

SULIT



**KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI**

**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENDIDIKAN TINGGI**

JABATAN MATEMATIK, SAINS DAN KOMPUTER

PEPERIKSAAN AKHIR

SESI I : 2025/2026

FB10064: MATHEMATICS 1

TARIKH : 3 DISEMBER 2025

MASA : 8.30 PAGI – 10.30 PAGI (2 JAM)

Kertas soalan ini mengandungi **SEMBILAN (9)** halaman bercetak.

Struktur (4 soalan)

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi EMPAT (4) soalan berstruktur. Jawab SEMUA soalan.

QUESTION 1**SOALAN 1**

- CLO1 (a) Express the following expressions in the simplest form.
Nyatakan ungkapan berikut dalam bentuk yang paling mudah.
- i. $2a(a + 4b) - 5b(b - a)$
- [3 marks]
[3 markah]
- ii. $\frac{4m}{m^2 - m} + \frac{m + 3}{m^2}$
- [5 marks]
[5 markah]
- CLO2 (b) Solve the following fraction into its partial fractions.
Selesaikan pecahan berikut kepada pecahan separanya.
- $$\frac{7x + 3 - 2x^2}{x^2(2x + 1)}$$
- [8 marks]
[8 markah]

- CLO1 (c) Based on the Diagram 1 below, identify the values of $\tan\theta$.
Berdasarkan Rajah 1 di bawah, kenalpasti nilai bagi $\tan\theta$.

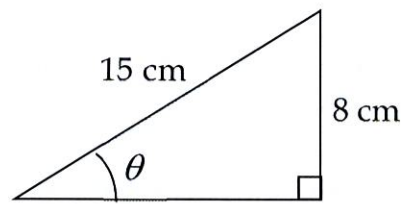


Diagram 1 / Rajah 1

[3 marks]

[3 markah]

- CLO2 (d) Calculate the angle between $0^\circ \leq \theta \leq 360^\circ$ for $\cos 2\theta = 0.0698$.
Kira sudut di antara $0^\circ \leq \theta \leq 360^\circ$ untuk $\cos 2\theta = 0.0698$.

[6 marks]

[6 markah]

QUESTION 2

SOALAN 2

- CLO2 (a) Given the matrix $P = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 0 & 2 \end{bmatrix}$ and $Q = \begin{bmatrix} 4 & 3 \\ -1 & 0 \\ 2 & 2 \end{bmatrix}$. Solve $3P^T - 2Q$.

Diberi matrik $P = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 0 & 2 \end{bmatrix}$ dan $Q = \begin{bmatrix} 4 & 3 \\ -1 & 0 \\ 2 & 2 \end{bmatrix}$. Selesaikan $3P^T - 2Q$.

[4 marks]

[4 markah]

- CLO2 (b) If $|A| = 2$, calculate the value of x , y and z by using Cramer's Rule for the equations:

Jika $|A| = 2$, kirakan nilai bagi x , y dan z dengan menggunakan Kaedah Cramer bagi persamaan-persamaan berikut:

$$5x - y + 7z = 4$$

$$6x - 2y + 9z = 5$$

$$2x + 8y - 4z = 8$$

[8 marks]

[8 markah]

CLO1

- (c) The diagram 2(c) below shows the vectors of $\overrightarrow{PQ}$ and $\overrightarrow{RS}$ in a Cartesian plane. Express both vectors in the $xi + yj$ form.

Rajah 2(c) di bawah menunjukkan vektor $\overrightarrow{PQ}$ dan $\overrightarrow{RS}$ dalam satah Cartesian. Ungkapkan kedua-dua vektor dalam bentuk $xi + yj$.

