

### QUICK TEST 3 (Thu 22 nov 10:15-10:35)

In mathematics, the trapezoidal rule is a way to approximately calculate the definite integral:

$$\int_a^b f(x) dx$$

The trapezoidal rule works by approximating the region under the graph of the function  $f(x)$  by a trapezoid and calculating its area. It follows that:

$$\int_a^b f(x) dx \approx (b-a) \frac{1}{2} (f(a) + f(b))$$

To calculate this integral more accurately, split the interval of integration  $[a, b]$  into  $n$  smaller subintervals, and apply the trapezoidal rule on each of them. One obtains the *composite trapezoidal rule*:

$$\int_a^b f(x) dx \approx \frac{(b-a)}{2n} (f(x_0) + 2f(x_1) + 2f(x_2) + \dots + 2f(x_{n-1}) + f(x_n))$$

where

$$x_k = a + k \frac{(b-a)}{n}, \text{ for } k = 0, 1, \dots, n$$

Write a C program to evaluate  $F(x) = \int_0^1 \sqrt{x^2 + 1} dx$  and fill in the value

	$n = 5$	$n = 25$	$n = 50$
$F(x) = \int_0^1 \sqrt{x^2 + 1} dx$			
$F(x) = \int_0^{1/2} \sqrt{1 - x^2} dx$			

Full name

Email

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Further feedbacks

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