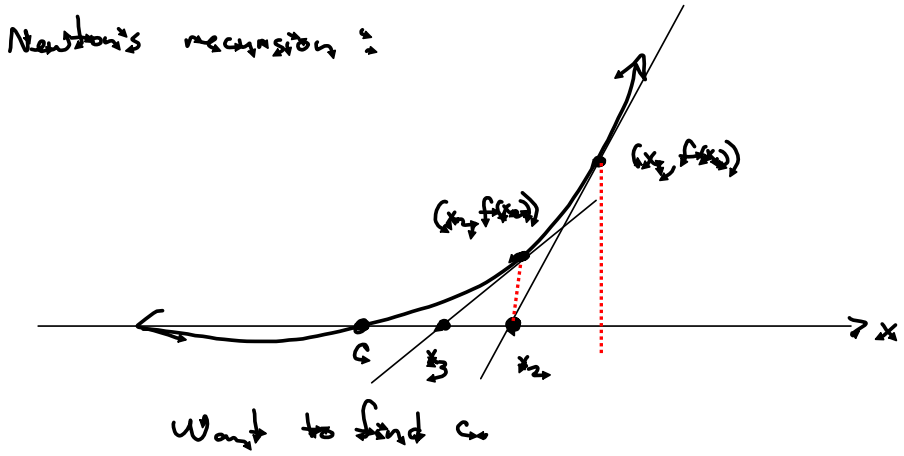
Section 3.8 - Newton's Method

Click here for spreadsheet examples on a variety of functions.

Each of the links to spreadsheets will download the Excel (.xlsx) file and it will be an old homework exercise, implemented with Excel.



$$L(x) = f'(x_1)(x - x_1) + f(x_1) \overset{\text{SET}}{=} 0$$

$$\Rightarrow f'(x_1)(x - x_1) = -f(x_1)$$

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

$$\Rightarrow x = x_2 = x_1 - \frac{f(x_1)}{f'(x_1)}$$

Example:

#6:

We solve $x^{\frac{1}{3}} - x^2 + 1 = 0$

$f(x) = x^{\frac{1}{3}} - x^2 + 1 \longrightarrow$

$f'(x) = \frac{1}{3}x^{-\frac{2}{3}} - 2x$

$$x_{k+1} = x_k - \frac{f(x_k)}{f'(x_k)} = x_k - \frac{x_k^{\frac{1}{3}} - x_k^2 + 1}{\frac{1}{3}x_k^{-\frac{2}{3}} - 2x_k}$$

Click here for spreadsheet download, implementing the Newton recursion to find the zero of $f(x)$.

#16* $f(x) = 2\cos(x) - x^4$

*from where, I have no idea.

$f'(x) = -2\sin(x) - 4x^3$

spreadsheet #6:

Click here for the spreadsheet implementation of this exercise.