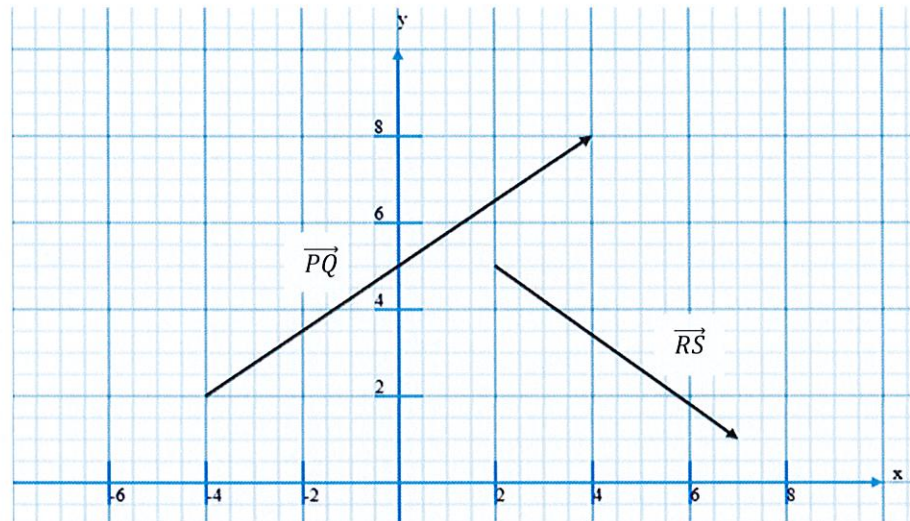


Diagram 2(c) / Rajah 2(c)

[4 marks]

[4 markah]

CLO2

- (d) Given $\overrightarrow{OP} = 2i + j - 4k$ and $\overrightarrow{OQ} = -i - 4j + 2k$. Compute $|\overrightarrow{PQ}|$.
Diberi $\overrightarrow{OP} = 2i + j - 4k$ dan $\overrightarrow{OQ} = -i - 4j + 2k$. Kirakan $|\overrightarrow{PQ}|$.

[3 marks]

[3 markah]

CLO2

- (e) Calculate the angle between vectors $\vec{j} = 4i - 6k$ and $\vec{k} = -i + 2j + 8k$.
Kirakan sudut antara vektor $\vec{j} = 4i - 6k$ dan $\vec{k} = -i + 2j + 8k$.

[6 marks]

[6 markah]

QUESTION 3

SOALAN 3

- CLO1 (a) The data in Table 1 shows the heights(cm) of 30 male students who participated in an athletic talent camp. Convert the data given to a frequency distribution table using 5 class intervals.

Data di dalam Jadual 1 menunjukkan tinggi(cm) 30 orang pelajar lelaki yang mengambil bahagian dalam suatu kem bakat olahraga. Tukarkan data yang diberi kepada jadual taburan kekerapan dengan menggunakan 5 selang kelas.

Table 1 / Jadual 1

160	174	171	164	180	168	180	162	166	175
167	175	158	173	167	166	178	176	168	177
170	162	172	169	165	173	176	182	168	175

[4 marks]

[4 markah]

- CLO2 (b) Table 2 shows the yield from 120 mango trees in one season.

Jadual 2 menunjukkan hasil daripada 120 batang pokok buah manga pada satu musim.

Table 2 / Jadual 2

Yield (kg) <i>Hasil (kg)</i>	Number of trees <i>Bilangan pokok</i>
10-14	3
15-19	7
20-24	9
25-29	24
30-34	35
35-39	27
40-44	9
45-49	6

Based on the Table 2, use a suitable formula to calculate mean and mode.

Berdasarkan Jadual 2, guna formula yang sesuai untuk mengira min dan mod.

[6 marks]

[6 markah]

CLO1

- (c) A ball is drawn at random from a box containing 3 red balls, 2 blue balls and 4 green balls. Express the probability that the ball drawn is:

Sebiji bola dikeluarkan secara rawak dari sebuah kotak yang mengandungi 3 bola merah, 2 bola biru dan 4 biji bola hijau. Tunjukkan kebarangkalian bahawa bola yang dikeluarkan adalah:

- i. Red ball

Bola merah

[2 marks]

[2 markah]

- ii. Blue ball or green ball

Bola biru atau bola hijau

[5 marks]

[5 markah]

CLO 2

- (d) Ahmad, Balan and Chong each shoot at a target once. The probability that Ahmad hits the target is $\frac{1}{5}$, the probability that Balan hits the target is $\frac{1}{4}$ and the probability that Chong hits the target is $\frac{1}{3}$. If they choose to shoot simultaneously, calculate the probability that at least one shot hit the target.

