PRACTICAL WORK UNIT 4 A

This code defines a function f that calculates the square of a given number. It then defines another function area that takes in three parameters a, b, and n. a and b are the limits of integration and n is the number of intervals. The function area calculates the area under the curve of f using the trapezoidal rule.

The trapezoidal rule is a numerical integration technique that approximates the definite integral of a function using trapezoids. The area under a trapezoid can be calculated using the formula (a + b) \* h / 2, where a and b are the lengths of the parallel sides of the trapezoid and h is the height. The trapezoidal rule divides the area under the curve of the function into n trapezoids of equal width and calculates the area under each trapezoid using the formula above. The sum of the areas of all the trapezoids gives an approximation of the area under the curve of the function.

The area function first calculates the width of each trapezoid h by dividing the difference between a and b by n. It then calculates the area under the first trapezoid using 0.5 \* f(a) because the first side of the trapezoid is half the length of the other side. It then calculates the area under the remaining n-1 trapezoids by summing up the area of each trapezoid using f(x), where x is the midpoint of each interval. Finally, it calculates the area under the last trapezoid using 0.5 \* f(b).

The area function returns the sum of the areas of all the trapezoids multiplied by the width of each trapezoid h, which gives an approximation of the area under the curve of the function.

In the main function, a, b, and n are initialized to 0.0, 10.0, and 10000, respectively. The area function is then called with these parameters and the result is stored in the variable result. The result is then printed to the console using std::cout.