

Soln 2

(c) Simpson's rule :- Simpson's rule is a method for numerical integration, the numerical approximation of definite integrals.

Specifically, It is the following approximation for $n+1$ values x_0, \dots, x_m bounding n equally space subdivisions. (where n is even)

General form :-

$$\int_a^b f(x) dx \approx \frac{\Delta x}{3} (f(x_0) + 4f(x_1) + 2f(x_2) + 4f(x_3) + 2f(x_4) + \dots + 4f(x_{m-1}) + f(x_m))$$

where $\Delta x = \frac{b-a}{n}$ and $x_i = a + i\Delta x$.

$$(c) \int \frac{x-1}{x+1} dx$$

$$\Rightarrow \int \frac{x+1-1-1}{x+1} dx$$

$$\Rightarrow \int \frac{x}{x+1} dx - \int \frac{2}{x+1} dx$$

$$\Rightarrow \int 1 dx - 2 \int \frac{1}{x+1} dx$$

$$\Rightarrow x - 2 \log|x+1| + C \quad \underline{\text{Ans}}$$