

TRENT UNIVERSITY, WINTER 2020
MATH 1120H Test
 Thursday, 27 February
 Time: 50 minutes

Instructions

- *Show all your work.* Legibly, please! Simplify where you reasonably can.
- *If you have a question, ask it!*
- Use the back sides of all the pages for rough work or extra space.
- You may use a calculator and (all sides of) an aid sheet.

1. Compute any *four* (4) of integrals **a–f**. [12 = 4 × 3 each]

$$\begin{array}{lll} \mathbf{a.} \int \frac{1}{1-t^2} dt & \mathbf{b.} \int_0^1 \arctan(x) dx & \mathbf{c.} \int \frac{z^2}{z^3+z} dz \\ \mathbf{d.} \int_0^\infty ye^{-y^2} dy & \mathbf{e.} \int \cos^3(w) dw & \mathbf{f.} \int_0^1 \sqrt{1-r^2} dr \end{array}$$

2. Do any *two* (2) of parts **a–c**. [10 = 2 × 5 each]

- Find the area of the finite region below $y = 2 - x$ and above $y = x^2$.
- Find the area of the surface obtained by revolving the curve $y = x$, for $0 \leq x \leq 4$, about the y -axis.
- Find the volume of the solid obtained by revolving the region between $y = \sqrt{x}$ and $y = 0$, where $0 \leq x \leq 4$, about the x -axis.

3. Do either *one* (1) of parts **a** or **b**. [8]

- Find the arc-length of the curve $y = \frac{1}{4}x^2 - \frac{1}{2}\ln(x)$, where $1 \leq x \leq 2e$.
- Compute $\int \frac{\cos(x)}{\sin^3(x) + \sin(x)} dx$.

[Total = 30]