

SULIT



BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENGAJIAN POLITEKNIK
KEMENTERIAN PENDIDIKAN MALAYSIA

JABATAN MATEMATIK, SAINS DAN KOMPUTER

PEPERIKSAAN AKHIR

SESI JUN 2014

BA102 : MATHEMATICS

TARIKH : 27 OKTOBER 2014

MASA : 2.30 PM - 4.30 PM (2 JAM)

Kertas ini mengandungi **SEPULUH (10)** halaman bercetak.

Struktur (4 soalan)

Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT



SECTION A : 100 MARKS
BAHAGIAN A : 100 MARKAH

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**

- a) State the type of angles below.

Nyatakan jenis-jenis sudut dibawah.

CLO1
C1

- i. 75°

[1 mark]
[1 markah]

CLO1
C1

- ii. 100°

[1 mark]
[1 markah]

CLO1
C1

- iii. 240°

[1 mark]
[1 markah]

CLO1
C3

- b) In Figure 1(b), calculate the value of z .

Dalam Rajah 1(b), kirakan nilai bagi z .

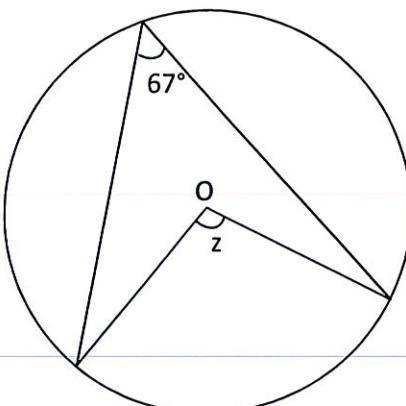


Figure 1(b) / Rajah 1(b)

[2 marks]
[2 markah]

(c)

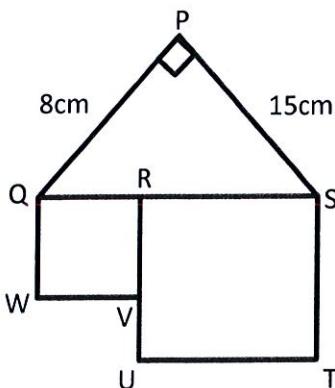


Figure 1(c) / Rajah 1(c)

In Figure 1(c), QRVW and RSTU are squares. If the area of RSTU is 144cm^2 , find :

Dalam Rajah 1(c), QRVW dan RSTU adalah segiempat sama. Jika luas RSTU adalah 144cm^2 , cari:

CLO3
C3

- i. The length of QS

Panjang QS

[1 mark]
[1 markah]

CLO3
C3

- ii. The area of QRVW

Luas QRVW

[4 marks]
[4markah]

CLO1
C3

- d) In Figure 1(d), calculate the values of x and y.

Dalam Rajah 1 (d), kirakan nilai bagi x dan y.

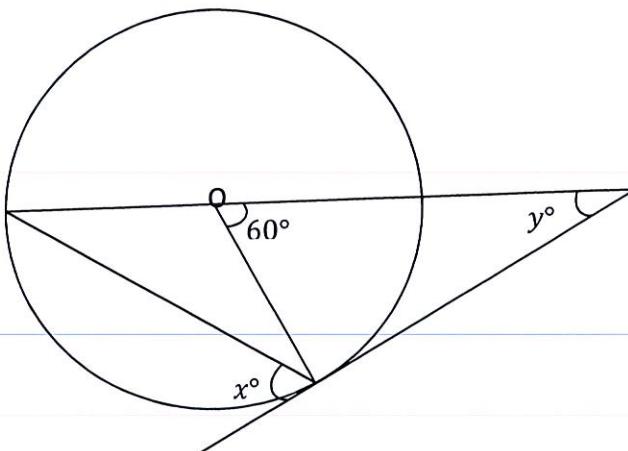


Figure 1(d) / Rajah 1(d)

[4 marks]
[4 markah]

CLO1
C3

- e) Figure 1(e) shows a rectangle. ABC is a quadrant with the radius of 7cm. Calculate the area of the shaded region.

Rajah 1 (e) menunjukkan sebuah segiempat tepat. ABC ialah sebuah sukuan yang berjejari 7cm. Kirakan luas kawasan berlorek.

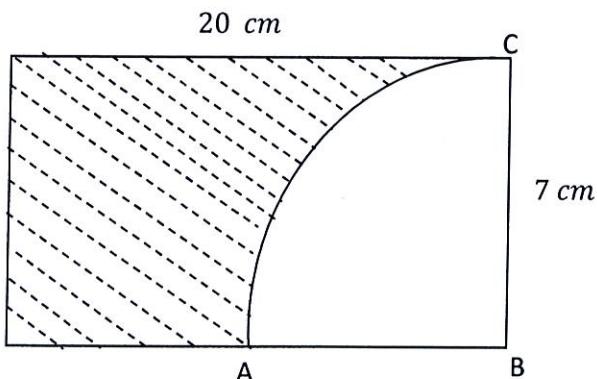


Figure 1(e) / Rajah 1(e)

[6 marks]
[6 markah]

CLO1
C3

- f) Figure 1(f) shows a square with area of 144 cm^2 . Calculate the value of x .

