

# Lab Session 8: Project

## Description

Numerical integration is widely employed to calculate the numerical value of a definite integral. One engineering application of numerical integration is to approximate the area bounded by a curve and lines.

In this project, you have to develop an algorithm (or technique) to approximate the area between the curve defined by the function  $f(x)$ , the x-axis, and the two lines  $x = 0$  and  $x = b$ , where  $b \in [2, 4]$ , i.e. the stripped area in the following figure.

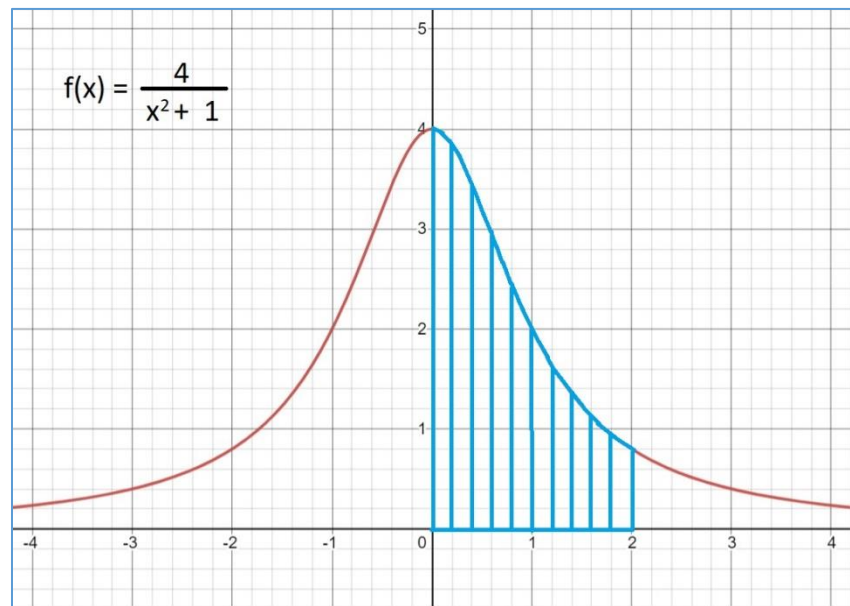
### Sample Input:

$b = 2$

$n = 10$

### Sample Output:

Area = 4.58806167



## Requirements

- Write an MIPS assembly program to calculate the stripped area using any area approximation methods (e.g. rectangle/trapezoid method, Simpson's method, etc.).
  - Input:**
    - $b$  (as described above)
    - $n$  – the number of small rectangles which shape the stripped area to adjust the accuracy of area calculation,  $n \in \mathbb{N}$ ,  $10 \leq n \leq 20$ .
  - Output:**
    - The stripped area.
- Write a report and submit **a hard copy** that includes:
  - The study on floating-point arithmetic on an MIPS computer.
  - The proposed algorithm/implementation and analysis in the state of the MIPS computer (e.g. the state of memory and registers).