Imroatul Hasanah.

No.

Date . .

① Diketahui data-data berikut:
(0, -6); (2, 4); (4, 10).
Tentukan perkiraan dari f(1)
penyelesaian (Interpolasi Newton Gregory Maju)

x	f(x)	Δf(x)	Δ²f(x)	
0	-6			→ f(x₀)
		10		→ Δf(x₀)
2	4		-4	→ Δ²f(x₀)
		6		
4	10			

h = 2

$s = \frac{x-0}{2} = \frac{x}{2}$

$P_2(x) = f(x_0) + \Delta f(x_0).s + \frac{\Delta^2 f(x_0)}{2!}.s(s-1)$

$= -6 + 10\left(\frac{x}{2}\right) + \frac{-4}{2!}\left(\frac{x}{2}\right)\left(\frac{x}{2}-1\right)$

$= -6 + 5x - 2\left(\frac{x}{2}\right)\left(\frac{x}{2}-1\right)$

$f(x) \approx P_2(x)$

$\approx -6 + 5x - 2\left(\frac{x}{2}\right)\left(\frac{x}{2}-1\right)$

$f(1) \approx -6 + 5(1) - 2\left(\frac{1}{2}\right)\left(\frac{1}{2}-1\right)$

$\approx -6 + 5 - 1\left(-\frac{1}{2}\right)$

$\approx -6 + 5 + \frac{1}{2}$

$\approx -1 + \frac{1}{2}$

$\approx -\frac{2}{2} + \frac{1}{2}$

$\approx -\frac{1}{2}$

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Date . .

1. Penyelesaian (interpolasi Newton Gregory mundur)

x	f(x)	∇f(x)	∇²f(x)	
0	-6			
		10		
2	4		-4	→ ∇²f(x₂)
		6		→ ∇f(x₂)
4	10			→ f(x₂)

$h = 2$

$s = \frac{x - x_2}{2} = \frac{x-4}{2}$

$P_2(x) = f(x_2) + \nabla f(x_2) \cdot s + \frac{\nabla^2 f(x_2) \cdot s(s+1)}{2!}$

$= 10 + 6\left(\frac{x-4}{2}\right) + \frac{-4}{2!} \cdot \left(\frac{x-4}{2}\right)\left(\frac{x-4}{2}+1\right)$

$= 10 + 3(x-4) + 2\left(\frac{x-4}{2}\right)\left(\frac{x-4}{2}+1\right)$

$f(x) \approx P_2(x)$

$\approx 10 + 3(x-4) - 2\left(\frac{x-4}{2}\right)\left(\frac{x-4}{2}+1\right)$

$f(1) \approx 10 + 3(1-4) - 2\left(\frac{1-4}{2}\right)\left(\frac{1-4}{2}+1\right)$

$\approx 10 + 3(-3) - 2\left(-\frac{3}{2}\right)\left(-\frac{3}{2}+1\right)$

$\approx 10 + 9 + 3\left(-\frac{3}{2} + \frac{2}{2}\right)$

$\approx 10 - 9 + 3\left(-\frac{1}{2}\right)$

$\approx 1 + \left(-\frac{3}{2}\right)$

$\approx \frac{2}{2} + \frac{3}{2}$

$\approx -\frac{1}{2}$