

Problem 1 Evaluate each integral after graphing the corresponding function.

(a) $\int_0^5 \sqrt{25 - x^2} dx$

(b) $\int_1^2 (x^2 - 2x - 3) dx$

(c) $\int_0^\pi \cos(x) dx$

(d) $\int_0^2 f(x) dx$, where $f(x) = \begin{cases} 1 - 5x & \text{if } x < 1 \\ 2(x - 1)^3 & \text{if } x > 1 \end{cases}$

Problem 2 Use the Midpoint Rule with $n = 5$ to approximate $\int_1^2 \frac{dx}{x}$.
Compare to $\ln(2)$.

Problem 3 Suppose you're driving to Chicago. For the first hour, you drive below the speed limit (which is still 65mph). How far are you from Urbana?

(a) Use the Comparison Properties of the Integral.

(b) Use derivatives.

(c) Why are the two methods very very very different?