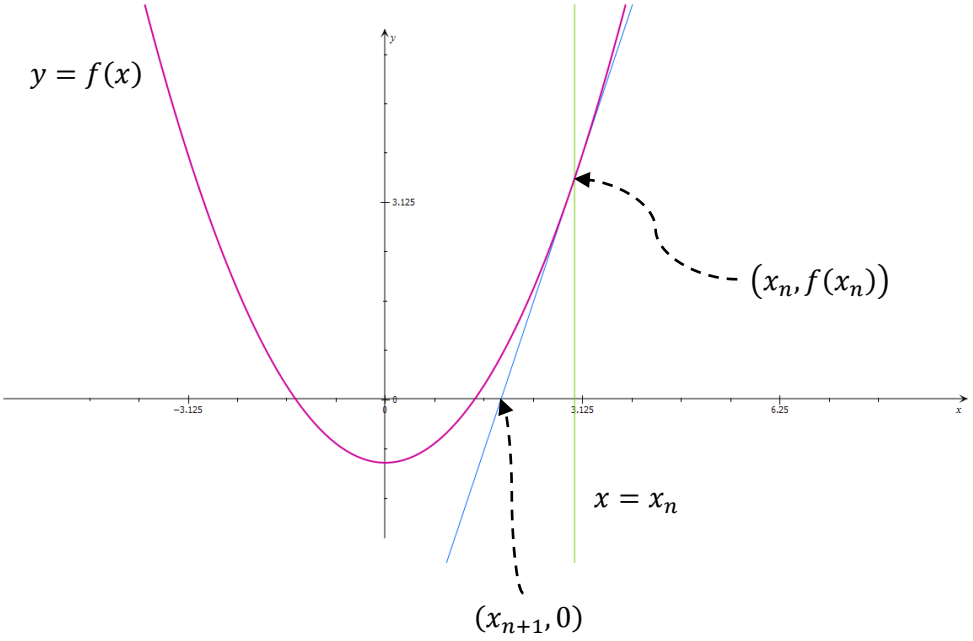
Newton's Method

(1)



$$y - f(x_n) = f'(x_n)(x - x_n)$$

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

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

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

$$\therefore x \leftarrow x - \frac{f(x)}{f'(x)}$$

(2)

$$x = \sqrt{n} \qquad x^2 = n \qquad x^2 - n = 0$$

$$x \leftarrow x - \frac{x^2 - n}{2x} = \frac{2x^2 - x^2 + n}{2x} = \frac{x^2 + n}{2x} = \frac{1}{2}\left(x + \frac{n}{x}\right)$$