

Trapezoid and Simpson Numerical Integration

Apply the selected composite rule to equally spaced data. Report numerical results as approximations and show weights explicitly.

1. Use composite trapezoid rule with $n = 4$ for table x : 1, 3, 5, 7, 9; $f(x)$: 4, 12, 28, 52, 84.

2. Use composite Simpson rule with $n = 4$ for $f(x) = 3x^2 + 0x + 1$ on $[2, 10]$.

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Apply the selected composite rule to equally spaced data. Report numerical results as approximations and show weights explicitly.

3. Use composite trapezoid rule with $n = 4$ for $f(x) = 1x^2 + 0x + 1$ on $[0, 4]$.

4. Use composite Simpson rule with $n = 4$ for table x : 0, 1, 2, 3, 4; $f(x)$: 5, 8, 17, 32, 53.

Trapezoid and Simpson Numerical Integration

Apply the selected composite rule to equally spaced data. Report numerical results as approximations and show weights explicitly.

5. Use composite trapezoid rule with $n = 4$ for table x : 1, 2, 3, 4, 5; $f(x)$: 9, 18, 31, 48, 69.

6. Use composite Simpson rule with $n = 4$ for $f(x) = 2x^2 - 1x + 4$ on $[0, 8]$.

Trapezoid and Simpson Numerical Integration

Worked Answer Key

Apply the selected composite rule to equally spaced data. Report numerical results as approximations and show weights explicitly.

1. Use composite trapezoid rule with $n = 4$ for table x : 1, 3, 5, 7, 9; $f(x)$: 4, 12, 28, 52, 84.

Answer: Approximately 272 square units.

1. $h = (9-1)/4 = 2$.

2. Weighted sum: $(2/2)[1(4) + 2(12) + 2(28) + 2(52) + 1(84)]$.

3. The numerical estimate is approximately 272 square units.

2. Use composite Simpson rule with $n = 4$ for $f(x) = 3x^2 + 0x + 1$ on $[2, 10]$.

Answer: Approximately 1000 square units.

1. $h = (10-2)/4 = 2$.

2. Weighted sum: $(2/3)[1(13) + 4(49) + 2(109) + 4(193) + 1(301)]$.

3. The numerical estimate is approximately 1000 square units.

Trapezoid and Simpson Numerical Integration

Worked Answer Key

Apply the selected composite rule to equally spaced data. Report numerical results as approximations and show weights explicitly.

3. Use composite trapezoid rule with $n = 4$ for $f(x) = 1x^2 + 0x + 1$ on $[0, 4]$.

Answer: Approximately 26 square units.

1. $h = (4-0)/4 = 1$.

2. Weighted sum: $(1/2)[1(1) + 2(2) + 2(5) + 2(10) + 1(17)]$.

3. The numerical estimate is approximately 26 square units.

4. Use composite Simpson rule with $n = 4$ for table x : 0, 1, 2, 3, 4; $f(x)$: 5, 8, 17, 32, 53.

Answer: Approximately 84 square units.

1. $h = (4-0)/4 = 1$.

2. Weighted sum: $(1/3)[1(5) + 4(8) + 2(17) + 4(32) + 1(53)]$.

3. The numerical estimate is approximately 84 square units.

Trapezoid and Simpson Numerical Integration

Worked Answer Key

Apply the selected composite rule to equally spaced data. Report numerical results as approximations and show weights explicitly.

5. Use composite trapezoid rule with $n = 4$ for table x : 1, 2, 3, 4, 5; $f(x)$: 9, 18, 31, 48, 69.

Answer: Approximately 136 square units.

- 1. $h = (5-1)/4 = 1$.
- 2. Weighted sum: $(1/2)[1(9) + 2(18) + 2(31) + 2(48) + 1(69)]$.
- 3. The numerical estimate is approximately 136 square units.

6. Use composite Simpson rule with $n = 4$ for $f(x) = 2x^2 - 1x + 4$ on $[0, 8]$.

Answer: Approximately 341.3333 square units.

- 1. $h = (8-0)/4 = 2$.
- 2. Weighted sum: $(2/3)[1(4) + 4(10) + 2(32) + 4(70) + 1(124)]$.
- 3. The numerical estimate is approximately 341.3333 square units.