

MATH1103 FALL 2022
DISCUSSION SHEET 1

Every discussion you will be assigned three problems and you are encouraged to work in groups.

Problem 1. Estimate the integral

$$\int_0^1 x^3 dx$$

by using rectangles to estimate the area under $y = x^3$ from 0 to 1.

Problem 2. In what ways can we define a function, besides using a formula? For instance, we can define a function in the following way:

$$f = \begin{cases} 1, & \text{if } x \text{ is rational} \\ 0, & \text{if } x \text{ is irrational} \end{cases}$$

What else can you think of?

Problem 3. If you put 0 as lower limit of integration and a variable as upper limit of integration, this becomes a function again. Any guesses on the relationship between this function and the original function? Try the following examples.

(1)

$$\int_0^x 2t dt$$

(2)

$$\int_0^x \cos t dt$$

(3)

$$\int_0^x \frac{1}{t} dt$$