

(2) $1/3$ Rule.

Simpson's $1/3$ rd rule is an extension of the trapezoidal rule in which the integrand is approximated by a second order polynomial. Simpson rule can be derived from the various way using Newton's divided difference polynomial, Lagrange polynomial, and the method. Simpson $1/3$ rd rule is defined

$$\int_a^b f(x) dx = h/3 [(y_0 + y_n) + 4(y_1 + y_3 + y_5 + \dots + y_{n-1}) + 2(y_2 + y_4 + y_6 + \dots + y_{n-2})]$$

(ii) Solve the following

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

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

$$= \int dx - 2 \int (x+1)^{-1} dx$$

$$= x - 2 \log_e (x+1) + C. \text{ Ans.}$$