MA1201 (*A/B/C/D) B16/17 Test 2 (70min) Name: ___________ Student No: ________ Marks: ____

Instruction: *Indicate carefully the above course session* you register and hand in your answer script together with this question paper as a cover page.* ***Marks will not be recorded without the question paper or with the wrong session you attend or indicate.***

1. (a) Compute the volume of the solid by revolving the region bounded by the parabolas $x=3y^2-2$ and $x=y^2$ about the x-axis. [15]

   (b) Find the surface area of the solid by revolving the Astroid: $x=\cos^3 t$, $y=\sin^3 t$, $0\le t\le 2\pi$, about the y-axis. [18]

2. (a) Let A be a point in the Argand diagram representing the complex number $z_A=-1+\sqrt{3}i$. Determine the resulting complex number z_B in the Cartesian form by rotating OA 75° along the clockwise direction and sketched in length by five times to OB. [15]

   (b) Solve $\frac{1}{i}z^3=1+i$ and list all solution in the Polar form with principal arguments. [18]

3. (a) Let $A=\begin{pmatrix}-1 & 2 & 3\\ 0 & 2 & 0\\ 2 & -1 & -4\end{pmatrix}$. Evaluate $|A^3|+|AA^T|-2|A^{-1}|$. [10]

   (b) Consider the system of linear equations as follows.

$$\begin{array}{rcrcrcrcr} 2x & + & 3y & - & z & + & w & = & 1\\ 8x & + & 12y & - & 5z & + & 8w & = & 3\\ -2x & - & 4y & + & 3z & - & 4w & = & -3 \end{array}$$

   (i) Solve the above linear system by the Gaussian elimination. [19]

   (ii) Write down the corresponding homogeneous system explicitly and provide a non-trivial solution from (i) without resolving the homogeneous system. [5]

- END -

Brief Table of Integrals

$\int x^p\,dx=\frac{x^{p+1}}{p+1}+C,\quad p\ne -1$	$\int \frac{1}{x}\,dx=\ln\lvert x\rvert+C$
$\int e^x\,dx=e^x+C$	$\int \sec^3 x\,dx=\frac{1}{2}\sec x\tan x+\frac{1}{2}\ln\lvert\sec x+\tan x\rvert+C$
$\int \sin x\,dx=-\cos x+C$	$\int \cos x\,dx=\sin x+C$
$\int \sec^2 x\,dx=\tan x+C$	$\int \csc^2 x\,dx=-\cot x+C$
$\int \sec x\tan x\,dx=\sec x+C$	$\int \csc x\cot x\,dx=-\csc x+C$
$\int \sec x\,dx=\ln\lvert\sec x+\tan x\rvert+C$	$\int \csc x\,dx=-\ln\lvert\csc x+\cot x\rvert+C$
$\int \frac{1}{\sqrt{1-x^2}}\,dx=\sin^{-1}x+C$	$\int \frac{1}{1+x^2}\,dx=\tan^{-1}x+C$

Not to be taken away