



Calculus 2 Workbook

Error bounds

MIDPOINT RULE ERROR BOUND

- 1. Calculate the area under the curve. Then use the Midpoint Rule with $n = 3$ to approximate the same area. Compare the actual area to the result to determine the error of the of the Midpoint Rule approximation.

$$\int_0^6 3x^2 - 2x + 5 \, dx$$

- 2. Calculate the area under the curve. Then use the Midpoint Rule with $n = 4$ to approximate the same area. Compare the actual area to the result to determine the error of the of the Midpoint Rule approximation. Round your answer to the nearest 3 decimal places.

$$\int_5^{13} 4\sqrt{x-2} \, dx$$

- 3. Calculate the area under the curve. Then use the Midpoint Rule with $n = 4$ to approximate the same area. Compare the actual area to the result to determine the error of the of the Midpoint Rule approximation.

$$\int_2^{10} 4x^3 - 3x^2 + 2x - 1 \, dx$$



TRAPEZOIDAL RULE ERROR BOUND

- 1. Calculate the area under the curve. Then use the Trapezoidal Rule with $n = 4$ to approximate the same area. Compare the actual area to the result to determine the error of the of the Trapezoidal Rule approximation.

$$\int_1^5 6x^2 - 8x + 5 \, dx$$

- 2. Calculate the area under the curve. Then use the Trapezoidal Rule with $n = 5$ to approximate the same area. Compare the actual area to the result to determine the error of the of the Trapezoidal Rule approximation. Round your answer to the nearest 3 decimal places.

$$\int_2^{12} e^{-x} + 3 \, dx$$

- 3. Calculate the area under the curve. Then use the Trapezoidal Rule with $n = 4$ to approximate the same area. Compare the actual area to the result to determine the error of the of the Trapezoidal Rule approximation. Round your answer to the nearest three decimal places.

$$\int_0^2 4\sqrt{x} + 1 \, dx$$



SIMPSON'S RULE ERROR BOUND

■ 1. Calculate the area under the curve. Then use Simpson's Rule with $n = 6$ to approximate the same area. Compare the actual area to the result to determine the error of the of Simpson's Rule approximation. Round your answer to the nearest three decimal places.

$$\int_{2.2}^{3.4} x^2 - x + 2 \, dx$$

■ 2. Calculate the area under the curve. Then use Simpson's Rule with $n = 4$ to approximate the same area. Compare the actual area to the result to determine the error of the of Simpson's Rule approximation. Round your answer to the nearest four decimal places.

$$\int_0^{1.2} e^x - 2x + 3 \, dx$$

■ 3. Calculate the area under the curve. Then use Simpson's Rule with $n = 4$ to approximate the same area. Compare the actual area to the result to determine the error of the of Simpson's Rule approximation. Round your answer to the nearest three decimal places.

$$\int_{-4}^4 2x^2 + 3x + 4 \, dx$$



