1. Use the Midpoint Rule with \( n = 4 \) to approximate the integral \( \int_2^{10} \sqrt{x^3+1} \, dx \).

Solution.

\[
\Delta x = \frac{10 - 2}{4} = 2.
\]

The subdivision is given by the points 2, 4, 6, 8, 10. The midpoints are 3, 5, 7, 9. Therefore

\[
\int_2^{10} \sqrt{x^3+1} \, dx \approx \Delta x \left( f(3) + f(5) + f(7) + f(9) \right) = 2 \left( \sqrt{3^3+1} + \sqrt{5^3+1} + \sqrt{7^3+1} + \sqrt{9^3+1} \right) \approx 124.164.
\]

Answer. 124.164.

2. Compute \( \int_0^1 (5x + 1)(3\sqrt{x} + 2) \, dx \).

Solution.

\[
\int_0^1 (5x + 1)(3\sqrt{x} + 2) \, dx = \int_0^1 \left( 15x^{3/2} + 3x^{1/2} + 10x + 2 \right) \, dx = 6x^{5/2} + 2x^{3/2} + 5x^2 + 2x \bigg|_0^1
\]

\[
= (6 + 2 + 5 + 2) - 0 = 15.
\]

Answer. 15.