Tugas 3

Stb : 222140 | Nama : Ridho Saputra
a : 4
b : 10

1. Carilah solusi dari integral berikut ini

$$\int_1^6 4x^2 + 10x^3 - \cos x \, dx$$

a. Cara kalkulus

$$\int_1^6 4x^2 + 10x^3 - \cos x \, dx$$

$$\int_1^6 4x^2 = 4 \frac{1}{2+1} x^{2+1} = 4/3 \, x^3 \Big|_1^6 = 4/3 (6)^3 - 4/3 (1)^3 = 286.\overline{6}$$

$$\int_1^6 10x^3 = 10 \frac{1}{3+1} x^{3+1} = 10/4 \, x^4 \Big|_1^6 = 10/4 (6)^4 - 10/4 (1)^4 = 3237.5$$

$$\int_1^6 -\cos x = \sin(6) - \sin(1) = 1.1209$$

Hasil dari : $\int_1^6 4x^2 + 10x^3 - \cos x \, dx$ adalah

$286.\overline{6} + 3237.5 + 1.1209 = 3525.3$

b. ~~Cara~~ Metode Numerik (Trapesium)

$h = 0.5$
$a = 1$
$b = 6$
$n = \frac{b-a}{h} = \frac{6-1}{0.5} = 5/0.5 = 10$

Metode Trapesium

$$\frac{h}{2} \left(f_0 + 2 \sum_{i=1}^{n=1} f_i + f_n \right)$$

n	$f(n) = 4n^2 + 10n^3 - \cos n$	
1	13.45	f_0
1.5	42.67	f_1
2	96.41	f_2
2.5	182.05	f_3
3	306.98	f_4
3.5	478.68	f_5
4	704.65	f_6
4.5	992.46	f_7
5	1349.71	f_8
5.5	1784.04	f_9
6	2303.03	f_{10}

Hasil :

$= 0.5/2 \left[f_0 + 2 \sum_{i=1}^{n=1} f_i + f_n \right)$

$= \frac{0.5}{2} ($ [illegible] $)$

$= \frac{0.5}{2} (14191.88)$

$= 3547.9$

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a = 4

b = 10

2. Carilah nilai turunan dari fungsi berikut; x = 1.2

$f(x) = 4x^2 + 10x^3 - \cos x$

a. Cara Kalkulus

$f(x) = 4x^2 + 10x^3 - \cos x$

$f'(x) = 4 \cdot 2x^{2-1} + 10 \cdot 3x^{3-1} + \sin x$

$= 8x + 30x^2 + \sin x$

$f'(1,2) = 8(1,2) + 30(1,2)^2 + \sin(1,2)$

$= 53.73$

b. Metode Numerik (Beda Maju)

$x = [1,3]; a = 1; b = 3;$ $f(x) = 4x^2 + 10x^3 - \cos x$

$h = 0.5;$

$n = \frac{b-a}{h} = \frac{3-1}{0.5} = \frac{2}{0.5} = 4$

x	1	1,5	2	2,5	3
f(x)	13.459	42.679	96.416	182.051	306.989

$f'(x) = \frac{f(x_{i+1}) - f(x_i)}{h}$

$= \frac{f(1,5) - f(1,2)}{0.5}$

$= \frac{42.679 - 22.677}{0.5}$

$= 40.004$