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ROLL NO. : MAT/21/60

Practical 11
Trapezoidal rule

```
In[1]:= TrapezoidalRule[a_, b_, n_] := Module[{}, h = (b - a) / n;
         y = Table[a + i x h, {i, 1, n}];
         Sumodd = 0;
         Sumeven = 0;
         For[i = 1, i ) n, i += 2, Sumodd = Sumodd + 2 x f[x] /. x c y[[i]]];
         For[i = 2, i ) n, i += 2, Sumeven = Sumeven + 2 x f[x] /. x c y[[i]]];
         Tn = (h / 2) x ((f[x] /. x c a) + N[Sumodd] + N[Sumeven] + (f[x] /. x c b));
         Print["For n=", n, ",Trapezoidal estimate is:", Tn];
         in = Integrate[f[x], {x, a, b}];
         Print["True value is ", in];
         Print "Absolute error is ", Abs Tn - in  ;
```

(i) f [x] = Log[x]

```
In[2]:= f x_  := Log x
```

```
In[3]:= TrapezoidalRule 4, 5.2, 6
```

    For n=6,Trapezoidal estimate is:1.82766

    True value is 1.82785

    Absolute error is 0.00019227

```
In[4]:= Clear f, x
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(ii) f [x] = Sin[x]

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In[5]:= f[x_] := Sin[ x ]
         TrapezoidalRule 0, Pi  2, 12
```

    For n=12,Trapezoidal estimate is:0.998572

    True value is 1

    Absolute error is 0.0014283

```
In[7]:= Clear f, x
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(iii) f [x] = Sin[x] - Log[x] + Exp[x]

In[8]:= **f[x_] := Sin[x] - Log[x] + Exp[x]**
TrapezoidalRule 0.2, 1.4, 12

```
        For n=12,Trapezoidal estimate is:4.05617

        True value is 4.05095

        Absolute error is 0.00522485
```

In[10]:= **Clear f, x**

(iv) f [x] = 1/(1+x^2)

In[11]:= **f [x_] := 1 / (1 + x^ 2)**
TrapezoidalRule 0, 1, 6

```
        For n=6,Trapezoidal estimate is:0.784241
                           Π
        True value is  ─
                           4
        Absolute error is 0.0011574
```

In[13]:= **Clear f, x**