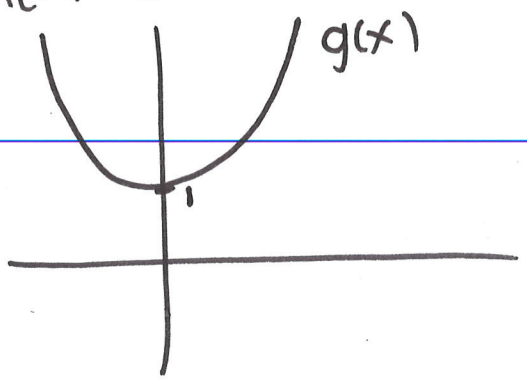
Lecture 10/23/23 : Vertical + Horizontal Shifts

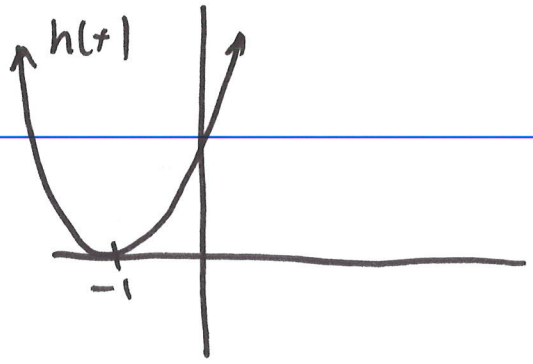
Quiz 7 This week
Extra Credit? TBD

Warm up: #1 parts c, d, e first then a, b. #2 } 10 min

Problem 1 gives us an example of vertical + horizontal shifts of functions!

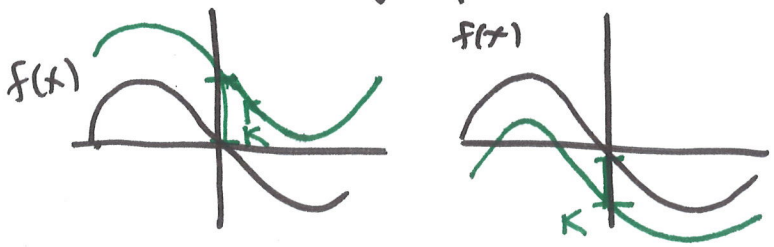
$f(x) = x^3$
$g(x) = x^2 + 1$ ← f(x) shifted up by 1
$h(x) = (x+1)^2$ ← f(x) shifted left by 1





Vertical shifts: Let $K > 0$ and $f(x)$ any function

1. The graph of $f(x) + K$ is the graph of f shifted up by K units

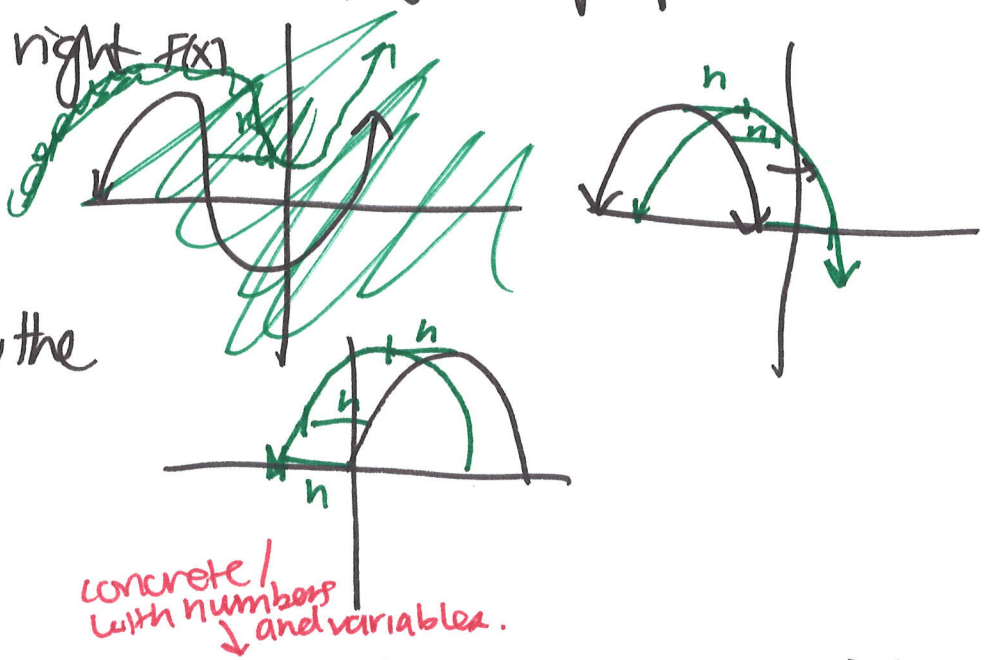


2) The graph of $f(x) - K$ is the graph of f shifted down by K units

Horizontal shifts: Let $h>0$ and $f(x)$ any function.

1) The graph of $f(x-h)$ is the graph of $f(x)$ shifted h units to the right

2) The graph of $f(x+h)$ is the graph of $f(x)$ shifted h units to the left



concrete / with numbers and variables.

Ex: Find explicit formulas for the following functions. Describe how their graphs compare to $f(x)=e^x$

a) $g(x)=f(x+1)$ e^x shifted left 1 unit

$g(x)=e^{x+1}$

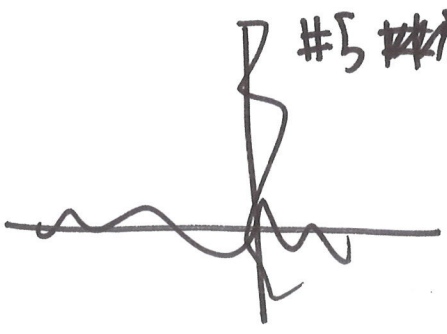
b) $h(x)=f(x-1)$ e^x shifted right one unit.

$h(x)=e^{x-1}$

c) $k(x)=f(x)+2$ e^x shifted up two units

$k(x)=e^x+2$

Ex: #5 on projector.



#9 Board!