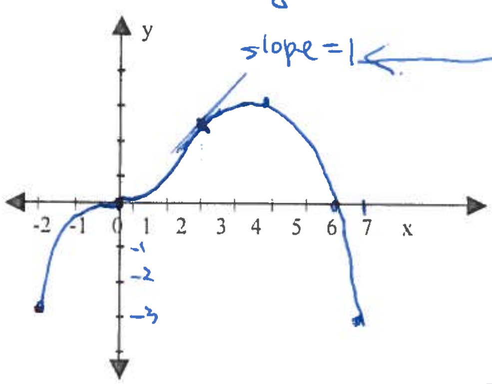
Group Memebers: Sol

Classwork 5 – Curve Sketching

1. Sketch a graph of a differentiable function $f(x)$ over the closed interval $[-2, 7]$, where $f(-2) = f(7) = -3$ and $f(4) = 3$. The roots of $f'(x)$ occur at $x = 0$ and $x = 6$, and $f'(x)$ has the properties indicated in the table below.

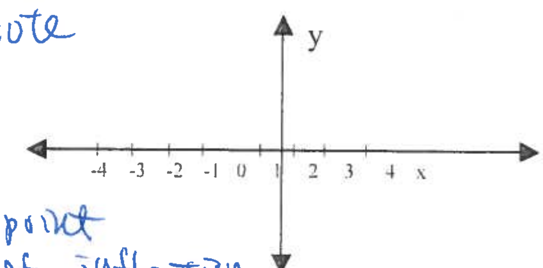
$\Leftrightarrow f(0)=0,\ f(6)=0$

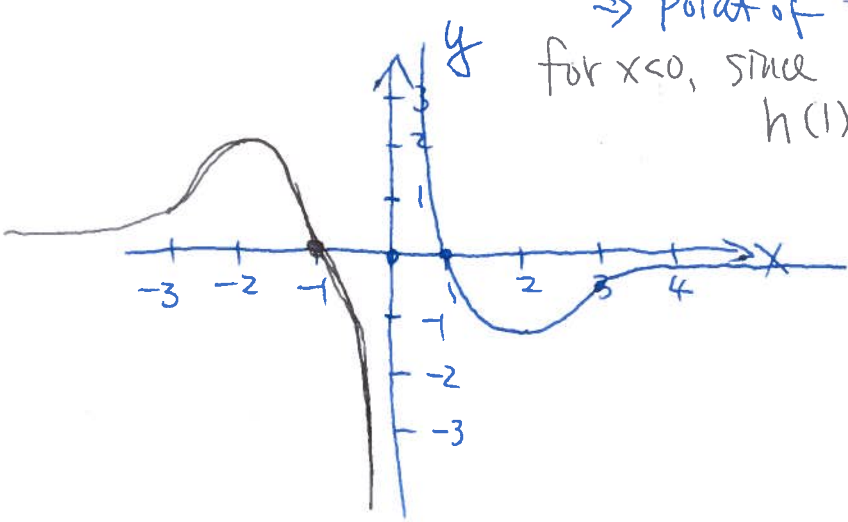
x	$-2<x<0$	$x = 0$	$0<x<2$	$x = 2$	$2<x<4$	$x = 4$	$4<x<7$
$f'(x)$	positive	0	positive	1	positive	0	negative
$f''(x)$	negative	0	positive	0	negative	0	negative
$f(x)$	concave down, Increasing	point of inflection	Increasing, concave up	point of Inflection	Increasing, concave down		Decreasing, concave down



2. a) as $x=0$, $\Rightarrow h(0) = -h(0)$
$\Rightarrow h(0)+h(0) = 0 \Rightarrow 2h(0) = 0$
$\Rightarrow h(0) = 0$.

2. Sketch function h(x) from the following information:
   a) $h(-x) = -h(x)$
   b) $\lim_{x\to 0^+} h(x) = \infty$ $\Rightarrow$ vertical asymptote
   c) $\lim_{x\to\infty} h(x) = 0$
   d) for $x>0$, $h(x) = 0$ only at $x = 1$ $\Rightarrow h(1)=0$
   e) for $x>0$, $h'(x) = 0$ only at $x = 2$ $\Rightarrow$ critical point
   f) for $x>0$, $h''(x) = 0$ only at $x = 3$ $\Rightarrow$ Point of inflection,





for $x<0$, since $h(1)=0$, $h(-1) = -h(1) = 0$

$\lim_{x\to 0^-} h(x) = -\infty$

$\lim_{x\to -\infty} h(x) = 0$.