PRACTICAL-7(a): TRAPEZOIDAL METHOD

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```
a = Input["Enter the left and point:"];
b = Input["Enter the right and 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, sumeven += 2 * f[x] /. x → y[[i]]];
Sn = (h / 2) * ((f[x] /. x → a) + N[sumodd] + N[sumeven] + (f[x] /. x → b));
Print["For n=", n, ",Trapezoidal estimate is:", Sn]
in = Integrate[Log[x], {x, 4, 5.2}]
Print["True value is", in]
Print["absolute error is ", Abs[Sn - in]]
```

```
For n=6,Trapezoidal estimate is:1.82766

1.82785

True value is1.82785

absolute error is 0.00019227
```

```
a = Input["Enter the left and point:"];
b = Input["Enter the right and 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, sumeven += 2 * f[x] /. x → y[[i]]];
Sn = (h / 2) * ((f[x] /. x → a) + N[sumodd] + N[sumeven] + (f[x] /. x → b));
Print["For n=", n, ",Trapezoidal estimate is:", Sn]
in = Integrate[Sin[x], {x, 0, Pi / 2}]
Print["True value is", in]
Print["absolute error is ", Abs[Sn - in]]
```

```
For n=12,Trapezoidal estimate is:0.997778
```

```
1
```

```
True value is1
```

```
absolute error is 0.00222204
```

```
a = Input["Enter the left and point:"];
b = Input["Enter the right and 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] - Log[x] + Exp[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, sumeven += 2 * f[x] /. x → y[[i]]];
Sn = (h / 2) * ((f[x] /. x → a) + N[sumodd] + N[sumeven] + (f[x] /. x → b));
Print["For n=", n, ",Trapezoidal estimate is:", Sn]
in = Integrate[Sin[x] - Log[x] + Exp[x], {x, 0.2, 1.4}]
Print["True value is", in]
Print["absolute error is ", Abs[Sn - in]]
```

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

```
4.05095
```

```
True value is4.05095
```

```
absolute error is 0.00522484
```

```
a = Input["Enter the left and point:"];
b = Input["Enter the right and 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] := 1/(1 + x * 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, sumeven += 2 * f[x] /. x → y[[i]]];
Sn = (h / 2) * ((f[x] /. x → a) + N[sumodd] + N[sumeven] + (f[x] /. x → b));
Print["For n=", n, ",Trapezoidal estimate is:", Sn]
in = NIntegrate[1/(1 + x * x), {x, 0, 1}]
Print["True value is", in]
Print["absolute error is ", Abs[Sn - in]]
```

```
For n=6,Trapezoidal estimate is:0.784241

0.785398

True value is0.785398

absolute error is 0.0011574
```