$p(Q^*) + Q^* p'(Q^*) = k \Rightarrow Q^* = \underline{\ ?\ }$ hard to find explicit form

$$\frac{dQ^*}{dk} = \_\_\_$$

changes in exogenous factors $\longrightarrow$ optimal quantities

e.g. k e.g. Q^*

Section 8.4 Exercise 8

function f is continuous over $(-1, 1)$

But it is not continuous over $[-1, 1]$ $\longrightarrow$ Thm 8.4.1 does not apply.

Section 8.5 Example 4

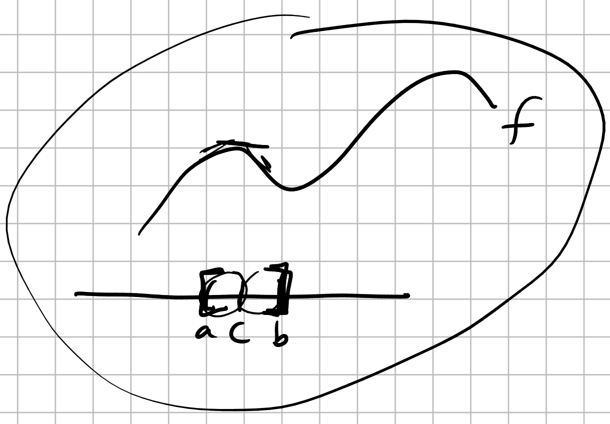
$\delta > 0$

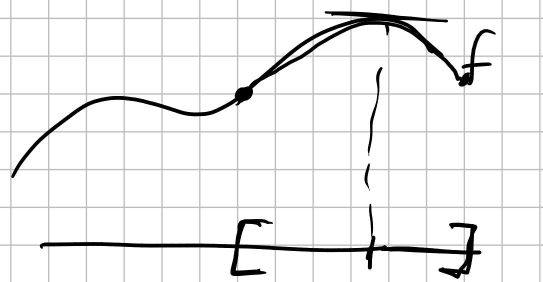
$$u = 1 \cdot \ln c_1 + \boxed{\frac{1}{1+\delta}} \ln c_2 \qquad \frac{1}{1+\delta} < 1$$

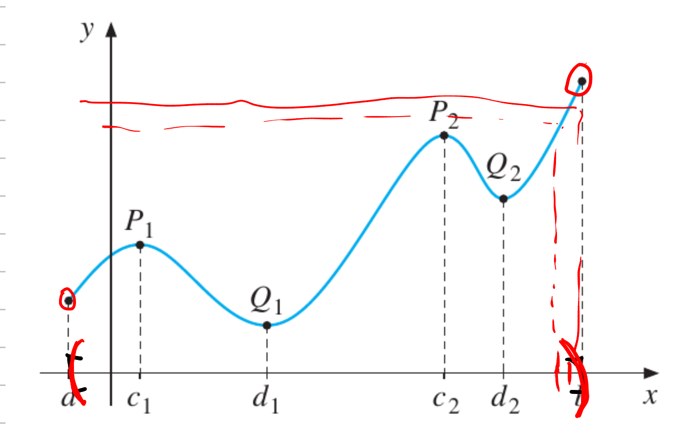
HW01 $2x + 2y = 8 \Rightarrow x + y = 4$ Area $= xy$

$A(x) = x(4 - x)$

r, y_1, y_2 are exogenous (given, taken as)



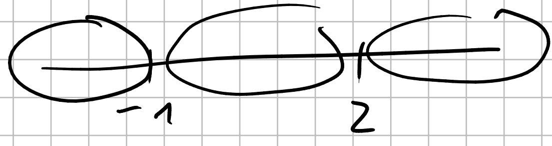




b is global max if $[a, b]$ is the interval
a, b are included

c_2 is local max but we could not find global max on (a, b)

stationary pts $-1, 2$



(optional)

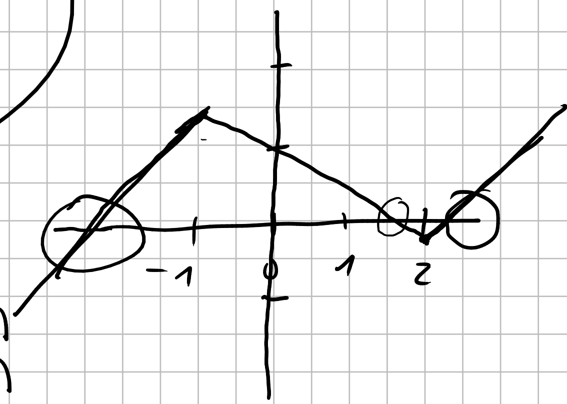
Interval	Test point	Sign of f'	Remarks.
$x<-1$	-2	$(+)$	f is inc.
$x=-1$			f has local max
$-1<x<2$	0	$(-)$	f is dec.
$x=2$			f has local min
$x>2$	3	$(+)$	f is inc.

$$f'(x)=\frac{1}{3}(x+1)(x-2)$$

table has a by-product → Sketch a curve by hand

$$\frac{1}{3}(x+1)(x-2)$$

Interval	Sign of $f'(x)$	Remarks.
$x<-1$	$(+)(-)(-)=(+)$	
$x=-1$		
$-1<x<2$	$(+)(+)(-)=(-)$	
$x=2$		
$x>2$	$(+)(+)(+)=(+)$	



$$f(x)=\frac{1}{9}x^3-\frac{1}{6}x^2-\frac{2}{3}x+1$$

has a local max at $x=-1$

has a local min at $x=2$

Does it have global max/min?

$$\lim_{x\to\infty} f(x)=+\infty \quad , \quad \lim_{x\to-\infty} f(x)=-\infty$$

$$f'(x)=\frac{1}{3}x^2-\frac{1}{3}x-\frac{2}{3}$$

$$f''(x)=\frac{2}{3}x-\frac{1}{3}$$

$c=-1, 2$

$f''(-1)=$ ___ $<0 \Rightarrow$ local max

$f''(2)=$ ___ $>0 \Rightarrow$ local min

$$f'(x)=x^2-7x+10$$

$$f'(x)=0$$

$$(x-5)(x-2)=0$$