

MA1201 B17/18 Assignment 2 Deadline: 3pm 22/3/2018 (Thursday) Venue: Thursday Tutorial Classes

Instruction: Write down clearly the course session (A/B/C/D/E/F/G/H) and the tutorial session you have registered together with your full name and student number on the front page of your answer script and hand the original hard copy to your tutorial class on Thursday on or before the deadline. In case your tutorial class is scheduled on Tuesday, please hand the original hard copy to your tutor in one of the tutorial classes on Thursday. **Please remind that we don't accept soft copies and photo copies. Marks will not be recorded if you submit the hard copy to the wrong tutor or after the deadline.**

1. Evaluate the following integrals.

(a) $\int_2^3 \frac{\ln(2x^5)}{x^2} dx$ [12]

(b) $\int_0^{\ln\sqrt{3}} \frac{e^{2x}}{\sqrt{9 - e^{4x}}} dx$ [13]

(c) $\int \frac{2x^3 + 5x^2 + 16x}{x^5 + 8x^3 + 16x} dx$ [25]

2. The region bounded by the curves $x = 3y^2 - 2$, $x = y^2$, and the line $y = 0$ is to be revolved about the x -axis to generate a solid. Find the volume of the solid using

(a) the disk method; [10]

(b) the shell method. [10]

3. The region bounded by the curve $y = \sin x$, $x = 0$, $x = \pi$ and $y = c$, ($0 \leq c \leq 1$), is revolved about the line $y = c$ to generate the solid.

(a) Find the value of c that minimizes the volume of the solid. What is the minimum volume? [15]

(b) What value of c in $[0, 1]$ maximizes the volume of the solid? [5]

(c) Graph the solid's volume as a function of c , first for $0 \leq c \leq 1$ and then on a larger domain. What happens to the volume of the solid as c moves away from $[0, 1]$? Does this make sense physically? Give reasons for your answers. [10]

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