#include <iostream>

#include <cmath>

float func(float a, float b, float c, float t);

int main()

{

float t1, t2, a, b, c, h, sum, sum1 = 0, sum2 = 0, sum3 = 0, I1, I2;

int n, i;

std::cout << "enter the initial and final temp: ";

std::cin >> t1 >> t2;

std::cout << "enter the constant values a, b, c: ";

std::cin >> a >> b >> c;

std::cout << "enter the number of iterations: ";

std::cin >> n;

h = (t2 - t1) / n;

sum = func(a, b, c, t1) + func(a, b, c, t2);

for (i = 1; i < n; i++)

{

sum1 = sum1 + func(a, b, c, (t1 + (i \* h)));

}

I1 = (h \* (sum + (2 \* sum1))) / 2;

I1 = I1 / (t2 - t1);

std::cout << "the specific heat by trapezoidal method is " << I1 << std::endl;

for (i = 1; i < n; i = i + 2)

{

sum2 = sum2 + func(a, b, c, (t1 + (i \* h)));

}

for (i = 2; i < n; i = i + 2)

{

sum3 = sum3 + func(a, b, c, (t1 + (i \* h)));

}

if (n % 2 == 0)

{

I2 = (h \* (sum + (4 \* sum2) + (2 \* sum3))) / 3;

I2 = I2 / (t2 - t1);

std::cout << "the specific heat by simpsons 1/3 method is " << I2 << std::endl;

}

else

{

std::cout << "cannot use simpsons method" << std::endl;

}

return 0;

}

float func(float a, float b, float c, float t)

{

float cp;

cp = a + (b \* t) + (c \* t \* t);

return std::fabs(cp);

}