Optimization-Basic Assignment

V.Meghana   FWC22045

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Problem Statement - **Find the maximum value of $2x^3 - 24x + 107$ in the interval $[1, 3]$. Find the maximum value of the same function in $[-3, -1]$**

Solution

1. For Maxima :
   Using gradient ascent method,

$$x_n = x_{n-1} + \mu \frac{df(x)}{dx} \tag{1}$$
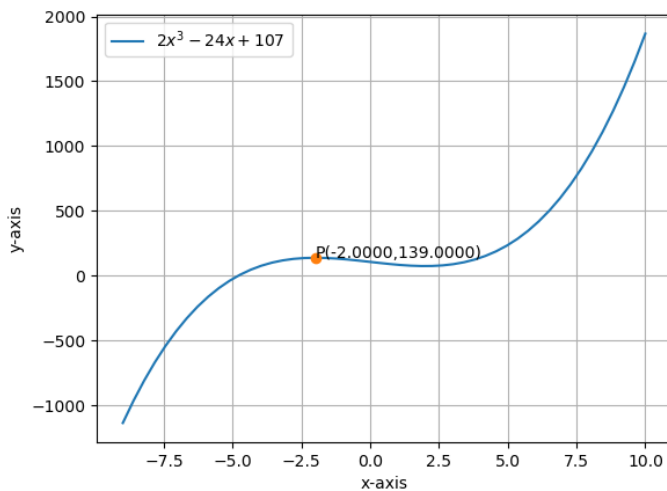
$$\frac{df(x)}{dx} = 6x^2 - 24 \tag{2}$$

After substituting **??** in **??** we get:

$$x_n = x_{n-1} + \mu(6x^2 - 24_{n-1}) \tag{3}$$

Taking $x_0 = 1, \mu = 0.001$ and $precision = 0.00000001$, values obtained using python are:

$$\boxed{\text{Maxima} = 138.99999999999997 \approx 139} \tag{4}$$

$$\boxed{\text{Maxima Point} = -1.9999999600969427 \approx -2.0} \tag{5}$$

Graph of f(x) $= 2x^3 - 24x + 107$