Ahmad, Balan dan Chong masing-masing menembak satu sasaran sekali sahaja. Kebarangkalian Ahmad kena sasaran itu ialah $\frac{1}{5}$, kebarangkalian Balan

kena sasaran ialah $\frac{1}{4}$ dan kebarangkalian Chong kena sasaran ialah $\frac{1}{3}$. Jika

mereka memilih untuk menembak secara serentak, hitung kebarangkalian bahawa sekurang-kurang satu tembakan yang kena pada sasaran.

[8 marks]

[8 markah]

QUESTION 4

SOALAN 4

CLO1

- (a) Given $P = 2 + i$, $Q = 6 - 9i$ and $R = -2 - 4i$. Express the following in the form $a + bi$:

Diberi $P = 2 + i$, $Q = 6 - 9i$ dan $R = -2 - 4i$. Nyatakan yang berikut dalam bentuk $a + bi$:

i. $P + \frac{1}{3}Q$

[3 marks]

[3 markah]

ii. $\frac{2R}{P}$

[5 marks]

[5 markah]

CLO2

- (b) Given $A = C + \frac{1}{2}B$, where $A = 5 - 6i$ and $B = 4 - 8i$. Show Argand Diagram for C . Then express the modulus and arguments for C .

Diberi $A = C + \frac{1}{2}B$, di mana $A = 5 - 6i$ dan $B = 4 - 8i$. Tunjukkan Rajah Argand bagi C . Kemudian nyatakan modulus dan hujah bagi C .

[7 marks]

[7 markah]

CLO2

(c) Given $Z_1 = 3(\cos 30^\circ + i \sin 30^\circ)$ and $Z_2 = 6e^{\frac{\pi}{2}i}$. Solve the following:

Diberi $Z_1 = 3(\cos 30^\circ + i \sin 30^\circ)$ dan $Z_2 = 6e^{\frac{\pi}{2}i}$. Selesaikan yang berikut:

i. $Z_1 Z_2$ in polar form

$Z_1 Z_2$ dalam bentuk polar

[4 marks]

[4 markah]

ii. $\frac{Z_1}{Z_2}$ in cartesian and exponential form

$\frac{Z_1}{Z_2}$ dalam bentuk cartesian dan eksponen.

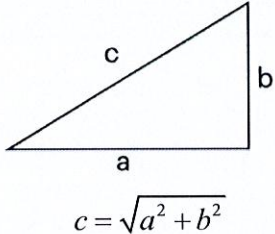
[6 marks]

[6 markah]

SOALAN TAMAT

FORMULA FB10064 – MATHEMATICS 1

BASIC ALGEBRA	
QUADRATICS EQUATION	
1. Quadratic Formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	2. Completing the square $\left(x + \frac{b}{2}\right)^2 - \left(\frac{b}{2}\right)^2 + c = 0$

TRIGONOMETRY	
PYTHAGORAS' THEOREM	TRIGONOMETRIC IDENTITIES
 $c = \sqrt{a^2 + b^2}$	1. $\tan \theta = \frac{\sin \theta}{\cos \theta}$ 2. $\cos^2 \theta + \sin^2 \theta = 1$ 3. $1 + \tan^2 \theta = \sec^2 \theta$ 4. $1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$
COMPOUND-ANGLE	
5. $\sin(A + B) = \sin A \cos B + \cos A \sin B$	
6. $\sin(A - B) = \sin A \cos B - \cos A \sin B$	
7. $\cos(A + B) = \cos A \cos B - \sin A \sin B$	
8. $\cos(A - B) = \cos A \cos B + \sin A \sin B$	
9. $\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$	
10. $\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$	
DOUBLE-ANGLE	
11. $\sin 2A = 2 \sin A \cos A$	
12. $\cos 2A = \cos^2 A - \sin^2 A$ $= 1 - 2 \sin^2 A$ $= 2 \cos^2 A - 1$	
13. $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$	
FORMULA OF TRIANGLE	
14. Sine Rules $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$	
15. Cosine Rules $a^2 = b^2 + c^2 - 2bc \cos A$	
16. Area of Triangle $= \frac{1}{2} ab \sin C$	

