

## Tugas 5 Komnum

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### Soal

Carilah  $\int f(x) dx$  dari data-data berikut dengan batas  $x=1$  sampai  $x=7$  menggunakan integrasi Trapezoida, Simpson 1/3, & Simpson 3/8 jika diketahui data<sup>2</sup> berikut :

|             |        |        |         |         |         |         |         |
|-------------|--------|--------|---------|---------|---------|---------|---------|
| <b>x</b>    | 1,0    | 2,0    | 3,0     | 4,0     | 5,0     | 6,0     | 7,0     |
| <b>f(x)</b> | 1,8287 | 5,6575 | 11,4862 | 19,3149 | 29,1437 | 40,9724 | 54,8011 |

|             |        |        |         |         |         |         |         |
|-------------|--------|--------|---------|---------|---------|---------|---------|
| <b>x</b>    | 1,0    | 2,0    | 3,0     | 4,0     | 5,0     | 6,0     | 7,0     |
| <b>f(x)</b> | 2,1353 | 6,2707 | 12,4060 | 20,5413 | 30,6767 | 42,8120 | 56,9473 |

|             |        |        |         |         |         |         |         |
|-------------|--------|--------|---------|---------|---------|---------|---------|
| <b>x</b>    | 1,0    | 2,0    | 3,0     | 4,0     | 5,0     | 6,0     | 7,0     |
| <b>f(x)</b> | 1,8419 | 5,6838 | 11,5257 | 19,3676 | 29,2095 | 41,0514 | 54,8933 |

### Jawaban

#### 1. Metode Trapezoida (7 Pias)

|             |        |        |         |         |         |         |         |
|-------------|--------|--------|---------|---------|---------|---------|---------|
| <b>x</b>    | 1,0    | 2,0    | 3,0     | 4,0     | 5,0     | 6,0     | 7,0     |
| <b>f(x)</b> | 1,8287 | 5,6575 | 11,4862 | 19,3149 | 29,1437 | 40,9724 | 54,8011 |

$$I = \frac{\Delta x}{2} \left[ f(x_0) + 2 \sum_{i=1}^{n-1} f(x_i) + f(x_n) \right]$$

$$I = \frac{1}{2} [ 1,8287 + 2 (5,6575 + 11,4862 + 19,3149 + 29,1437 + 40,9724) + 54,8011 ]$$

$$I = 134,8896$$

|             |        |        |         |         |         |         |         |
|-------------|--------|--------|---------|---------|---------|---------|---------|
| <b>x</b>    | 1,0    | 2,0    | 3,0     | 4,0     | 5,0     | 6,0     | 7,0     |
| <b>f(x)</b> | 2,1353 | 6,2707 | 12,4060 | 20,5413 | 30,6767 | 42,8120 | 56,9473 |

$$I = \frac{\Delta x}{2} \left[ f(x_0) + 2 \sum_{i=1}^{n-1} f(x_i) + f(x_n) \right]$$

$$I = \frac{1}{2} [ 2,1353 + 2 (6,2707 + 12,4060 + 20,5413 + 30,6767 + 42,8120) + 56,9473 ]$$

$$I = 142,248$$

|             |        |        |         |         |         |         |         |
|-------------|--------|--------|---------|---------|---------|---------|---------|
| <b>x</b>    | 1,0    | 2,0    | 3,0     | 4,0     | 5,0     | 6,0     | 7,0     |
| <b>f(x)</b> | 1,8419 | 5,6838 | 11,5257 | 19,3676 | 29,2095 | 41,0514 | 54,8933 |

$$I = \frac{\Delta x}{2} \left[ f(x_0) + 2 \sum_{i=1}^{n-1} f(x_i) + f(x_n) \right]$$

$$I = \frac{1}{2} [ 1,8419 + 2 (5,6838 + 11,5257 + 19,3676 + 29,2095 + 41,0514) + 54,8933 ]$$

$$I = 135,1856$$

## 2. Metode Simpson 1/3 (2 Pias)

|             |        |        |         |         |         |         |         |
|-------------|--------|--------|---------|---------|---------|---------|---------|
| <b>x</b>    | 1,0    | 2,0    | 3,0     | 4,0     | 5,0     | 6,0     | 7,0     |
| <b>f(x)</b> | 1,8287 | 5,6575 | 11,4862 | 19,3149 | 29,1437 | 40,9724 | 54,8011 |

