SIMPSON’S 1/3 RULE

PROGRAM 1

c program sim3.for

f(x)=1/(1+x)

real::h,ul,ll

open(unit=1,file="sim3.in")

open(unit=2,file="sim3.out")

read(1,\*)ul,ll,h

n=(ul-ll)/h

write(2,\*)"f(x)=1/(1+x)"

write(2,\*)" "

write(2,\*)"ul=",ul

write(2,\*)"ll=",ll

write(2,\*)"h=",h

write(2,\*)" "

write(2,\*)" x y"

sum=(f(ul)+f(ll))

do 10 i=2,n-1,2

sum=sum+2.0\*f(ll+i\*h)

10 continue

do 20 i=1,n-1,2

sum=sum+4.0\*f(ll+i\*h)

20 continue

do 5 i=0,n,1

x=ll+i\*h

y=f(ll+i\*h)

write(2,\*)x ,y

5 continue

area=sum\*h/3.0

write(2,\*)"area=",area

stop

end

INPUT FILE

1

0

0.25

OUTPUT FILE

f(x)=1/(1+x)

ul= 1.00000000

ll= 0.00000000

h= 0.250000000

x y

0.00000000 1.00000000

0.250000000 0.800000012

0.500000000 0.666666687

0.750000000 0.571428597

1.00000000 0.500000000

area= 0.693253994

PROGRAM 2

c program sim3e1.for

f(x)=(sin(x)-alog(x)+exp(x))

real::h,ul,ll

open(unit=1,file="sim3e1.in")

open(unit=2,file="sim3e1.out")

read(1,\*)ul,ll,n

h=(ul-ll)/n

write(2,\*)"f(x)=(sin(x)-alog(x)+exp(x))"

write(2,\*)" "

write(2,\*)"ul=",ul

write(2,\*)"ll=",ll

write(2,\*)"h=",h

write(2,\*)"n=",n

write(2,\*)" "

write(2,\*)" x y"

sum=(f(ul)+f(ll))

do 10 i=2,n-1,2

sum=sum+2.0\*f(ll+i\*h)

10 continue

do 20 i=1,n-1,2

sum=sum+4.0\*f(ll+i\*h)

20 continue

do 5 i=0,n,1

x=ll+i\*h

y=f(ll+i\*h)

write(2,\*)x ,y

5 continue

area=sum\*h/3.0

write(2,\*)"area=",area

stop

end

INPUT FILE

1.4

0.2

6

OUTPUT FILE

f(x)=(sin(x)-alog(x)+exp(x))

ul= 1.39999998

ll= 0.200000003

h= 0.199999988

n= 6

x y

0.200000003 3.02951002

0.399999976 2.79753375

0.599999964 2.89758682

0.799999952 3.16604066

0.999999940 3.55975270

1.19999993 4.06983423

1.39999998 4.70417786

area= 4.05213308

PROGRAM 3

c sim3d.for

real,dimension(5)::x,y

real::h,ul,ll

open(unit=1,file="sim3d.in")

open(unit=2,file="sim3d.out")

read(1,\*)n,h

do 5 i=1,n

read(1,\*) x(i),y(i)

5 continue

sum=y(1)+y(n)

do 10 i=3,n-1,2

sum=sum+2.0\*y(i)

10 continue

do 20 i=2,n-1,2

sum=sum+4.0\*y(i)

20 continue

area=sum\*h/3.0

write(2,\*)"area=",area

stop

end

INPUT FILE

5

0.25

0.000000000 1.00000000

0.250000000 0.800000012

0.500000000 0.666666687

0.750000000 0.571428597

1.000000000 0.500000000

OUTPUT FILE

area= 0.693253994