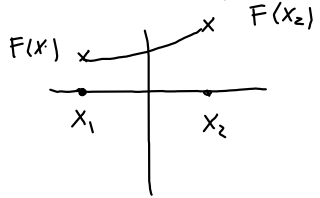
Ex $f\uparrow$ $g\downarrow$ $\quad f\circ g$? $\uparrow$ OR $\downarrow$?

WE REMEMBER : $F\uparrow \iff x_1 < x_2$

$F(x_1) \Downarrow < F(x_2)$



$x_1 < x_2 \overset{?}{\Rightarrow} f\circ g(x_1) < f\circ g(x_2)$ or $>$

$x_1 < x_2$ $\quad g\downarrow$ WE FLIP

$g(x_1) > g(x_2)$

$f\uparrow$ WE DON'T FLIP

$f(g(x_1)) > f(g(x_2))$

$\Vert$

$f\circ g(x_1) > f\circ g(x_2)$

: $f\circ g$ FLIPS $\Downarrow$ $f\circ g\downarrow$

Ex

f EVEN

g ODD

$\Rightarrow \quad f+g \;?$

f ?

$f(x) = x^2$

$f+g : \quad x^3 + x^2$

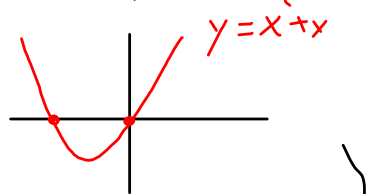
g ?

$g(x) = x^3$

$g(x) = x$

GRAPH IS NOT IMMEDIATE

$f+g : \quad x^2 + x$



NO SYMMETRY W.R.T $(0,0)$

OR $\quad X = 0$

$\Rightarrow$ NOT ODD OR EVEN

Ex

f EVEN
g ODD

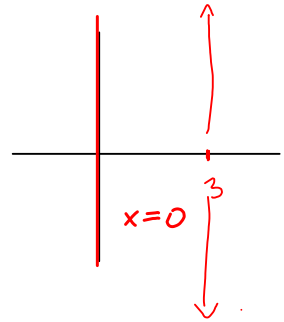
IS POSSIBLE FOR $f+g$ TO BE EVEN?

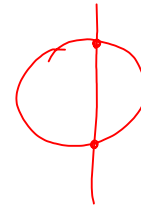
$f(x) = x^2$ EVEN

$g(x) = 0$ BOTH EVEN AND ODD

$f+g$ IS EVEN

$x^2 + 0$ IS EVEN

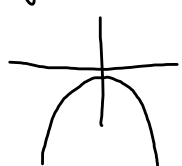




Ex $f\uparrow$ $g\downarrow$ $\overset{?}{\Rightarrow}$ $f\cdot g$ $\downarrow$? OR $\uparrow$?

$f\uparrow, g\downarrow$ S.T. $f\cdot g$: $\uparrow$ $f(x)=$ $g(x)=$ MAY NEVER HAPPEN ?

$f\uparrow, g\downarrow$ S.T. $f\cdot g$ $\downarrow$ $\uparrow f(x)=x$ $\downarrow g(x)=-x$ $\uparrow f\cdot g(x)=-x^2$



$f\uparrow, g\downarrow \Rightarrow f\cdot g\uparrow$ WE WANT TO PROVE THAT

$x_1 < x_2$ we want $f\cdot g(x_1) < f\cdot g(x_2)$