

# C Program for Numerical Integration (Trapezoidal Rule, Simpson's Rule and Boole's Rule)

💬 1 🔒

Program /\* This program is for numerical integration of numerical methods Here we are going to solve the integration of defined functio...

- > [C Program for Runge-Kutta Method](#)
- > [C Program for Heun's Method](#)
- > [C Program for Euler's Method](#)

## Program

/\*

This program is for numerical integration of numerical methods

Here we are going to solve the integration of defined function  $f(x)$

Using...

1. Trapezoidal Rule



2. Composite Trapezoidal Rule
3. Simpson's 1/3 Rule
4. Composite Simpson's 1/3 Rule
5. Simpson's 3/8 Rule
6. Boole's Rule

In this program we are going to solve for integration of square root of  $\sin(x)$  and get output when lower limit is 0 and upper limit is  $\pi/2$ .

Note: You can change the integration function  $f(x)$  and also can change the lower and upper limit for solution..

For more update visit daily.

Thank You!!!

```
*/

#include<conio.h>
#include<stdio.h>          // header file for standard input and output
#include<stdlib.h>          //for exit() function
#include<math.h>           //for mathematical operation like sqrt
#define f(x) sqrt(sin(x))  //defined the function i.e of which integration is going to calculate
void main()
{
    int i,choice;
    float n,a,b,h,it,ict,is1,ics1,is2,ib,sum,sum1;
```



```

clrscr();
printf("Solution for integration of sqrt(sin(x)) \n");
printf("Enter lower limit and upper limit\n");    //lower and upper value of integral
scanf("%f%f",&a,&b);
printf("Select Options\n1.Trapezoidal Rule\n2.Composite Trapezoidal Rule\n3.Simpson's 1/3 Rule\n4.Composite Simpson's 1/3
Rule\n5.Simpson's 3/8 Rule\n6.Boole's Rule\n7.Exit\n");
a:printf("\nEnter Choice : ");
scanf("%d",&choice);
switch(choice)
{

///Solution for Trapezoidal Rule i.e It
case 1:
h=b-a;
it=((f(a)+f(b))/2)*h;
printf("It = %.4f\n",it);
break;

///Solution for Composite Trapezoidal Rule i.e Ict
case 2:
printf("Enter value for n : ");
scanf("%f",&n);
h=(b-a)/n;
sum=0;
for(i=1;i<n;i++)

```



```

{
sum=sum+f(a+i*h);
}
ict=(h/2)*(f(a)+f(b)+2*sum);
printf("Ict = %.4f\n",ict);
break;

///Solution for Simpson's Rule / Simpson's 1/3 Rule i.e Is1
case 3:
h=(b-a)/2;
is1=(h/3)*(f(a)+f(b)+4*f(a+h));
printf("Is1 = %.4f\n",is1);
break;

///Solution for Composite Simpson's Rule i.e Ics1
case 4:
printf("Enter value for n : ");
scanf("%f",&n);
h=(b-a)/n;
sum=0;
sum1=0;
for(i=1;i<n;i++)
{
if(i%2==0)
sum1=sum1+f(a+i*h);

```



```
else
sum=sum+f(a+i*h);
}
ics1=(h/3)*(f(a)+f(b)+4*sum+2*sum1);
printf("Ics1 = %.4f\n",ics1);
break;

///Solution for Simpson's 3/8 Rule i.e Is2
case 5:
h=(b-a)/3;
is2=(3*h/8)*(f(a)+f(b)+3*f(a+h)+3*f(a+2*h));
printf("Is2 = %.4f\n",is2);
break;

///Solution for Boole's Rule i.e Ib
case 6:
h=(b-a)/4;
ib=(2*h/45)*(7*f(a)+7*f(b)+12*f(a+2*h)+32*(f(a+h)+f(a+3*h)));
printf("Ib = %.4f\n",ib);
break;

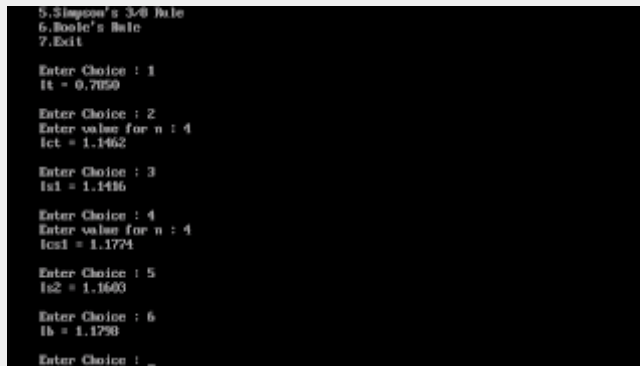
case 7:
exit(0);

default:
```



```
printf("\nEnter the correct choice...\n");  
}  
goto a;  
getch();  
}
```

