**MIDPOINT**

**Variable Key:**

Y1 - The function to be evaluated

A - Lower bound

B - Upper bound

N – Number of subintervals

T – The x value for the left bound of the current interval

R – The approximate area under the curve

D – The width of each interval

C – The midpoint of the current interval

H – The value of the function at the current midpoint

I - Current number of Iterations

**Program: Comments: (not in actual program)**

Input “INTEGRAND:”,Y1

Input “LOWER LIMIT:”,A

Input “UPPER LIMIT:”,B

Input “SUB-INTERVAL:”,N

prgmEQUATION

A→T

0→R

(B-A)/N→D

For(I,1,N,1)

T+.5\*D→C

Y1(C) →H

R+H\*D→R

A+I\*D→T

End

Disp “AREA IS:”,R

Stop

**Trapezoidal**

**Variable Key:**

Y1 - The function to be evaluated

A - Lower bound

B - Upper bound

N – Number of subintervals

T – The x value for the left bound of the current interval

R – The approximate area under the curve

D – The width of each interval

I - Current number of Iterations

**Program: Comments: (not in actual program)**

Input “INTEGRAND:”,Y1

Input “LOWER LIMIT:”,A

Input “UPPER LIMIT:”,B

Input “SUB-INTERVAL:”,N

prgmEQUATION

A→T

0→R

(B-A)/N→D

For(I,1,N-1,1)

A+I\*D→T

R+Y1(T) →R

End

2\*R→R

R+Y1(A)+Y1(B) →R

R\*0.5\*D→R

Disp “INTERVALS:”,N

Disp “AREA IS:”,R

Stop

**Simpson’s 1/3 Rule**

**Variable Key:**

Y1 - The function to be evaluated

A - Lower bound

B - Upper bound

N – Number of subintervals

T – The x value for the left bound of the current interval

R – The total approximate area under the curve

O – Summation of the area for the odd intervals

E – Summations of the area of the even intervals

D – The width of each interval

I - Current number of iterations for the odd intervals

J – Current number of iterations for the even intervals

**Program: Comments: (not in actual program)**

Input “INTEGRAND:”,Y1 //Input the equation

Input “LOWER LIMIT:”,A //Input Lower limit

Input “UPPER LIMIT:”,B //Input upper limit

Input “SUB-INTERVAL:”,N //Input the number of sub-intervals

prgmEQUATION //Call the Equation sub-program, sets Y1 to the equation specified in the Equation sub-program

A→T //Set the T to the lower limit

0→R //Set the odd interval summation variable to zero

0→O //Set the even interval summation variable to zero

0→E //Set the total approximation variable to zero

(B-A)/N→D //Calculate the width of the intervals and assign to delta

For(I,1,N-1,2)

A+I\*D→T

O+Y1(T) →O

End

For(J,2,N-2,2)

A+J\*D→T

E+Y1(T) →E

End

4\*O→O

2\*E→E

O+E+Y1(A)+Y1(B) →R

R\*(1/3)\*D→R

Disp “INTERVALS:”,N

Disp “AREA IS:”,R

Stop