

TRENT UNIVERSITY, WINTER 2019

MATH 1120H Test

Friday, 1 March

Time: 11:00–11:50

Space: GCS 114

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**. [$12 = 4 \times 3$ each]

a. $\int_0^{\pi/2} \cos(x) \sin^3(x) dx$ **b.** $\int_2^{\infty} \frac{1}{y^3} dy$ **c.** $\int e^z \cos(z) dz$

d. $\int \frac{5}{t^2 + t - 6} dt$ **e.** $\int \frac{1}{\sqrt{1 - 9s^2}} ds$ **f.** $\int_0^1 \frac{r + 1}{r^2 + 1} dr$

2. Do any *two* (2) of parts **a–c**. [$8 = 2 \times 4$ each]

- a.** Use a Right-Hand Rule sum to compute $\int_0^4 x dx$.
- b.** Find the area of the finite region above $y = e^x$ and below $y = (e - 1)x + 1$.
- c.** Find the arc-length of the curve $y = \frac{4x}{3}$, where $0 \leq x \leq 3$.

3. Do either *one* (1) of parts **a** or **b**. [10]

- a.** Compute $\int \frac{x^4 + x^2 + 1}{x^3 + x} dx$.
- b.** A triangular flat plate of constant thickness and density has its vertices at the points $(0, 0)$, $(0, 4)$, and $(4, 0)$. Find the coordinates of its centroid. (You may assume that units have been chosen so that mass per unit area equals 1.)

[Total = 30]