Soln 11

$$\int \frac{dx}{1+x^2} dx \quad , \quad h = 0.25$$

$x_0 = 0$, $x_1 = x_0 + h = 0 + 0.25$

$= 0.25$

$x_2 = x_0 + 2h = 0 + 2 \times 0.25 = 0.50$

$x_3 = x_0 + 3h = 0 + 3 \times 0.25 = 0.75$

$x_4 = x_0 + 4h = 0 + 4 \times 0.25 = 1$

$$y_0 = \frac{1}{1+x_0^2} = \frac{1}{1+0} = 1$$

$$y_1 = \frac{1}{1+x_1^2} = \frac{1}{1+(0.25)^2}$$

$$= \frac{1}{1+0.0625} = 0.9412$$

$$y_2 = \frac{1}{1+x_2^2} = \frac{1}{1+(0.50)^2} = 0.8$$

$$y_3 = \frac{1}{1+(x_3)^2} = \frac{1}{1+(0.75)^2} = 0.64$$

$$y_4 = \frac{1}{1+x_4^2} = \frac{1}{1+(1)^2} = \frac{1}{2}$$

$$I = \int_0^1 \frac{1}{1+x^2} \, dx$$

$$= \frac{h}{3}\left[(y_0+y_4)+4(y_1+y_3)+2(y_2)\right]$$

$$= \frac{0.25}{3}\left[(1+0.5)+4(0.9412+0.64)+2\times(0.8)\right]$$

$$= \frac{0.25}{3}\left[1.5+4(1.5812)+1.6\right]$$

$$= \frac{0.25}{3}\left[1.5+6.3248+1.6\right]$$

$$= \frac{0.025}{3}\left[9.4248\right]$$

$$\Rightarrow \frac{2.3562}{3}$$

$$= 0.7854 \quad \underline{\text{Ans}}$$