

Mathematics 1110H – Calculus I: Limits, Derivatives, and Integrals

TRENT UNIVERSITY, Fall 2023

Assignment #5

Definite integrals done the hard – but not hardest! – way!

Due just before midnight on Friday, 24 November.*

Warning: Please read the accompanying handout *Right-Hand Rule Riemann Sums* for the necessary definitions and a simple example.

1. Use the Right-Hand Rule to compute $\int_{-1}^3 (x^2 - 1) dx$ by hand. [6]

You may find the summation formulas $\sum_{i=1}^n i = 1 + 2 + 3 + \cdots + n = \frac{n(n+1)}{2}$ and $\sum_{i=1}^n i^2 = 1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$ to be useful in working through 1.

2. Use the Right-Hand Rule to compute $\int_{-1}^3 (x^2 - 1) dx$ using SageMath. [4]

You may find SageMath's `sum` command, and perhaps also the `limit` command, to be of use in working through 2.

* You should submit your solutions via Blackboard's Assignments module, preferably as a single pdf. If submission via Blackboard fails, please submit your work to your instructor by email or on paper.