

Practical 12 : Simpson' s Third Rule

Find the value of the definite Integral .

$$Q1 : \int_1^2 \frac{1}{x} dx$$

```
In[100]:= f[x_] :=  $\frac{1}{x}$ ; a = 1; b = 2;
n = 10;
h =  $\frac{b-a}{n}$ ;
value =  $\frac{h}{3} * (f[a] + \text{Sum}[\text{If}[\text{Mod}[i, 2] == 0, 2, 4] * f[a + i * h], \{i, 1, n - 1\}] + f[b])$ ;
Print["Value Evaluated = ", N[value]]
Value Evaluated = 0.69315
```

$$Q2 : \int_0^1 e^{-x} dx$$

```
In[105]:= Clear[x, a, b, n, h, i];
f[x_] := Exp[-x]; a = 0; b = 1;
n = 40;
h =  $\frac{b-a}{n}$ ;
value =  $\frac{h}{3} * (f[a] + \text{Sum}[\text{If}[\text{Mod}[i, 2] == 0, 2, 4] * f[a + i * h], \{i, 1, n - 1\}] + f[b])$ ;
Print["Value Evaluated = ", N[value]]
Value Evaluated = 0.632121
```

$$Q3 : \int_0^1 \frac{1}{1+x^2} dx$$

```
In[111]:= Clear[x, a, b, n, h, i];
f[x_] :=  $\frac{1}{1+x^2}$ ; a = 0; b = 1;
n = 40;
h =  $\frac{b-a}{n}$ ;
value =  $\frac{h}{3} * (f[a] + \text{Sum}[\text{If}[\text{Mod}[i, 2] == 0, 2, 4] * f[a + i * h], \{i, 1, n - 1\}] + f[b])$ ;
Print["Value Evaluated = ", N[value]]
Value Evaluated = 0.785398
```