

PRACTICAL – 9

Trapezoidal Rule

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Ques:1

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In[149]:= a = Input["Enter the left end point"];
b = Input["Enter the right end point"];
n = Input["Enter the number of sub intervals to be formed"];
h = (b - a) / n;
y = Table[a + i * h, {i, 1, n}];
f[x] := Log[x];
sumodd = 0;
sumeven = 0;
For[i = 1, i < n, i += 2, sumodd += 2 * f[x] /. x -> y[[i]]];
For[i = 2, i < n, i += 2, sumodd += 2 * f[x] /. x -> y[[i]]];
Tn = (h/2) * ((f[x] /. x -> a) + N[sumodd] + N[sumeven] + (f[x] /. x -> b));
Print["For n=", n, ",Trapezoidal estimate is:", Tn]
in = Integrate[Log[x], {x, 4, 5.2}];
Print["True value is ", in]
Print["Absolute error is", Abs[Tn - in]]

Absolute error is 0.0000692259

True value is 1.82785

For n=10,Trapezoidal estimate is:1.82778
```

Ques:2

```

In[179]:= a = Input["Enter the left end point"];
b = Input["Enter the right end point"];
n = Input["Enter the number of sub intervals to be formed"];
h = (b - a) / n;
y = Table[a + i * h, {i, 1, n}];
f[x] := Sin[x];
sumodd = 0;
sumeven = 0;
For[i = 1, i < n, i += 2, sumodd += 2 * f[x] /. x -> y[[i]]];
For[i = 2, i < n, i += 2, sumodd += 2 * f[x] /. x -> y[[i]]];
Tn = (h / 2) * ((f[x] /. x -> a) + N[sumodd] + N[sumeven] + (f[x] /. x -> b));
Print["For n=", n, ", Trapezoidal estimate is:", Tn]
in = Integrate[Sin[x], {x, 0, Pi / 2}];
Print["True value is ", in]
Print["Absolute error is", Abs[Tn - in]]

Absolute error is 0.00205701

True value is 1

For n=10, Trapezoidal estimate is: 0.997943

```