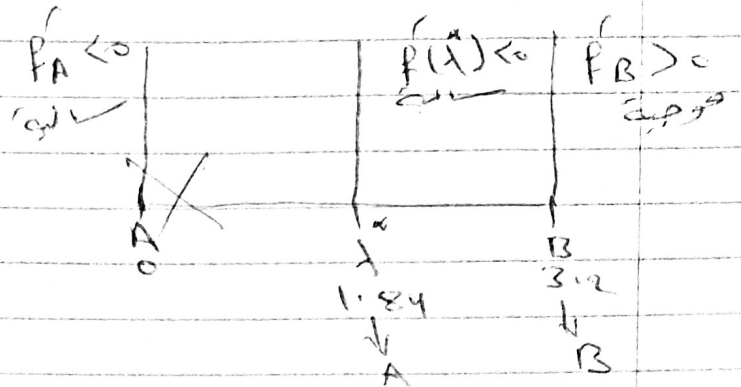


iteration 1:-



iteration (2):-

$$A = 1.84 \quad f_A = -41.86 \quad f'_A = -13.47$$

$$B = 3.2 \quad f_B = 112.7 \quad f'_B = 350.69$$

$$Z = -3.72$$

$$C = 68.63$$

$$\lambda^* = A + \frac{f'_A + Z + C}{f'_A + f'_B + 2Z} (B - A)$$

$$= 1.84 + \frac{-13.47 + (-3.72) + 68.63}{-13.47 + 350.69 + 2(-3.72)} (3.2 - 1.84)$$

$$= 1.84 - 0.35 = 1.49$$

$$\text{so } 1.84 + 0.21 = 2.05$$

2.05 is the new value of λ .

$$f(\lambda^*) = 5(2.05)^4 - 15(2.05)^2 - 20 = 5.27$$

$$|f(\lambda^*)| = |5.27| = 5.27 > \epsilon$$

$$f'(\lambda^*) = -42.87$$

Example:- Find the minimum of

$$f(A) = (A-1)^4$$

by cubic interpolation method where $A = 0$
 $t_0 = 0.2$ and $\epsilon = 0.05$

Solution:-

$$f'(A) = 4(A-1)^3$$

$$f'(A) = f'(0) = 4(0-1)^3 = -4 < 0$$

$$f(A) = f(0) = 1$$

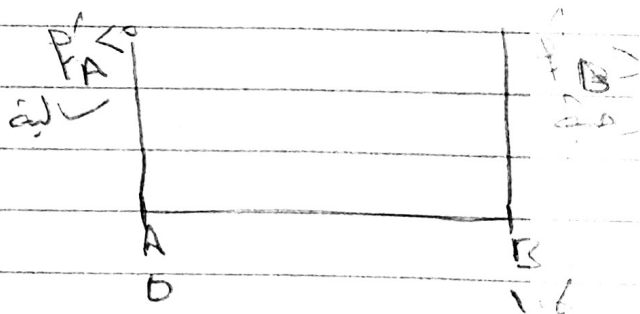
$$f'(t_0) = f'(0.2) = 4(0.2-1)^3 = -2.048 < 0 \quad \text{dr}$$

$$f'(2t_0) = f'(2(0.2)) = f'(0.4) = 4(0.4-1)^3 = -0.864 < 0 \quad \text{dr}$$

$$f'(4t_0) = f'(4(0.2)) = f'(0.8) = 4(0.8-1)^3 = -0.032 < 0 \quad \text{dr}$$

$$f'(8t_0) = f'(8(0.2)) = f'(1.6) = 4(1.6-1)^3 = 0.864 > 0$$

$$f(1.6) = (1.6-1)^4 \\ = 0.1296$$



iteration (1):-

$$A = 0$$

$$f_A = 1$$

$$f'_A = -4$$

$$B = 1.6$$

$$f_B = 0.1296$$

$$f'_B = 0.864$$

$$A < \hat{A} < B$$