

**SULIT**



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

**JABATAN MATEMATIK, SAINS & KOMPUTER**

**PEPERIKSAAN AKHIR**

**SESI JUN 2016**

**DBM1042: MATHEMATICS**

**TARIKH : 31 OKTOBER 2016**

**MASA : 8.30 AM - 10.30 AM (2 JAM)**

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Kertas ini mengandungi **TIGA BELAS (13)** halaman bercetak.

Bahagian A: Struktur (4 soalan)

Bahagian B: Struktur (2 soalan)

Dokumen sokongan yang disertakan : Formula

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**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN**

(CLO yang tertera hanya sebagai rujukan)

**SULIT**

**SECTION A : 75 MARKS**  
**BAHAGIAN A : 75 MARKAH**

**INSTRUCTION:**

This section consists of **FOUR (4)** structured questions. Answer **THREE (3)** questions only.

**ARAHAN:**

*Bahagian ini mengandungi EMPAT (4) soalan berstruktur. Jawab TIGA (3) soalan sahaja.*

**QUESTION 1****SOALAN 1**

CLO1  
C2

- a) Simplify each of the following fractions to its lowest terms:  
*Permudahkan pecahan berikut kepada bentuk termudah:*

i.  $\frac{(a+b)^2}{a^2-b^2}$  [3 marks]

[3 markah]

ii.  $\frac{6}{1-2S} - \frac{S}{3+S}$  [3 marks]

[3 markah]

iii.  $\frac{p}{p^2+q^2} \div \frac{q}{p-q}$  [4 marks]

[4 markah]

CLO1  
C3

- b) Solve the given quadratic equations by the method mentioned in bracket.  
*Selesaikan persamaan kuadratik yang diberikan dengan menggunakan kaedah yang telah dinyatakan dalam kurungan.*

i.  $15a^2 - 3a = -7a + 3$  (Factoring) [4 marks]

(pemfaktoran) [4 markah]

ii.  $5z^2 - 44z + 120 = -30 + 11z$  (Factoring) [5 marks]

(pemfaktoran) [5 markah]

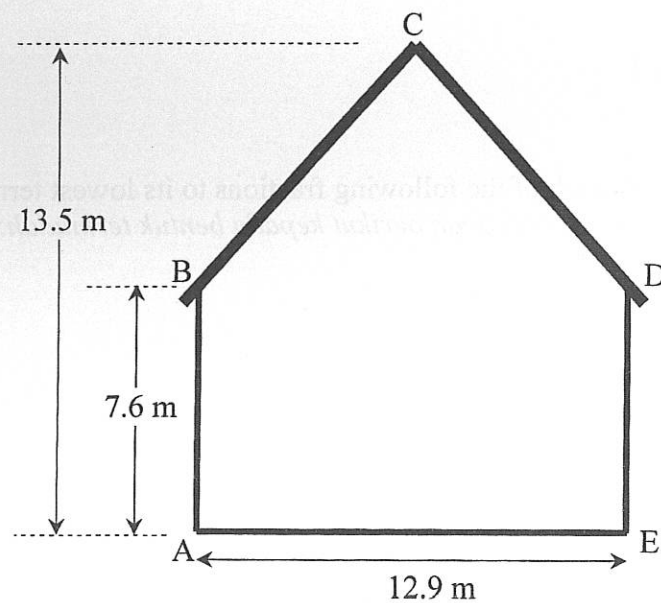
iii.  $8t^2 + 7t - 15 = -7$  (Quadratic formula) [6 marks]

(formula kuadratik) [6 markah]

**QUESTION 2**  
**SOALAN 2**

- CLO1  
C2 (a) Figure 2a shows a barn wall.

Rajah 2a menunjukkan sebuah dinding bangsal.



**Figure 2a**  
**Rajah 2a**

- (i) Find the total area of the wall surface.

Dapatkan jumlah luas bagi permukaan dinding.

[5 marks]

[5 markah]

- (ii) Find the perimeter of the wall surface.

Dapatkan perimeter bagi permukaan dinding.

