Lecture 10/25/23: Vertical + Horizontal Shifts (ctd) and Reflection + even and odd functions

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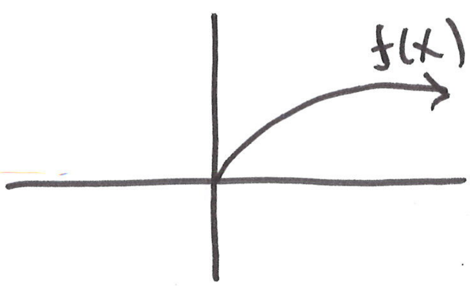
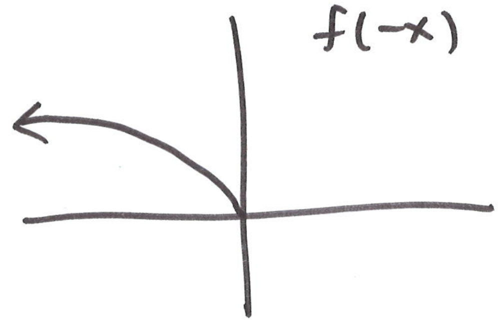
Review Defn's of horizontal + vertical shifts

Reflection about y-axis: let $f(x)$ be a function. The graph of $f(-x)$ is the graph of $f(x)$ ~~flippled~~ reflected about the y-axis





Ex # 9 Workbook

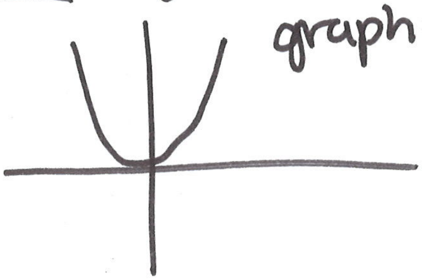
Even functions: A function $f(x)$ is called even if

$$f(x) = f(-x)$$

i.e if we reflect it about the y-axis it does not change

Ex: $y = x^2$ is even

graphically



algebraically:

We need $f(x) = f(-x)$, so let's check if this is true

$f(x) = x^2$

$f(-x) = (-x)^2 = (-1)^2 x^2 = x^2$

So $f(x) = f(-x)$, so f is even!

#7 is fun! Use defn or draw a picture!

<u>Reflection about x-axis</u>: Let $f(x)$ be a function.
The graph of $-f(x)$ is the graph of $f(x)$ reflected about the x-axis

<u>Ex</u>: #10

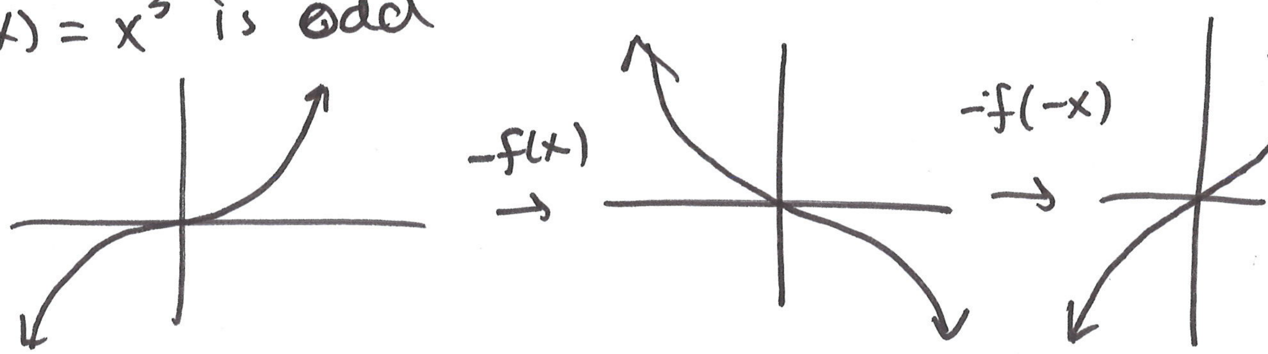
<u>Odd functions</u>: A function f is said to be odd if

$$f(x) = -f(-x).$$

I.e if we flip f across y-axis and x-axis, the graph is the same

<u>Ex</u>: $f(x) = x^3$ is odd

graphically



algebraically: we need to show $f(x) = -f(-x)$.

$f(x) = x^3$

$-f(-x) = -(-x)^3 = (-1)(-1)^3 x^3 = x^3$

So $f(x) = -f(-x)$; hence f is odd!

#8 is also fun!