COMPLEX NUMBERS	
1. Modulus of $z = \sqrt{a^2 + b^2}$	2. Polar Form; $z = r \angle \theta$
3. Argument of $z = \tan^{-1} \left(\frac{b}{a} \right)$	4. Exponential Form; $z = re^{i\theta}$
5. Cartesian Form; $z = a + bi$	6. Trigonometric Form; $z = r(\cos \theta + i \sin \theta)$

MATRICES	
1. Cofactor; $C = (-1)^{i+j} M_{ij}$	2. Adjoin; $Adj(A) = C^T$
3. Inverse of Matrix; $A^{-1} = \frac{1}{ A } Adj(A)$	4. Cramer's Rule; $x = \frac{ A_1 }{ A }, \quad y = \frac{ A_2 }{ A }, \quad z = \frac{ A_3 }{ A }$

VECTOR AND SCALAR	
1. Unit Vector; $\hat{u} = \frac{\vec{u}}{ u }$	2. $\cos \theta = \frac{\vec{A} \cdot \vec{B}}{ \vec{A} \vec{B} }$
3. Scalar Product; $\vec{A} \cdot \vec{B} = a_1 a_2 + b_1 b_2 + c_1 c_2$	4. Vector Product; $\vec{A} \times \vec{B} = \begin{vmatrix} i & j & k \\ a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \end{vmatrix}$
5. Area of parallelogram ABC; $= \vec{AB} \times \vec{BC} $	

DATA DESCRIPTION	
1. Number of class Sturges Rule, $k = 1 + 3.33 \log n$ Rule of Thumb, $2^k > n$	2. Mean $\bar{x} = \frac{\sum x}{n}, \quad \bar{x} = \frac{\sum (fx)}{\sum f}$
3. Median $= L_m + \left(\frac{\frac{N}{2} - F}{f_m} \right) c$	4. Mode $= L_{Mo} + \left(\frac{d_1}{d_1 + d_2} \right) c$

5. Quartile $Q_k = L_{Qk} + \left(\frac{\frac{kN}{4} - F}{f_{Qk}} \right) c; \quad k=1,2,3$	6. Decile $D_k = L_{Dk} + \left(\frac{\frac{kN}{10} - F}{f_{Dk}} \right) c;$ $k=1,2,3,\dots,9$
7. Percentile $P_k = L_{Pk} + \left(\frac{\frac{kN}{100} - F}{f_{Pk}} \right) c;$ $k=1,2,3,\dots,99$	8. Mean Deviation $E = \frac{\sum x - \bar{x} }{n}, \quad E = \frac{\sum x - \bar{x} f}{\sum f},$
9. Variance $s^2 = \frac{\sum (x - \bar{x})^2}{n} \quad s^2 = \frac{\sum [(x - \bar{x})^2 f]}{\sum f} \quad s^2 = \frac{\sum x_i^2 - n\bar{x}^2}{\sum f} \quad s^2 = \frac{\sum fx^2}{\sum f} - \left[\frac{\sum fx}{\sum f} \right]^2$	
10. Standard Deviation, $s = \sqrt{\text{variance}}$	

PROBABILITY	
1. $E = pn$	2. $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
3. $P(A \cap B) = P(A) \bullet P(B)$	4. $P(A \cup B) = P(A) + P(B)$
5. $P(A \cap B) = P(A) \bullet P(B A)$	6. $P(B A) = \frac{P(B \cap A)}{P(A)}$