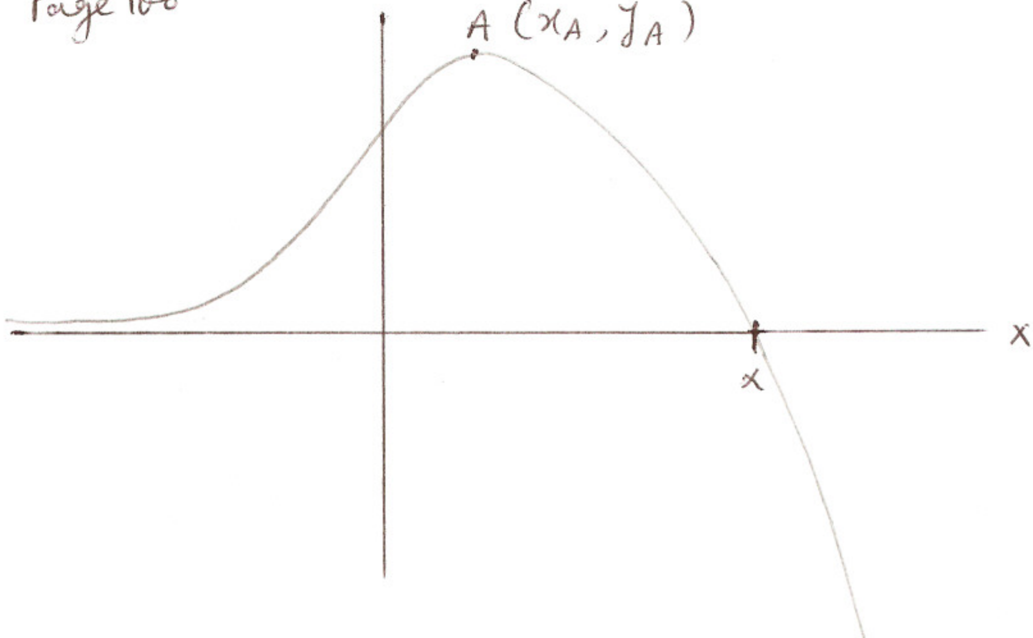
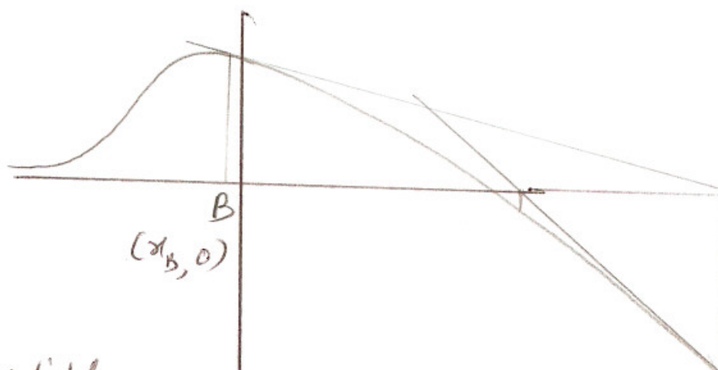
Q7 Page 100

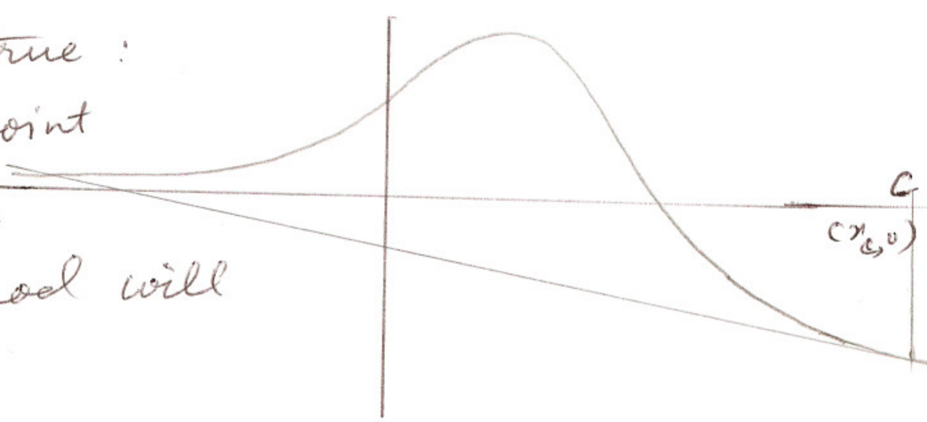


(I) Note that point A where $f'(x_A) = 0$ is at $x_A > 0$. (II) Also note that there is no change in the sign of the curvature after $x_0 = \alpha$

