3.2595)

Rombergs Method:-

- ~~Trapezoidal Rule~~.
- This Method is often be used to improved the approximate results obtain by the finite-difference method.
- It's appl^n to the numerical evaluation of definite integrals. eg. in the use of trapezoidal rule,
- we consider the definite Integral

$$I = \int_a^b y \, dx.$$

we evaluate it by the trapezoidal rule with two or more different subintervels. of width, h_1, h_2, h_3 obtain approximate value I_1, I_2, I_3 respectively.

we take $h_1 = h$, $h_2 = h/2$, $h_3 = h/4$

~~find,~~
$\therefore I(h)$, ~~$I(h/2)$, $I(h/4)$~~.

working rule

Step-I
given definite Integral

$$I = \int_a^b y\,dx.$$

Step-II
~~find val~~ evaluate it by trapezoidal Rule with interval $h, h/2, h/4$ and obtain $I_1 = I(h), I_2 = I(h/2), I_3 = I(h/4)$ ... respectively.

Step-III
form following table.

$I_1 = I(h)$

$I_4 = I(h, h/2)$

$I_2 = I(h/2)$ $\quad$ $I_6 = I(h, h/2, h/4)$.

$I_5 = I(h/2, h/4)$.

$I_3 = I(h/4)$

$$\therefore I(h, h/2) = I_2 + \frac{1}{3}(I_2 - I_1)$$

$$I(h/2, h/4) = I_3 + \frac{1}{3}(I_3 - I_2)$$

$$I(h, h/2, h/4) = I_5 + \frac{1}{3}(I_5 - I_4).$$

(Q). Use Rombergs method to compute:-

$$I = \int_0^1 \frac{1}{1+x}\,dx.$$

correct upto four decimal place