## Output



```
5.Simpson's 3/8 Rule  
6.Boole's Rule  
7.Exit  
  
Enter Choice : 1  
It = 0.7050  
  
Enter Choice : 2  
Enter value for n : 4  
Ict = 1.1462  
  
Enter Choice : 3  
Is1 = 1.1446  
  
Enter Choice : 4  
Enter value for n : 4  
Ics1 = 1.1774  
  
Enter Choice : 5  
Is2 = 1.1603  
  
Enter Choice : 6  
Ih = 1.1790  
Enter Choice : _
```

🏷️ LABELS: Numerical Method

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## 🕒 WEEK TRENDING

C Program for Newton Raphson Method



C program for Regula Falsi Method



## RECENT WITH THUMBS



Accident Detection And Alert System



Extract Matrix Column

Sum Two Array And Compare With Given Value





Items of 2

Two items are shown in a row, each with a placeholder image and a title. The first item is titled "Items of 2" and the second item is titled "Items of 2".

Domain Type

Domain Type

Domain Type From Array Of Urls

RECENT

REPLIES

RANDOM



 YEAR POPULAR



```

Using Newton Raphson method to find root of equation x^2-4x-10=0
Enter values of x0
x0: 9
steps  x0    x1    f0    g0
1      9.0000 6.5000 35.0000 14.0000
2      6.5000 5.8056 6.2500  9.0000
3      5.8056 5.7422 0.4023  7.6111
4      5.7422 5.7417 0.0090  7.4844
The root is 5.7417_

```

1

## C Program for Newton Raphson Method

Algorithm First you have to define equation  $f(x)$  and its first derivative  $g(x)$  or  $f'(x)$ . Guess the initial value of  $x_0$ , here the gu... [Readmore](#)

```

Regula Falsi Method to find root of equation x^2-4x-10=0
Enter values of x1 and x2
x1: 4
x2: 0
steps  x0    f0    x1    f(x1)  x2    f(x2)
1      5.2500 -3.4375 4.0000 -10.0000 8.0000 22.0000
2      5.6216 -0.8839 5.2500 -3.4375 8.0000 22.0000
3      5.7135 -0.2100 5.6216 -0.8839 8.0000 22.0000
4      5.7351 -0.0490 5.7135 -0.2100 8.0000 22.0000
5      5.7401 -0.0114 5.7351 -0.0490 8.0000 22.0000
6      5.7413 -0.0026 5.7401 -0.0114 8.0000 22.0000
7      5.7416 -0.0006 5.7413 -0.0026 8.0000 22.0000
8      5.7416 -0.0001 5.7416 -0.0006 8.0000 22.0000
9      5.7417 -0.0000 5.7416 -0.0001 8.0000 22.0000
The root is 5.7417_

```

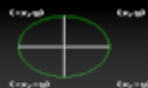
2

## C program for Regula Falsi Method

Algorithm Enter two guesses value i.e  $x_1$  and  $x_2$ . [note: guesses must selected in such a way that root of the equation is in between gues... [Readmore](#)

3

```
Mid point ellipse drawing algorithm
Enter Center for ellipse
x : 300
y : 300
Enter x-radius and y-radius
x-radius : 80
y-radius : 40
```



## C Program for Mid Point Ellipse Drawing Algorithm

Program `#include<conio.h> #include<stdio.h> #include<graphics.h> void main() { int gd=DETECT,gm; float x,y,xc,yc... Readmore`

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