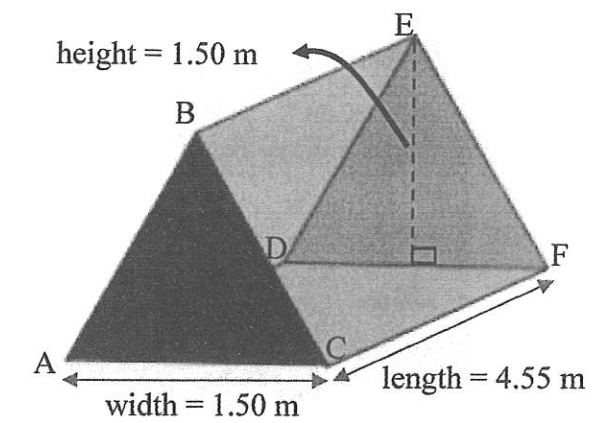
[5 marks]

[5 markah]

CLO1  
C3

- (b) Figure 2b shows an object with a length of 4.55 m, a width of 1.50 m and a height of 1.50 m

Rajah 2b menunjukkan sebuah objek dengan panjang 4.55 m, lebar 1.50 m dan tinggi 1.50 m.



**Figure 2b**

**Rajah 2b**

- (i) How many surface of the object?

Berapakah jumlah permukaan objek?

[1 mark]

[1 markah]

- (ii) Calculate the total surface area of the object.

Kirakan jumlah luas permukaan bagi objek.

[9 marks]

[9 markah]

- (iii) Calculate the volume of the object.

Kirakan isipadu bagi objek.

[5 marks]

[5 markah]

**QUESTION 3**  
**SOALAN 3**

CLO1  
C3

- (a) Given that  $\sin \theta = \frac{5}{12}$  with  $0^\circ \leq \theta \leq 360^\circ$ . Without using a calculator, calculate :

Diberi  $\sin \theta = \frac{5}{12}$  dengan  $0^\circ \leq \theta \leq 360^\circ$ . Tanpa menggunakan kalkulator, kirakan :

i)  $\cos \theta$  [4 marks]

$\cos \theta$  [4 markah]

ii)  $\sec \theta$  [4 marks]

$\sec \theta$  [4 markah]

iii)  $\tan \theta$  [3 marks]

$\tan \theta$  [3 markah]

iv)  $\cot \theta$  [4 marks]

$\cot \theta$  [4 markah]

CLO1  
C3

- b) Find the values of  $\cos \theta = -0.6428$ , where  $0^\circ \leq \theta \leq 360^\circ$  [6 marks]

Cari nilai bagi  $\cos \theta = -0.6428$ , di mana  $0^\circ \leq \theta \leq 360^\circ$  [6 markah]

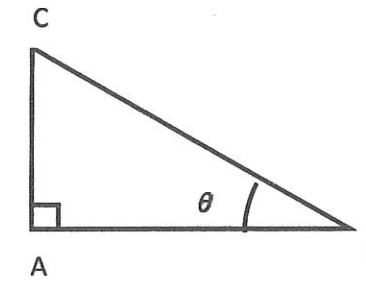
CLO1  
C3

- c) Based on the right-angled triangle in **Figure 3 (a)**, given that  $\cot \theta = 0.577$  and  $AB = 4$  units.

Determine the value of  $\theta$ .

Merujuk kepada **Rajah 3 (a)**, diberi  $\cot \theta = 0.577$  dan  $AB = 4$  units.

Cari nilai  $\theta$ .



**Figure 3 (a)**

**Rajah 3 (a)**

[4 marks]

[4 markah]

## QUESTION 4

## SOALAN 4

CLO2  
C2

a) Integrate the following functions:

*Kamirkan setiap fungsi berikut:*

i)  $\int x(5x+3)dx$  [4 marks]

[4 markah]

ii)  $\int (x+2x)(3x+4x)dx$  [4 marks]

[4 markah]

iii)  $\int \frac{1}{x^3} + \frac{1}{x^3} - \frac{3}{x^6} + 3dx$  [5 marks]

[5 markah]

iv)  $\int_0^2 (x^4 + 2x^3 + 3)dx$  [6 marks]

[6 markah]

v)  $\int_{-1}^1 (x^2 - 4)dx$  [6 marks]

[6 markah]

## SECTION B: 25 MARKS

## BAHAGIAN B: 25 MARKAH

## INSTRUCTION:

This section consists of TWO (2) structured questions. Answer ONE (1) question only.

## ARAHAN:

Bahagian ini mengandungi DUA (2) soalan berstruktur. Jawab SATU (1) soalan sahaja.

