Kolej Matrikulasi Kedah
Kementerian Pendidikan Malaysia

TUGASAN INDIVIDU/INDIVIDUAL ASSIGNMENT

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SM015
MATHEMATICS
SEMESTER 1 SESSION 2018/2019

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ARAHAN KEPADA PELAJAR */ INSTRUCTIONS TO STUDENTS*

1. Tugasan ini mengandungi **SEMBILAN** soalan./ *This assignment contains **NINE** questions.*

2. Jawab **SEMUA** soalan. */ Answer **ALL** the questions.*

3. Tugasan anda hendaklah diserahkan sebelum **2hb Ogos 2018.** Serahan **selepas 2hb Ogos 2018 TIDAK** akan diterima. / *Your assignment must be submitted before **2nd August 2018**. Submission **after 2nd August 2018** will **NOT** be accepted.*

4. Tugasan hendaklah disiapkan secara individu. Anda dilarang meniru tugasan orang   lain. / *Your assignment should be prepared individually. You should not copy another person's assignment.*

1. Given two complex numbers $z_1 = 5 + 4i$ and $z_2 = 3 - i$.

   a) State $\overline{z_1}$ and $\overline{z_2}$. **[2 marks]**

   b) Find $z_1 z_2$. Hence, show that $\overline{z_1}\,\overline{z_2} = \overline{z_1 z_2}$. **[6 marks]**

2 a) Given two complex numbers $z_1 = 1 + 2i$ and $z_2 = 2 - i$. Express $\dfrac{1}{z_1 - z_2} + \dfrac{1}{\overline{z_1}}$ in the

   form of $a + bi$, where a and b are real numbers. **[4 marks]**

   b) Given $(1 + 4i)u - 4w = -1 + 2i$. Find u and w if u and w are complex numbers with w

   is a conjugate of u. Hence, find uw. **[9 marks]**

3. Express $z = \dfrac{i}{2 - i}$ in polar form. **[8 marks]**

4. Given $A = \begin{bmatrix} 1 & 2 & 1 \\ 3 & 2 & 2 \\ 3 & 4 & 1 \end{bmatrix}$. Find A^{-1} by using

   a) adjoint method. **[8 marks]**

   b) the elementary row operations method. **[7 marks]**

5. Matrix A is given by $A = \begin{bmatrix} 5 & 8 & 5 \\ 4 & 6 & 6 \\ 5 & 9 & 7 \end{bmatrix}$.

   a) Find

      i) the determinant of A. **[3 marks]**

      ii) the adjoint of A. **[3 marks]**

      iii) A^{-1}. **[2 marks]**

   b) Hence, solve the simultaneous equations

   $$5x + 8y + 5z = 36$$

   $$4x + 6y + 6z = 30$$

   $$5x + 9y + 7z = 40$$

   [5 marks]

6. The following table shows quantities, in kg, and the amount paid by three housewives in a market in a particular day.

Housewife	Beef (kg)	Chicken (kg)	Prawn (kg)	Amount Paid (RM)
Mrs. Chong	2	1	1	36
Mrs. Lee	1	1	1	29
Mrs. Chin	2	2	1	42

The prices, in RM per kg, of beef, chicken and prawn are x, y and z respectively.
a) Construct a system of equations to represent the given information. **[3 marks]**
b) By forming a matrix equation, solve this equation system using the elimination method.
[8 marks]

7. Given that $f(x) = \sqrt{x+1}$, $x \geq -1$.
   a) Show that f is a one to one function. **[3 marks]**
   b) Find $f^{-1}(x)$. **[3 marks]**
   c) Sketch the graphs of $f(x)$ and $f^{-1}(x)$ on the same axes. **[3 marks]**

8. Given $f(x) = \ln(2x+5)$ and $g(x) = \dfrac{e^x - 5}{2}$.

   a) Show that $f(x)$ is a one-to-one function. **[3 marks]**
   b) Find $(f \circ g)(x)$ and $(g \circ f)(x)$. Hence, state the conclusion about the results. **[8 marks]**
   c) Sketch the graphs of $f(x)$ and $g(x)$ on the same axes. **[3 marks]**

9. Given $f(x) = e^{3x} + 5$, $x \in R$.
   a) Show that $f(x)$ is a one-to-one function. **[3 marks]**
   b) Find $f^{-1}(x)$. **[3 marks]**
   c) On the same axes, sketch the graphs of $f(x)$ and $f^{-1}(x)$. **[3 marks]**