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ROLL NO. :

MAT/21/60

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## Practical 12

### Simpson's rule

AIM :- To approximate the value of integrals using Simpson Rule

```
In[1]:= SimpsonRule [a_, b_] := Module[{k}, k = ((b - a) / 6) * (f[a] + 4 * f[(a + b) / 2] + f[b]);  
Print "Integral value is = ", k ;
```

(i)  $\int_0^1 x \, dx$

```
In[2]:= f[k_] = x  
SimpsonRule 0, 1  
  
Integral value is =  $\frac{1}{2}$ 
```

```
In[4]:= Clear f, x
```

(ii)  $\int_0^1 e^{-x} \, dx$

```
In[5]:= f[k_] = Exp[-k]  
SimpsonRule 0, 1  
  
Integral value is =  $\frac{1}{6} \left( 1 + \frac{1}{e} + \frac{4}{\sqrt{e}} \right)$ 
```

```
In[7]:= N %
```

```
Out[7]= 0.632334
```

```
In[8]:= Clear f, x
```

(iii)  $\int_0^1 \frac{1}{1+x^2} \, dx$

```
In[9]:= f[x_] := 1 / (1 + x^2)  
SimpsonRule 0, 1
```

Integral value is =  $\frac{47}{60}$

```
In[11]:= Clear f, x
```