

Kuis?

Diketahui data-data berikut: $(0, -6)$; $(2, 4)$; $(4, 10)$.

Tentukan pertiraaan dari $f(x)$

Penyelesaian:

(Maju)

x	$f(x)$	$\Delta f(x)$	$\Delta^2 f(x)$
0	$\textcircled{-6}$ $f(x_0)$		
2	4	$\textcircled{10}$ $\Delta f(x_0)$	
4	10		$\textcircled{-4}$ $\Delta^2 f(x_0)$

$$h = 2.$$

$$s = \frac{x - x_0}{h} = \frac{x - 0}{2} = \frac{x}{2}.$$

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

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

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

$$f(x) \approx P_2(x) = -6 + 5(x) + (-2) \left(\frac{x}{2}\right) \left(\left(\frac{x}{2}\right) - 1\right)$$

$$\begin{aligned}
 f(1) &\approx -6 + 5(1) + (-2)\left(\frac{1}{2}\right)\left(\left(\frac{1}{2}\right) - 1\right) \\
 &\approx -6 + 5 + (-2)(0,5)(0,5 - 1) \\
 &\approx -6 + 5 + (-2)(0,5)(-0,5) \\
 &\approx -6 + 5 + 0,5 \\
 &\approx -0,5 \Rightarrow -\frac{1}{2}
 \end{aligned}$$

(Mundur)

x	f(x)	$\nabla f(x)$	$\nabla^2 f(x)$
---	------	---------------	-----------------

0	-6		
---	----	--	--

2	4	10	$(-4) \nabla^2 f(x_2)$
---	---	----	------------------------

4	$(10) f(x_2)$	$(6) \nabla f(x_2)$	
---	---------------	---------------------	--

$$h = 2.$$

$$\begin{aligned}
 s &= \frac{x - x_n}{h} = \frac{x - x_2}{h} \\
 &= \frac{x - 4}{2}
 \end{aligned}$$

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

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

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

$$f(x) \approx P_2(x) = 10 + 3(x-4) + (-2) \left(\frac{x-4}{2}\right) \left(\left(\frac{x-4}{2}\right) + 1\right).$$

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

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

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

$$\approx 10 - 9 - \frac{3}{2}.$$

$$\approx 10 - 9 - 1,5.$$

$$\approx -0,5 \Rightarrow -\frac{1}{2}.$$