Rajah 1 (f) menunjukkan satu segiempat sama yang mempunyai luas 144 cm^2 .
Kirakan nilai bagi x .

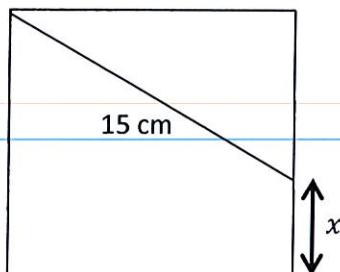


Figure 1(f) / Rajah 1(f)

[5 marks]
[5 markah]

QUESTION 2**SOALAN 2**

- a) Solve each of the following complex numbers in the form of $a + bi$

Selesaikan setiap nombor kompleks berikut dalam bentuk $a + bi$

CLO2
C2

i. $(3 - 7i) + (6 + 8i)$

[2 mark]
[2 markah]

CLO2
C2

ii. $(-2 - 5i) - (9 - 4i)$

[2 marks]
[2 markah]

CLO2
C2

iii. $(2 - 3i)(4 - i)$

[3 marks]
[3 markah]

CLO3
C3

iv. $\frac{(4 + 5i)}{(1 + 3i)}$

[5 marks]
[5 markah]

- b) Given that complex numbers $p = -3 + i$ and $q = -1 - i$

Diberi nombor kompleks $p = -3 + i$ dan $q = -1 - i$

CLO2
C2

- i. Simplify $p - q$

Permudahkan $p - q$

[2 marks]
[2 markah]

CLO3
C2

- ii. Sketch an Argand's Diagram for $p - q$.

Lakarkan gambarajah Argand's bagi $p - q$

[2 marks]
[2 markah]

CLO3
C3

- iii. Hence, find the modulus and the argument for $p - q$

Seterusnya, cari modulus dan hujah bagi $p - q$

[4 marks]
[4 markah]

CLO3
C2

- c) Express $z = 6(\cos 50^\circ + i \sin 50^\circ)$ in Cartesian, Exponential and Polar form.

Nyatakan $z = 6(\cos 50^\circ + i \sin 50^\circ)$ dalam bentuk Cartesian, Eksponen dan Polar.

[5 marks]

[5 markah]

QUESTION 3**SOALAN 3**

- (a) Differentiate each of the following functions:

Bezakan setiap fungsi yang berikut:

CLO1
C3

i. $y = 11x^3 - \frac{2}{5}\pi$

[2 marks]
[2 markah]

CLO1
C3

ii. $y = (4x + 1)(x^2 - 6)$

[3 marks]
[3 markah]

CLO3
C3

iii. $y = \frac{x^2 - 3}{x + 2}$

[4 marks]
[4 markah]

- (b) Find the following indefinite integrals:

Dapatkan kamiran tak tentu bagi yang berikut:

CLO1
C2

i. $\int (3x^2 - x + 1) dx$

[2 marks]
[2 markah]

CLO1
C3

ii. $\int \frac{2}{x^2} + \frac{4}{5x^3} dx$

[3 marks]
[3 markah]

CLO3
C3

iii. $\int \frac{12}{(2x-3)^5} dx$

[3 marks]
[3 markah]

CLO3
C3

- (c) Calculate the area of the region bounded by the curve $y = x^2 - 4$ and the x -axis.

Kirakan luas bagi kawasan yang terangkum di antara lengkung $y = x^2 - 4$ dan paksi-x.

[8 marks]
[8 markah]

QUESTION 4
SOALAN 4

(a) Given that $A = \begin{bmatrix} 2 & 0 \\ 7 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -1 \\ 0 & -4 \end{bmatrix}$ dan $C = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$. Solve

Diberi $A = \begin{bmatrix} 2 & 0 \\ 7 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -1 \\ 0 & -4 \end{bmatrix}$ dan $C = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$. *Selesaikan*

CLO2
C2

i. $2B - A$

[3 marks]
[3 markah]

CLO2
C3

ii. AC

[3 marks]
[3 markah]

(b) Given matrix $A = \begin{bmatrix} 2 & 0 & 1 \\ 4 & -2 & 0 \\ 0 & -5 & 7 \end{bmatrix}$. Find