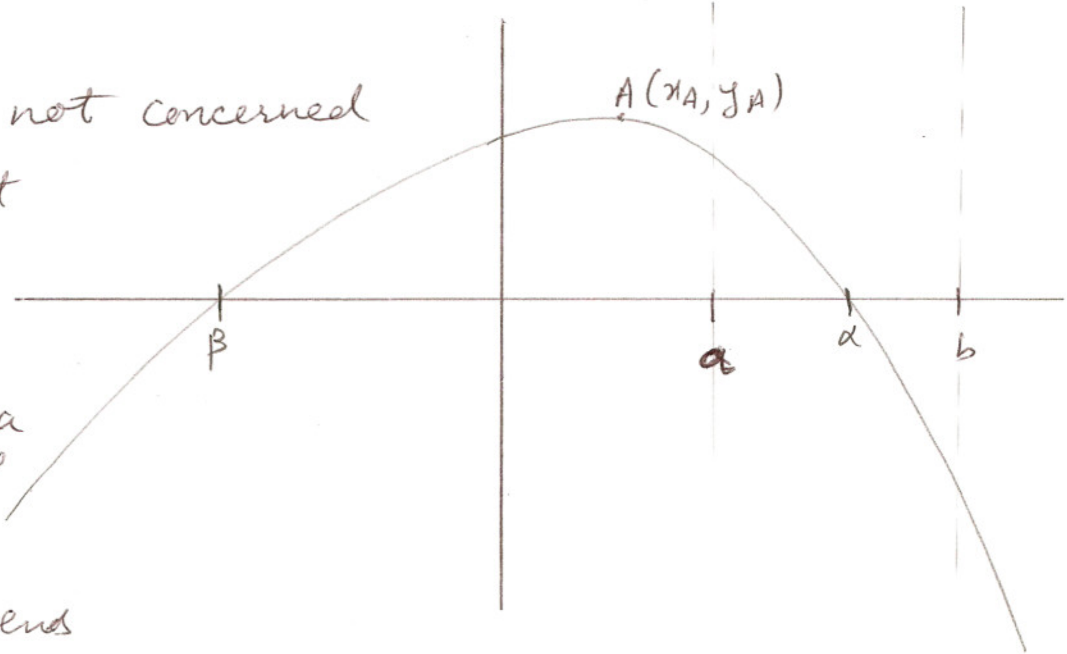
If (I) were not true: You will be able to find a point x_B as your initial point so that $x_B < 0$ and still it converges.



If (II) were not true: you can find a point $C(x_c, y_c)$ and $(x_c > 0)$ beyond which the method will not converge.



Q8.



We are not concerned with what happens between $\underbrace{x=\beta \text{ and } x=a}$

and

what happens $\underbrace{\text{beyond } x=b}$

Again notice that the point A where $f'(x_A)=0$ occurs somewhere ~~between~~ in the interval (β, a).

Again it is important that there is no sign change in the curvature of the curve between a and b i.e. when $x \in [a, b]$ and also when $x \le \beta$.

spring 2005 Q 4.

Based on the above two questions of HW similarly you can see that for the ~~function~~ ~~f(x)~~ to Newton's method never to diverge $\forall\ x \in (-\infty, +\infty)$

(I) $f'(x_0) \neq 0 \quad \forall\ x_0 \in (-\infty, +\infty)$

which means $f'(x) \neq 0 \quad \forall\ x \in (-\infty, +\infty)$

This necessary because otherwise in the formula $x_{n+1} = x_n - \dfrac{f(x_n)}{f'(x_n)}$

The denominator become zero.

(II) Also $f(x)$ should not approach '0' (zero) asymptotically as x goes to $\pm\infty$. This can be seen ~~from~~ Q7.

(III) There should not be any point of inflection