

UNIVERSITY OF MANITOBA

MATH 1700 D01

Assignment 4

Due date: February 27, 2016 (Before midnight)

Total marks: 100

All assignments must be submitted ONLINE, in ONE single pdf file following the procedure explained on UM Learn. If you have trouble submitting them the right way, please contact the DE technical support.

Your assignment will not be graded if you fail to submit it ONLINE, in ONE single pdf file.

This assignment is based on units 7 and 8. SHOW ALL WORK to get full marks. Leave answers as exact answers. For example, leave it as $1/7$ as opposed to 0.142857.

1.

Determine whether each integral is convergent or divergent. Evaluate those that are convergent.

(a) (14 points) $\int_0^{\infty} x e^{-2x} dx$

(b) (12 points) $\int_0^{\infty} \frac{1}{\sqrt{x} e^{\sqrt{x}}} dx$

(c) (12 points) $\int_0^2 \frac{x}{x^2 - 1} dx$

2.

Find the length of the curve.

(a) (10 points) $y = x^{2/3}$, $1 \leq x \leq 8$

(b) (14 points) $y = x^4 + \frac{1}{32x^2}$, $1 \leq x \leq 2$

3.

Find the area of the surface obtained by rotating the curve about the x -axis.

(a) (12 points) $y = \sqrt{x}$, from $P(1, 1)$ to $Q(4, 2)$

(b) (14 points) $8y = 2x^4 + x^{-2}$, from $P(1, 8/3)$ to $Q(2, 129/32)$

4. (12 points)

The curve $x = 4\sqrt{y}$, from $P(4, 1)$ to $Q(12, 9)$, is rotated about the y -axis. Find the area of the resulting surface.