$$\Delta x = \frac{b-a}{2} = \frac{7-1}{2} = 3$$

$$a = 1, b = 7, c = 4$$

$$I = \frac{\Delta x}{3} [f(a) + 4f(c) + f(b)]$$

$$I = \frac{3}{3} [1,8287 + 4(19,3149) + 54,8011]$$

$$I = 133,8894$$

|             |        |        |         |         |         |         |         |
|-------------|--------|--------|---------|---------|---------|---------|---------|
| <b>x</b>    | 1,0    | 2,0    | 3,0     | 4,0     | 5,0     | 6,0     | 7,0     |
| <b>f(x)</b> | 2,1353 | 6,2707 | 12,4060 | 20,5413 | 30,6767 | 42,8120 | 56,9473 |

$$\Delta x = \frac{b-a}{2} = \frac{7-1}{2} = 3$$

$$a = 1, b = 7, c = 4$$

$$I = \frac{\Delta x}{3} [f(a) + 4f(c) + f(b)]$$

$$I = \frac{3}{3} [2,1353 + 4(20,5413) + 56,9473]$$

$$I = 141,2478$$

|             |        |        |         |         |         |         |         |
|-------------|--------|--------|---------|---------|---------|---------|---------|
| <b>x</b>    | 1,0    | 2,0    | 3,0     | 4,0     | 5,0     | 6,0     | 7,0     |
| <b>f(x)</b> | 1,8419 | 5,6838 | 11,5257 | 19,3676 | 29,2095 | 41,0514 | 54,8933 |

$$\Delta x = \frac{b-a}{2} = \frac{7-1}{2} = 3$$

$$a = 1, b = 7, c = 4$$

$$I = \frac{\Delta x}{3} [f(a) + 4f(c) + f(b)]$$

$$I = \frac{3}{3} [1,8419 + 4(19,3676) + 54,8933]$$

$$I = 134,2056$$

3. Metode Simpson 1/3 (2 Pias)

|             |        |        |         |         |         |         |         |
|-------------|--------|--------|---------|---------|---------|---------|---------|
| <b>x</b>    | 1,0    | 2,0    | 3,0     | 4,0     | 5,0     | 6,0     | 7,0     |
| <b>f(x)</b> | 1,8287 | 5,6575 | 11,4862 | 19,3149 | 29,1437 | 40,9724 | 54,8011 |

$$\Delta x = \frac{b-a}{3} = \frac{7-1}{3} = 2$$

$$a = 1, b = 7, c = 3, d = 5$$

$$I = \frac{3\Delta x}{8} [f(a) + 3f(c) + 3f(d) + f(b)]$$

$$I = \frac{3(2)}{8} [1,8287 + 3(11,4862) + 3(29,1437) + 54,8011]$$

$$I = 133,889625$$

|             |        |        |         |         |         |         |         |
|-------------|--------|--------|---------|---------|---------|---------|---------|
| <b>x</b>    | 1,0    | 2,0    | 3,0     | 4,0     | 5,0     | 6,0     | 7,0     |
| <b>f(x)</b> | 2,1353 | 6,2707 | 12,4060 | 20,5413 | 30,6767 | 42,8120 | 56,9473 |

$$\Delta x = \frac{b-a}{3} = \frac{7-1}{3} = 2$$

$$a = 1, b = 7, c = 3, d = 5$$

$$I = \frac{3\Delta x}{8} [f(a) + 3f(c) + 3f(d) + f(b)]$$

$$I = \frac{3(2)}{8} [2,1353 + 3(12,4060) + 3(30,6767) + 56,9473]$$

$$I = 141,248025$$

|             |        |        |         |         |         |         |         |
|-------------|--------|--------|---------|---------|---------|---------|---------|
| <b>x</b>    | 1,0    | 2,0    | 3,0     | 4,0     | 5,0     | 6,0     | 7,0     |
| <b>f(x)</b> | 1,8419 | 5,6838 | 11,5257 | 19,3676 | 29,2095 | 41,0514 | 54,8933 |

$$\Delta x = \frac{b-a}{3} = \frac{7-1}{3} = 2$$

$$a = 1, b = 7, c = 3, d = 5$$

$$I = \frac{3\Delta x}{8} [f(a) + 3f(c) + 3f(d) + f(b)]$$

$$I = \frac{3(2)}{8} [1,8419 + 3(11,5257) + 3(29,2095) + 54,8933]$$

$$I = 134,2056$$