Diberi matrik $A = \begin{bmatrix} 2 & 0 & 1 \\ 4 & -2 & 0 \\ 0 & -5 & 7 \end{bmatrix}$. *Cari*

CLO2
C3

i. The determinant of matrix A

Penentu bagi matrik A

[3 marks]
[3 markah]

CLO3
C3

ii. The minor of matrix A

Minor bagi matrik A

[4 marks]
[4 markah]

CLO3
C3

iii. The inverse of matrix A

Sonsangan bagi matrik A

[4 marks]
[4 markah]

- (c) Given the following simultaneous linear equations;
Diberi persamaan serentak seperti berikut;

$$5x - 3y + 2z = 1$$

$$-2x + 5y - 3z = 5$$

$$3x + 5y - z = 4$$

CLO2
C2

- i. Express the equations in the form of $Ax = B$
Nyatakan persamaan dalam bentuk $Ax = B$

[1 mark]

[1 markah]

CLO2
C3

- ii. Calculate the determinant of matrix A
Kira penentu matrik A

[3 mark]

[3 markah]

CLO3
C3

- iii. Solve the values of x and y by using Cramer's Rule.
Selesaikan nilai x dan y menggunakan kaedah Cramer.

[4 mark]

[4 markah]

SOALAN TAMAT

FORMULA SHEET FOR BA 102 – MATHEMATICS**VECTORS**Magnitude of vector

$$1. |\vec{v}| = \sqrt{a^2 + b^2}$$

Sine Rule

$$1. \frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

Cosine Rule

$$1. a^2 = b^2 + c^2 - 2bc \cos A$$

$$2. b^2 = a^2 + c^2 - 2ac \cos B$$

$$3. c^2 = a^2 + b^2 - 2ab \cos C$$

Dot Product

$$1. \vec{a} \cdot \vec{b} = |\vec{a}| |\vec{b}| \cos \theta$$

CIRCLELength of an arc

$$1. s = r\theta$$

Area of a sector , Area of a segment

$$1. A = \frac{1}{2}r^2\theta \quad 1. A = \frac{1}{2}r^2(\theta - \sin \theta)$$

SURFACE AREA AND VOLUME

$$1. \text{Cylinder : } A = 2\pi rh + 2\pi r^2, V = \pi r^2 h$$

$$2. \text{Cone : } A = \pi rs + \pi r^2, V = \frac{1}{3}\pi r^2 h$$

$$3. \text{Sphere : } A = 4\pi r^2, V = \frac{4}{3}\pi r^3$$

$$4. \text{Pyramid : } A = \text{area of 4 triangles} + \text{area of base}$$

$$V = \frac{1}{3} \times \text{area of base} \times \text{height}$$

COMPLEX NUMBERModulus Argument

$$1. |z| = \sqrt{a^2 + b^2} \quad 1. \arg z = \tan^{-1} \frac{b}{a}$$

Complex no. In other form

$$1. \text{Polar form : } |z| \angle \theta$$

$$2. \text{Exponential form : } |z| e^{i\theta}$$

$$3. \text{Trigonometric form : } |z| (\cos \theta + i \sin \theta)$$

Multiplication & Division

$$1. (a \angle \theta_a) \cdot (b \angle \theta_b) = (a)(b) \angle (\theta_a + \theta_b)$$

$$2. \frac{(a \angle \theta_a)}{(b \angle \theta_b)} = \left(\frac{a}{b} \right) \angle (\theta_a - \theta_b)$$

DIFFERENTIATION

$$y = ax^n \quad y = (ax + b)^n$$

$$1. \frac{dy}{dx} = anx^{n-1}, \quad 2. \frac{dy}{dx} = an(ax + b)^{n-1}$$

$$3. \text{Chain Rule : } \frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$$

$$4. \text{Product Rule : } y = u \times v$$

$$y' = uv' + vu'$$

$$5. \text{Quotient Rule : } y = \frac{u}{v}$$

$$y' = \frac{vu' - uv'}{v^2}$$

INTEGRATIONIndefinite Integration

$$1. \int x^n dx = \frac{x^{n+1}}{n+1} + C$$

$$2. \int (ax + b)^n dx = \frac{(ax + b)^{n+1}}{a(n+1)} + C$$

Definite Integration

$$1. \int_a^b f(x) dx = F(b) - F(a)$$

AREA UNDER A CURVE

$$1. \text{Along x-axis: } A = \int_a^b y dx$$

$$2. \text{Along y-axis: } A = \int_a^b x dy$$

MATRIXInverse Matrix

$$1. A^{-1} = \frac{1}{|A|} adj A$$

Cramer's Rule

$$1. x = \frac{|A_1|}{|A|}, y = \frac{|A_2|}{|A|}, z = \frac{|A_3|}{|A|}$$

