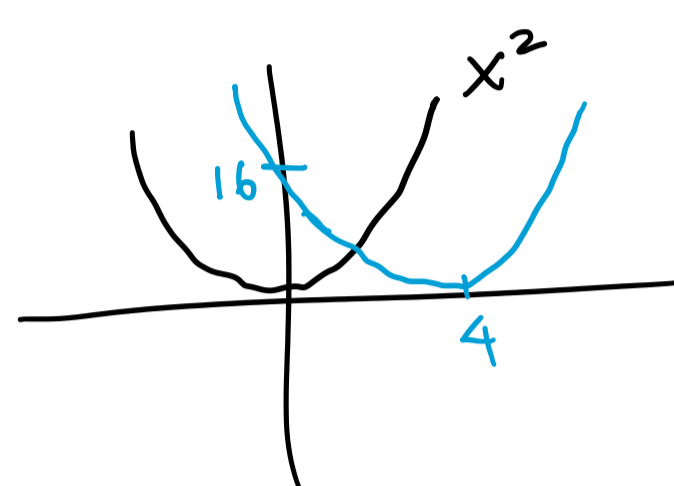
- Vertical shift of k units upward if $k > 0$ and k units downward if $k < 0$ (outside change — affects y -values)
- Horizontal shift of h units to the right if $h > 0$ and h units to the left if $h < 0$.

