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Roll No. : 20201430

Course: Bsc. (h) Computer Science


```
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 / x;
sumodd = 0;
sumeven = 0;
For[i = 1, i < n, i += 2, sumodd += 4 * f[x] /. x → y[[i]]];
For[i = 2, i < n, i += 2, sumeven += 2 * f[x] /. x → y[[i]]];
Sn = (h / 3) * ((f[x] /. x → a) + N[sumodd] + N[sumeven] + (f[x] /. x → b));
Print["For n=", n, ",Simpson estimate is:", Sn]
in = Integrate[1 / x, {x, 1, 2}]
Print["True value is", in]
Print["absolute error is ", Abs[Sn - in]]
```

```
For n=10,Simpson estimate is:0.69315

Log[2]

True value isLog[2]
```

absolute error is 3.05013×10^{-6}

```
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 / x;
sumodd = 0;
sumeven = 0;
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For[i = 2, i < n, i += 2, sumeven += 2 * f[x] /. x → y[[i]]];
Sn = (h / 3) * ((f[x] /. x → a) + N[sumodd] + N[sumeven] + (f[x] /. x → b));
Print["For n=", n, ",Simpson estimate is:", Sn]
in = Integrate[1 / x, {x, 1, 2}]
Print["True value is", in]
Print["absolute error is ", Abs[Sn - in]]
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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 += 4 * f[x] /. x → y[[i]]];
For[i = 2, i < n, i += 2, sumeven += 2 * f[x] /. x → y[[i]]];
Sn1 = (h / 3) * ((f[x] /. x → a) + N[sumodd] + N[sumeven] + (f[x] /. x → b));
Print["For n=", n, ",Simpson estimate is:", Sn1]
in1 = Integrate[Log[x], {x, 4, 5.2}]
Print["True value is", in1]
Print["absolute error is ", Abs[Sn1 - in1]]
```

For n=6,Simpson estimate is:1.82785

1.82785

True value is1.82785

absolute error is 1.50624×10^{-7}

```
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 += 4 * f[x] /. x → y[[i]]];
For[i = 2, i < n, i += 2, sumeven += 2 * f[x] /. x → y[[i]]];
Sn1 = (h / 3) * ((f[x] /. x → a) + N[sumodd] + N[sumeven] + (f[x] /. x → b));
Print["For n=", n, ",Simpson estimate is:", Sn1]
in1 = Integrate[1 / x, {x, 4, 5.2}]
Print["True value is", in1]
Print["absolute error is ", Abs[Sn1 - in1]]
```

```
For n=12,Simpson estimate is:1.82785

0.262364

True value is0.262364

absolute error is 1.56548
```

```
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 += 4 * f[x] /. x → y[[i]]];
For[i = 2, i < n, i += 2, sumeven += 2 * f[x] /. x → y[[i]]];
Sn1 = (h / 3) * ((f[x] /. x → a) + N[sumodd] + N[sumeven] + (f[x] /. x → b));
Print["For n=", n, ",Simpson estimate is:", Sn1]
in1 = NIntegrate[Sin[x] - Log[x] + Exp[x], {x, 0.2, 1.4}]
Print["True value is", in1]
Print["absolute error is ", Abs[Sn1 - in1]]
```

```
For n=12,Simpson estimate is:0.574056

4.05095

True value is4.05095

absolute error is 3.47689
```

```
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 += 4 * f[x] /. x → y[[i]]];
For[i = 2, i < n, i += 2, sumeven += 2 * f[x] /. x → y[[i]]];
Sn1 = (h / 3) * ((f[x] /. x → a) + N[sumodd] + N[sumeven] + (f[x] /. x → b));
Print["For n=", n, ",Simpson estimate is:", Sn1]
in1 = Integrate[Sin[x], {x, 0, Pi / 2}]
Print["True value is", in1]
Print["absolute error is ", Abs[Sn1 - in1]]
```

```
For n=12,Simpson estimate is:0.999205

1

True value is1

absolute error is 0.000794697
```

```
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 += 4 * f[x] /. x → y[[i]]];
For[i = 2, i < n, i += 2, sumeven += 2 * f[x] /. x → y[[i]]];
Sn1 = (h / 3) * ((f[x] /. x → a) + N[sumodd] + N[sumeven] + (f[x] /. x → b));
Print["For n=", n, ",Simpson estimate is:", Sn1]
in1 = Integrate[Sin[x], {x, 0, Pi/2}]
Print["True value is", in1]
Print["absolute error is ", Abs[Sn1 - in1]]
```

```
For n=6,Simpson estimate is:0.99923

1

True value is1

absolute error is 0.000770089
```

```
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] := √x * Exp[x];
sumodd = 0;
sumeven = 0;
For[i = 1, i < n, i += 2, sumodd += 4 * f[x] /. x → y[[i]]];
For[i = 2, i < n, i += 2, sumeven += 2 * f[x] /. x → y[[i]]];
Sn1 = (h / 3) * ((f[x] /. x → a) + N[sumodd] + N[sumeven] + (f[x] /. x → b));
Print["For n=", n, ",Simpson estimate is:", Sn1]
in1 = Integrate[√x * Exp[x], {x, 1, 2}]
Print["True value is", in1]
Print["absolute error is ", Abs[Sn1 - in1]]
```

For n=12,Simpson estimate is:5.85023

$$\frac{1}{2}\left(-2\,e+2\sqrt{2}\,e^{2}+\sqrt{\pi}\,\left(\mathrm{Erfi}[1]-\mathrm{Erfi}\left[\sqrt{2}\right]\right)\right)$$

True value is $\frac{1}{2}\left(-2\,e+2\sqrt{2}\,e^{2}+\sqrt{\pi}\,\left(\mathrm{Erfi}[1]-\mathrm{Erfi}\left[\sqrt{2}\right]\right)\right)$

absolute error is 2.95573×10^{-6}