## QUESTION 5

## SOALAN 5

CLO2  
C2

a) Classify the angles for each Figure 5 (a) and Figure 5 (b) below:

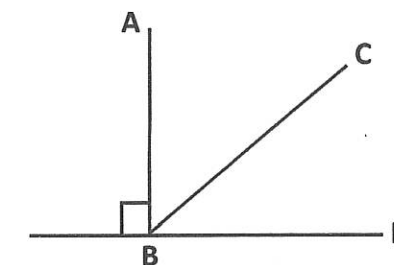
*Kelaskan sudut bagi setiap Rajah 5(a) dan Rajah 5 (b) di bawah:*

Figure 5 (a) / Rajah 5(a)

i.  $\angle ABD$ 

[1 mark]

[1 markah]

ii.  $\angle ABC$ 

[1 mark]

[1 markah]

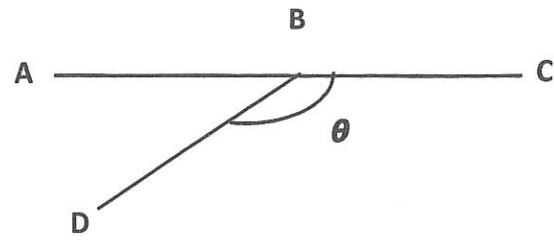


Figure 5 (b) / Rajah 5 (b)

iii.  $\angle \theta$

[1 mark]  
[1 markah]

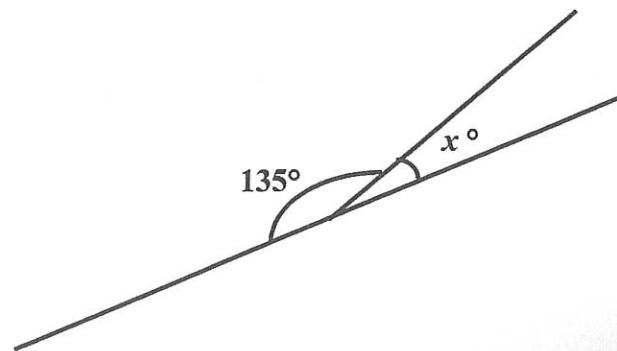
iv.  $\angle ABD$

[1 mark]  
[1 markah]

CLO2  
C3

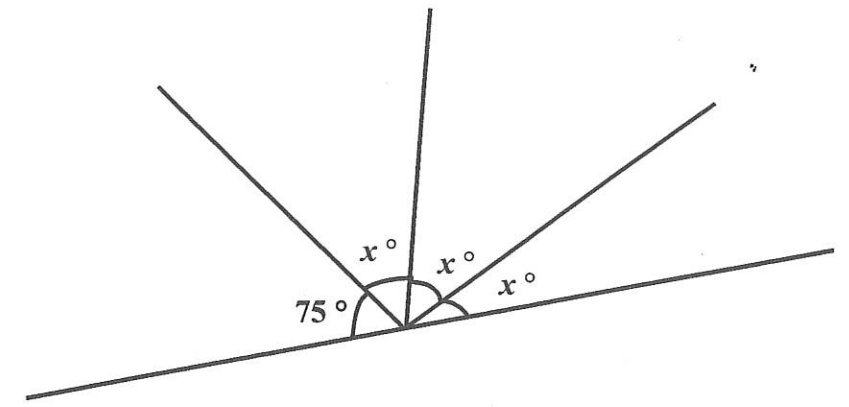
b) Calculate the value of angle  $x^\circ$  in each of the following below:  
*Kirakani nilai sudut  $x^\circ$  dalam setiap yang berikut di bawah:*

i.



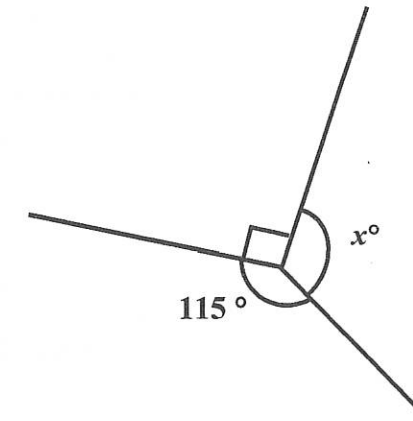
[2 mark]  
[2 markah]

ii.



