

Mathematics 1100Y – Calculus I: Calculus of one variable

TRENT UNIVERSITY, SUMMER 2011

MATH 1100Y Test 2

6 July, 2011

Time: 50 minutes

Instructions

- Show all your work. Legibly, please!
- If you have a question, ask it!
- Use the extra page and the back sides of the test sheets for rough work or extra space.
- You may use a calculator and an aid sheet.

1. Compute any *four* (4) of the integrals in parts **a-f**. [16 = 4 × 4 each]

a. $\int \tan^2(x) dx$ b. $\int_0^{3/2} 2(2x + 1)^{3/2} dx$ c. $\int xe^x dx$

d. $\int_0^\pi x \cos(x) dx$ e. $\int \sec^3(x) \tan(x) dx$ f. $\int_0^1 (x^2 + 2x + 3) dx$

2. Do any *two* (2) of parts **a-e**. [12 = 2 × 6 each]

a. Compute $\int_0^3 \sqrt{9 - x^2} dx$. What does this integral represent?

b. Sketch the solid obtained by rotating the region bounded by $y = x$, $y = 0$, and $x = 2$ about the y -axis, and find its volume.

c. Give an example of a function $f(x)$ with $f'(x) = 1 - \int_0^x f(t) dt$ for all x .

d. Sketch the region between $y = \sin(x)$ and $y = -\sin(x)$ for $0 \leq x \leq 2\pi$, and find its area.

e. Compute $\int_1^2 x dx$ using the Right-hand Rule.

3. The region between $y = \sqrt{1 - x^2}$ and $y = 2x - 2$, where $0 \leq x \leq 1$, is rotated about the y -axis to make a solid. Do part **a** and *one* (1) of parts **b** or **c**.

a. Sketch the solid of revolution described above. [3]

b. Find the volume of the solid using the disk/washer method. [9]

c. Find the volume of the solid using the method of cylindrical shells. [9]

[Total = 40]