Example $y = x^2$

(a) $y = x^2 + 3$

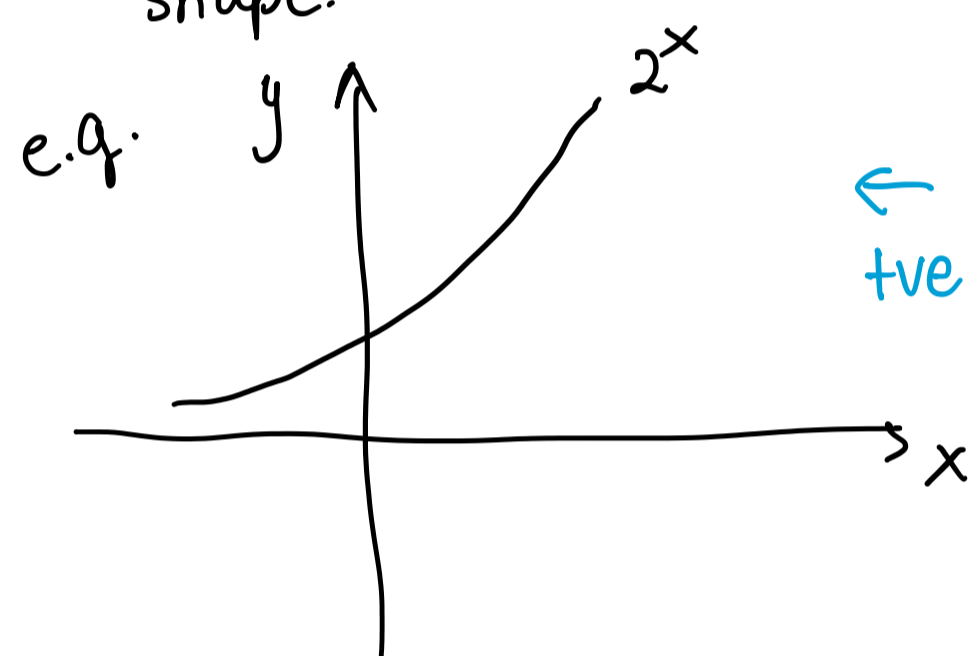


(b) $y = (x-4)^2$

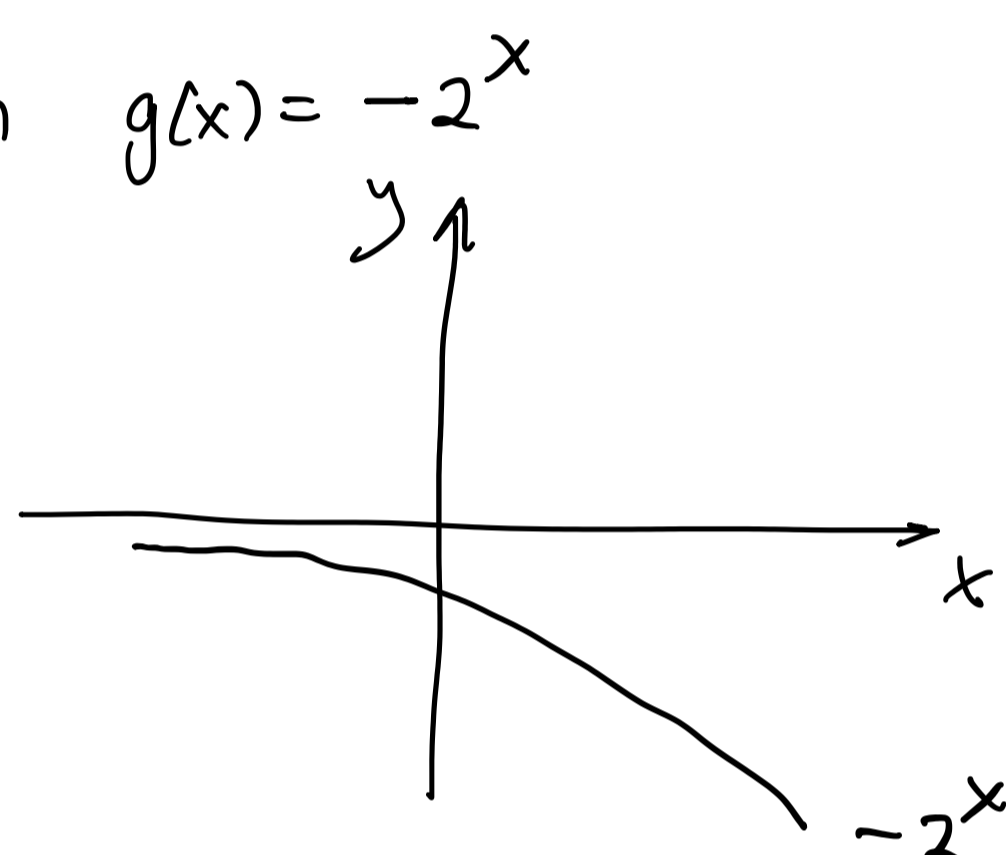


Reflections

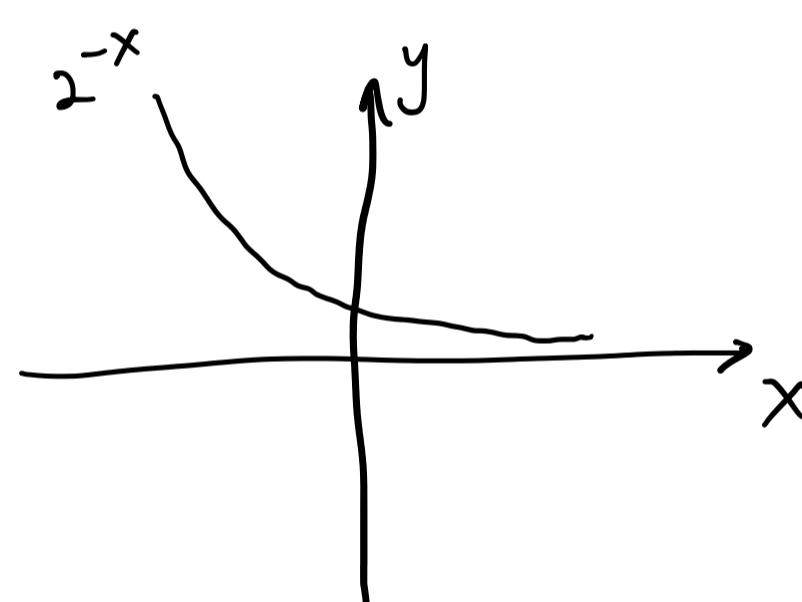
Reflections are transformations that flip a graph in the x - y plane without change its shape.



$f(x) = 2^x$. Sketch $g(x) = -2^x$
 ← +ve y -values



Sketch $h(x) = 2^{-x}$



Note A reflection across the x -axis corresponds to an outside change ($-f(x)$)
 A reflection across the y -axis corresponds to an inside change ($f(-x)$)

Determining if functions are odd or even.

Even functions satisfy: $f(x) = f(-x)$. Symmetric about the y -axis.

