

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

TRENT UNIVERSITY, Summer 2026 (S62) [reading course]

### Assignment #6

*Due on Friday, 31 July.\**

*Please note that this is the day after the exam,  
so late submissions will not be accepted.*

Please at least skim through Sections 9.3, 9.9, and 9.10 of our textbook, or else review the lectures on computing volumes of solids of revolution, arc-lengths, and areas of surfaces of revolution. Also, please take a look at Section 1.12 of Gregory Bard's *Sage for Undergraduates*.

Consider the region below  $y = e^{-x^2/2}$  and above  $y = 0$ , for  $0 \leq x \leq 1$ .

1. Sketch or plot this region. What is the area of this region? [2]
2. Sketch the solid obtained by revolving this region about the  $y$ -axis. What is the volume of this solid? [3]

Consider the curve  $y = \ln(x)$ , for  $1 \leq x \leq e$ .

3. Sketch or plot this curve. What is the arc-length of this curve? [2]
4. Sketch the surface obtained by revolving this curve about the  $y$ -axis. What is the area of this surface? [3]

NOTE. Out of the four integrals you are asked to compute above, one is doable by hand with the integral techniques we know so far ...

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\* You should submit your solutions via Blackboard's Assignments module, preferably as a single pdf. If that fails, please submit directly to the instructor on paper or via email to [sbilaniuk@trentu.ca](mailto:sbilaniuk@trentu.ca). You may work with others, use whatever tools you like, and look things up, so long as you write up your submission by yourself and give due credit to your collaborators and any tools or sources you actually used.