

② $f(x) = 2x^3 - 5x - 1$ [1, 2]

a.) Bisection iter-5 5 digit belakang koma

syarat: $f(a) * f(b) < 0$

$= f(1) * f(2) < 0$

$= -4 * 5 < 0$

$= -2 < 0$

Iterasi	x_l	x_r	x_m	$f(x_l)$	$f(x_r)$	$f(x_m)$
1	1	2	1,5	-4	5	-1,75
2	1,5	2	1,75	-1,75	5	0,96875
3	1,5	1,75	1,625	-1,75	0,96875	-0,54297
4	1,625	1,75	1,6875	-0,54297	0,96875	0,17334
5	1,625	1,6875	1,65625	-0,54297	0,17334	-0,19451

Akar = 1,65625

b.) Secant

$$x_{r+1} = x_r - \frac{f(x_1) * x_r (x_1 - x_0)}{f(x_1) - f(x_0)}$$

Iterasi	x_0	x_1	$f(x_0)$	$f(x_1)$	x_{r+1}	$f(x_{r+1})$
1	1	2	-4	5	1,44444	-2,19482
2	2	1,44444	5	-2,19482	1,61392	-0,6619
3	1,44444	1,61392	-2,19482	-0,6619	1,68710	0,1685
4	1,61392	1,68710	-0,6619	0,1685	1,67225	-0,0086
5	1,68710	1,67225	0,1685	-0,0086	1,67297	-0,00013

③ a.) Interpolasi Newton $p_3(x)$

$$p_1(x) = p_0(x) + a_1(x - x_0)$$

$$= 1 + (-0,8) * (x - 1)$$

$$p_2(x) = p_1(x) + a_2(x - x_0)(x - x_1)$$

$$= (1 + (-0,8) * (x - 1)) + 0,5336 (x - 1)(x - 1,25)$$

$$p_3(x) = (1 + (-0,8) * (x - 1)) + 0,5336 (x - 1)(x - 1,25) + a_3(x - x_0)(x - x_1)(x - x_2)$$

$$= 1 + (-0,8)(x - 1) + 0,5336 (x - 1)(x - 1,25) + 1,2695 (x - 1)(x - 1,25)(x - 1,5)$$

$p_3(1,1) = 0,9196166$

$$a_1 = \frac{y_1 - y_0}{x_1 - x_0}$$

$$a_2 = \frac{\frac{y_2 - y_1}{x_2 - x_1} - \frac{y_1 - y_0}{x_1 - x_0}}{x_2 - x_0}$$

b.) Interpolasi: Newton - Gregory

X	f(x)	Δf	$\Delta^2 f$	$\Delta^3 f$	$h = 0,25$ $s = \frac{x - x_0}{h}$ $= \frac{1,1 - 1}{0,25} = 0,4$
1	1	-0,2	0,0667	-0,02867	
1,25	0,8	-0,1333	0,03803		
1,5	0,6667	-0,09527			
1,75	0,57143				

f(1,1) Pendekat P_3

$$\begin{aligned}
 P_3(x) &= f_0 + \frac{s}{1!} \Delta f_0 + \frac{s(s-1)}{2!} \Delta^2 f_0 + \frac{s(s-1)(s-2)}{3!} \Delta^3 f_0 \\
 &= 1 + 0,4 * (-0,2) + \frac{(0,4)(0,6)}{2} 0,0667 + \frac{(0,4)(-0,6)(-1,6)}{6} * (-0,02867) \\
 &= 0,91015536
 \end{aligned}$$

④ a.) Trapezium $\int_0^{0,8} f(x) dx = \frac{h}{2} (f_0 + 2 \sum_{i=1}^{n-1} f_i + f_n)$

$$\begin{aligned}
 &= \frac{0,2}{2} (1 + 2 * 0,96154 + 2 * 0,86207 + 2 * 0,73529 + 0,60976) \\
 &= 0,1 (6,72756) \\
 &= 0,672756
 \end{aligned}$$

Simpson 1/3 $\int_0^{0,8} f(x) dx = \frac{h}{3} (f_0 + 4 \sum_{i=1,3,5}^{n-1} f_i + 2 \sum_{i=2,4,6}^{n-2} f_i + f_n)$

$$\begin{aligned}
 &= \frac{0,2}{3} (1 + 4 * 0,96154 + 2 * 0,86207 + 4 * 0,73529 + 0,60976) \\
 &= \frac{0,2}{3} (10,12122) \\
 &= 0,674748
 \end{aligned}$$

b.) ~~XX~~ Selisih pusat orde $O(h^2)$

$$f'_0 = \frac{f_1 - f_{-1}}{2h}$$

$$f'(0,4) = (0,73529 - 0,96154) / 2 * 0,2$$

$$= -0,565625 \quad \text{---} \quad -0,5656$$

XX Selisih Pusat orde $O(h^4)$

$$f'_0 = \frac{-f_2 + 8f_1 - 8f_{-1} + f_{-2}}{12h}$$

$$= \frac{-0,60976 + 8 \times 0,73529 - 8 \times 0,96154 + 1}{2,4}$$

$$= -0,59156 = -0,5916$$

XX Selisih Mundur orde $O(h)$

$$f'_0 = \frac{f_0 - f_{-1}}{h}$$

$$= \frac{0,86207 - 0,96154}{0,2}$$

$$= -0,4923$$

XX Selisih Maju orde $O(h)$

$$f'_0 = \frac{f_1 - f_0}{h}$$

$$= \frac{0,73529 - 0,86207}{0,2}$$

$$= -0,6339$$