# Secant Method:-

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

in above case $f'(x_n)$ is Analotical so Raphson method is some times called hybraid method Compination of Numerial and analotical

→ In secant method we will ~~$f'(x_n)$ eliminate~~ replace $f'(x_n)$.

| | |
|---|---|
| $x$ | $y = f(x)$ |
| $x_{n-1}$ | $f(x_{n-1})$ |
| $x_n$ | $f(x_n)$ |
| $x_{n+1}$ | $f(x_{n+1})$. |

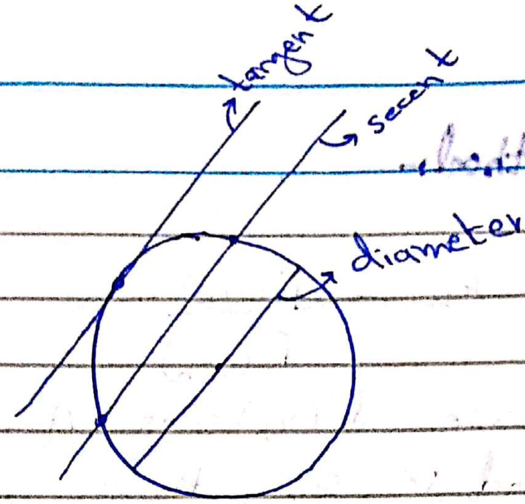
Approximation of $f'(x_n)$

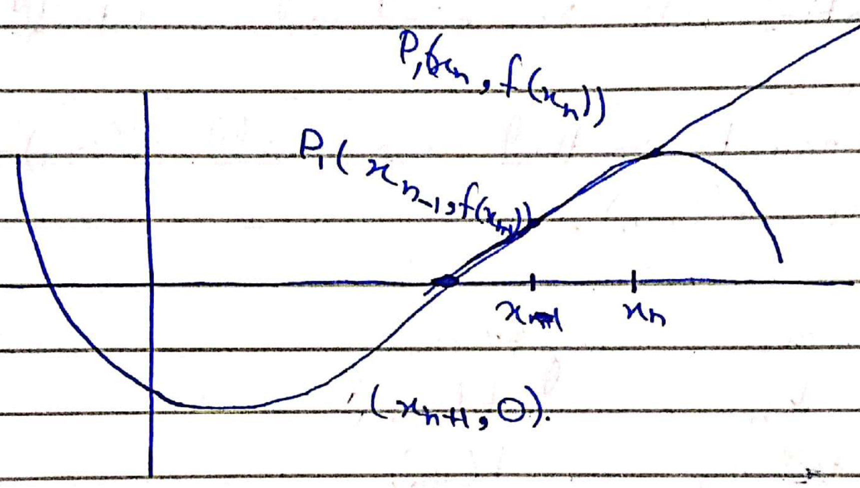
$$f'(x_n) \approx \frac{f(x_n) - f(x_{n-1})}{x_n - x_{n-1}} \quad \because m = \frac{y_2 - y_1}{x_2 - x_1} \text{ formula of sloap.}$$

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

$$= x_n - \frac{f(x_n)}{\frac{f(x_n) - f(x_{n-1})}{x_n - x_{n-1}}}$$

$$x_{n+1} = x_n - \frac{[x_n - x_{n-1}]\, f(x_n)}{f(x_n) - f(x_{n-1})}.$$




$$y - y_2 = \frac{y_2 - y_1}{x_2 - x_1}(x - x_2)$$

$x_1 = x_{n-1}$ $\quad$ $x_2 = x_n$

$y_1 = f(x_{n-1})$ $\quad$ $y_2 = f(x_n)$

$$y - f(x_n) = \frac{f(x_n) - f(x_{n-1})}{x_n - x_{n-1}}(x - x_n)$$

put $x = x_{n+1}$, $y = 0$

$$0 - f(x_n) = \frac{f(x_n) - f(x_{n-1})}{x_n - x_{n-1}}(x_{n+1} - x_n)$$