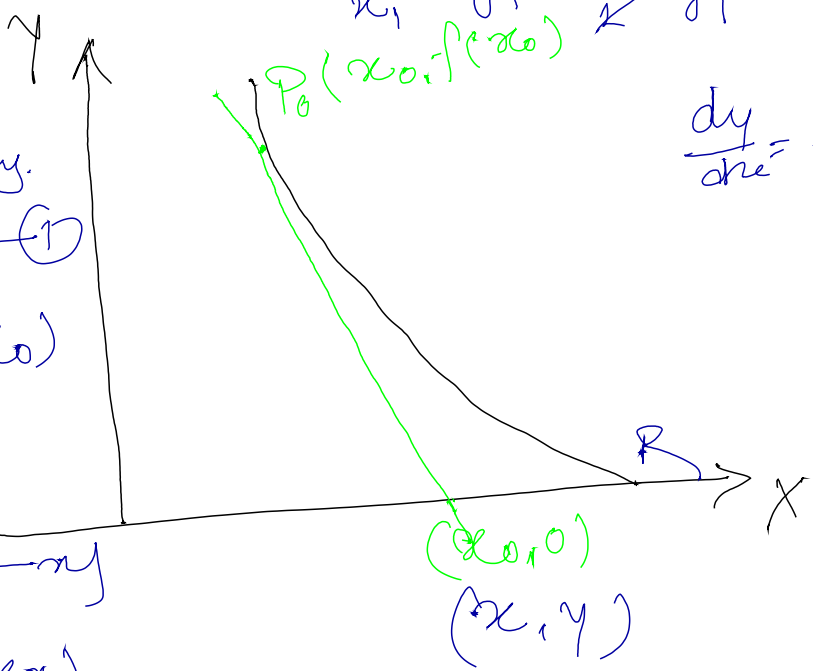
Date 01/10/21

Newton Raphson Method



Tangent slope Eqn w/ Eq. of Tang.

$$y - y_1 = \frac{dy}{dx}(x - x_1) \quad \text{--- (1)}$$

$$\frac{dy}{dx} = f'(x)$$

$$0 - f(x_0) = f'(x_0)\cdot(x - x_0)$$

$$0 - f(x_0) = f'(x_0)(x_1 - x_0)$$

$$(x_1 - x_0) = \frac{-f(x)}{f'(x_0)}$$

$$\boxed{x_1 = x_0 - \frac{f(x_0)}{f'(x_0)}}$$

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

Newton-Raphson formulae.

$x_0 =$ ≠ 0

(−)ve to (+)ve

Q① find the N.R method, root of eqn $x^3 - 3x - 5 = 0$.

(1) $x = 0$

$$f(x) = x^3 - 3x - 5$$

$$= 0 - 0 - 5 = -5$$

$x = 1$ $\quad f(1) = 1^3 - 3\cdot 1 - 5 = -7$

$x = 2$ $\quad f(2) = 8 - 6 - 5 = -3$ (−)

$f(3) = 27 - 9 - 5 = 16$ (+)

x_2 -1 to 0

$\boxed{x_0 = 2}$