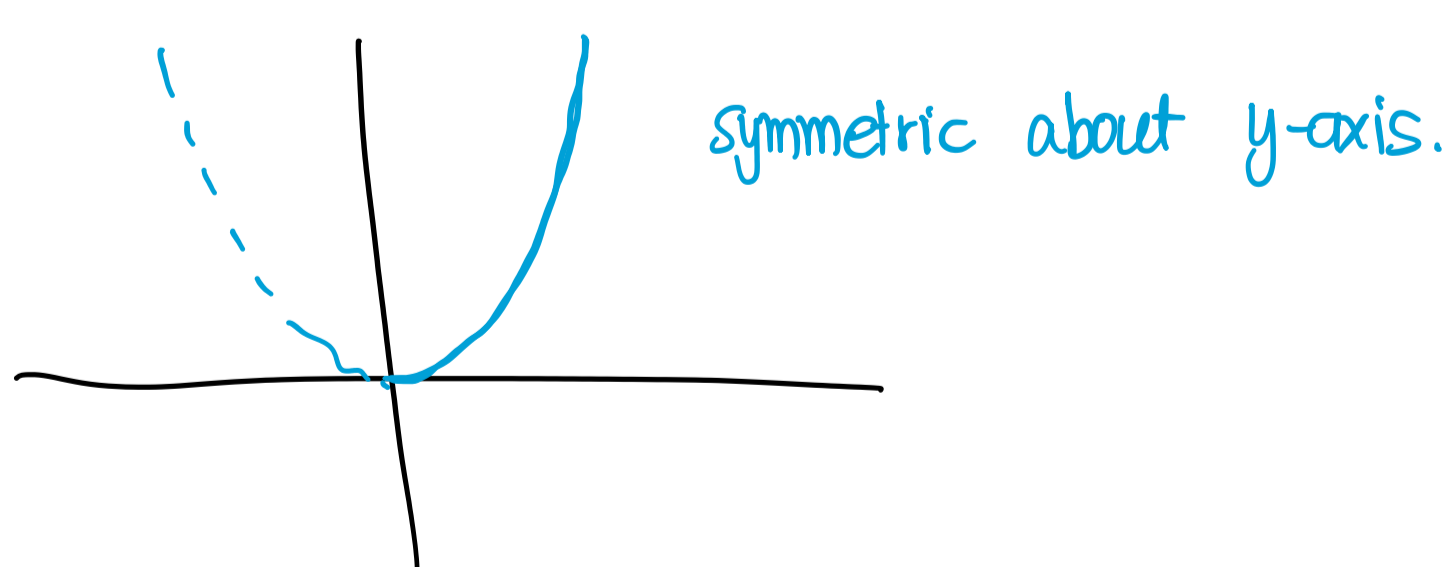
e.g. $f(x) = x^2$

Check algebraically that this is even
 $\Rightarrow f(x) = x^2$ is even.

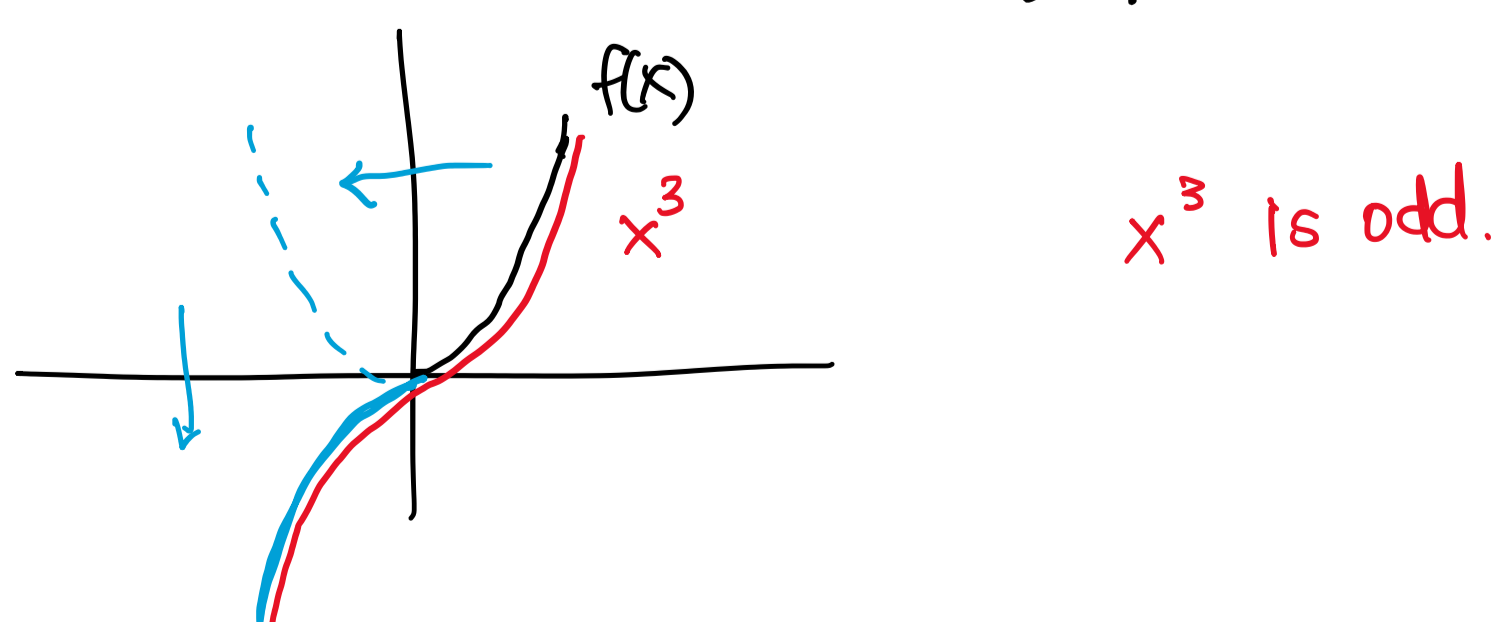
$f(-x) = (-x)^2 = x^2 = f(x)$ ✓

e.g. $f(x) = x^2 - 6$

$f(-x) = (-x)^2 - 6 = x^2 - 6 = f(x)$ ✓ also even.



Odd functions satisfy: $f(x) = -f(-x)$. Symmetric about the origin.



e.g. $f(x) = x^5 - 4x^2 + 1$

$f(-x) = (-x)^5 - 4(-x)^2 + 1 = -x^5 - 4x^2 + 1$ neither.