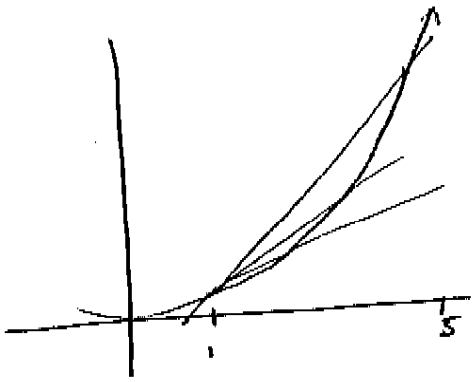
9,3
1/3

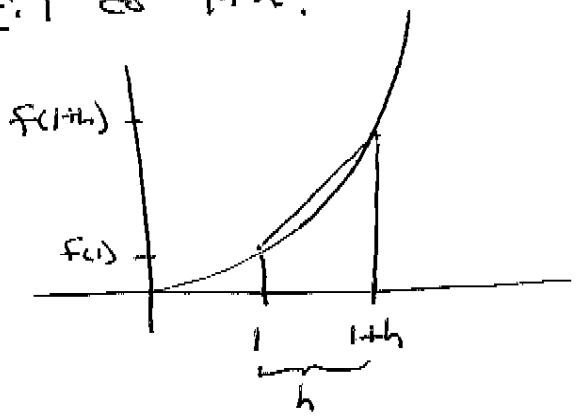
Ex1: Find the average RoC of $f(x) = x^2$ on $[1,5]$, $[1,4]$, $[1,3]$, ...



Average RoC $= \dfrac{f(b) - f(a)}{b - a}$

As $b - a \to 0$, the Ave. RoC $\longrightarrow$ Instantaneous RoC.

Ex2: Find the instantaneous RoC of $f(x) = x^2$ at $x = 1$. Let h represent the change in x from 1st: 1 to $1+h$.



Ave RoC $= \dfrac{f(1+h) - f(1)}{h}$

2nd: ~~2nd~~: $f(1+h) - f(1)$

3rd: form diff. quot.

4th: Determine $f'(1)$.

Defn: The Derivative.

If f is a function defined by $y = f(x)$, then the derivative of $f(x)$ at any value x, denoted $f'(x)$, is

$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

if this limit exists. If $f'(c)$ exists, we say that f is differentiable at c.

9.3
2/3

Ex3: Find ~~the~~ $f'(x)$ if $f(x) = 2x^2 - x$.

Ex4: Find $g'(x)$ if $g(x) = 3 - 2x$ (for grays).

The Derivative gives the slope at a point.

pt - slope form

Ex5: Find the tangent line to $f(x) = 2x^2 - x$ when $x = -3$.

Back in ch1, marginal cost was defined as the slope of the cost fct.

Ex6: (a) If $c(x) = 25x + 1000$, find $\overline{MC}$.

(b) review of fixed cost.

(c) what does $\overline{MC}$ mean.

Ex7: Suppose $P(x) = 500x - x^2 - 100$ gives the profit from the sale of x cans.

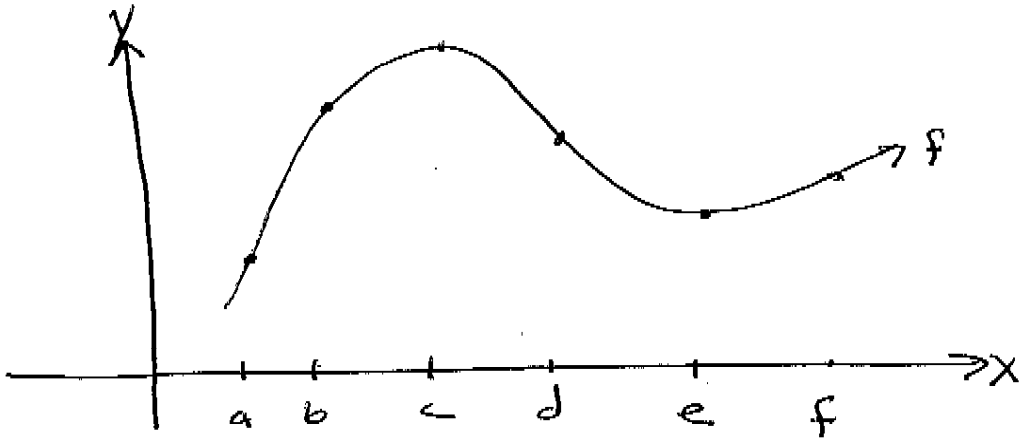
a) Find $\overline{MP}$

b) Find & interpret $\overline{MP}(200)$

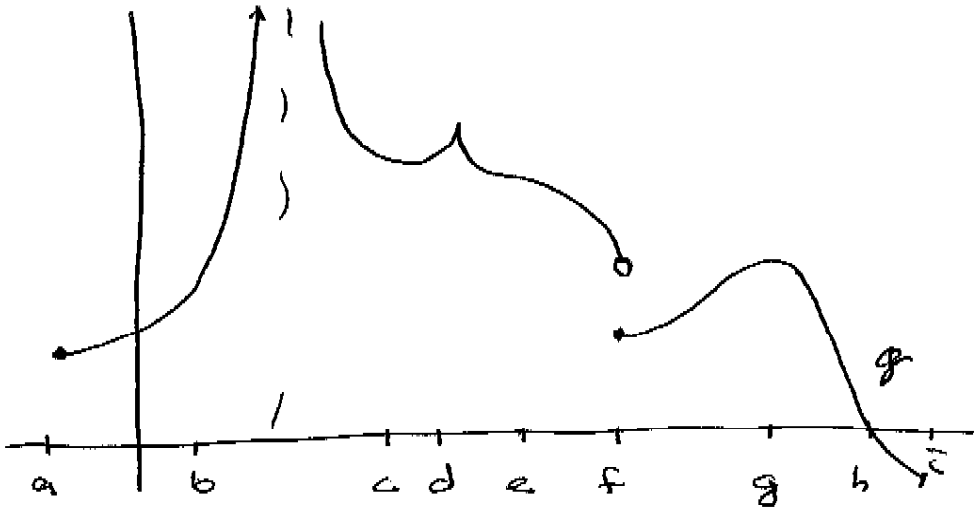
c) " " $\overline{MP}(300)$

9.3
3/3

The Graphical Derivative



order $f'(a), \ldots, f'(f)$ from greatest to least.



What can be said about g' @ $x = a, \ldots, i$?