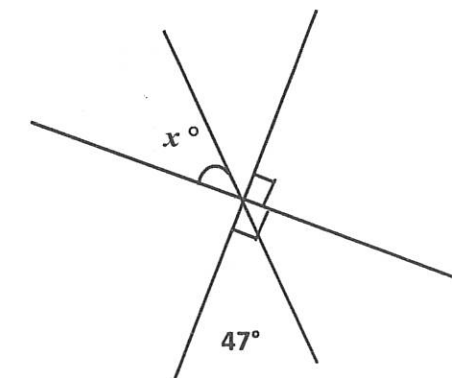
[5 marks]  
[5 markah]

iii.



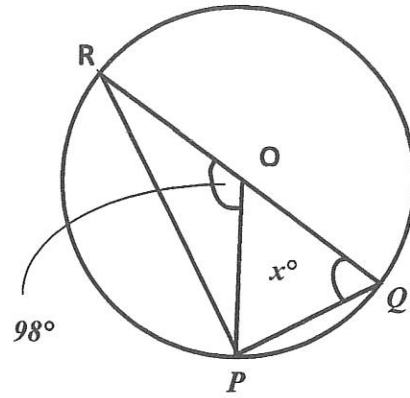
[4 marks]  
[4 markah]

iv.



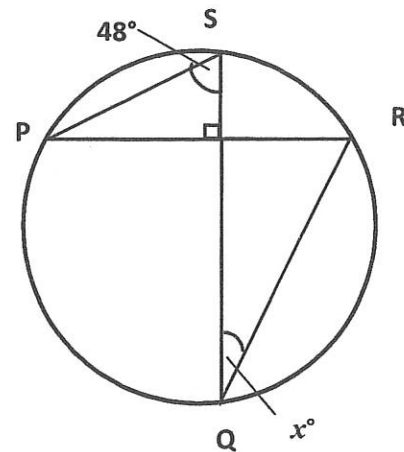
[2 marks]  
[2 markah]

v.



[4 marks]  
[4 markah]

vi.



[4 marks]  
[4 markah]

QUESTION 6

SOALAN 6

CLO2  
C2

a) In the **Figure 6 (a)** shown, find the length of AD.

*Dalam Rajah 6 (a) yang ditunjukkan, cari panjang AD.*

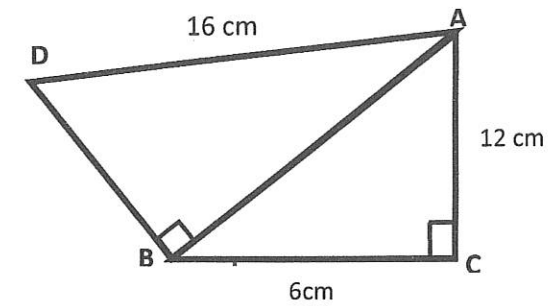


Figure 6 (a) / Rajah 6 (a)

[6 marks]  
[6 markah]

CLO2  
C2

b) Triangle in the **Figure 6 (b)** shows that  $BC=5\text{cm}$ , angle  $ABC = 30^\circ$  and angle  $ACB = 90^\circ$ . Calculate.

*Segi tiga dalam Rajah 6 (b) menunjukkan bahawa  $BC = 5\text{ cm}$ , sudut  $ABC = 30^\circ$  dan sudut  $ACB = 90^\circ$ . Kirakan.*

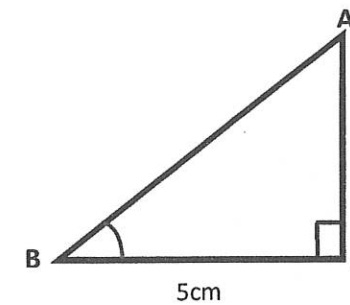


Figure 6 (b) / Rajah 6 (b)

- i) the length AB  
*panjang AB*
- ii) the length AC  
*panjang AC*

[4 marks]  
[4 markah]

CLO2  
C3

- c) Convert the following to radians  
Tukarkan yang berikut kepada radian

i)  $43\frac{1}{3}^\circ$  [2 marks]  
[2 markah]

ii)  $40^\circ$  [2 marks]  
[2 markah]

iii)  $128.4^\circ$  [1 marks]  
[1 markah]

CLO2  
C3

- d) Convert the following to degree  
Tukarkan yang berikut kepada darjah

i)  $1.5\pi$  rad [1 marks]  
[1 markah]

ii) 2.932 rad [1 marks]  
[1 markah]

iii)  $\frac{17}{9}\pi$  rad [1 marks]  
[1 markah]

CLO2  
C3

- e) A circle has an arc length of 14.8 cm. If the angle subtended at the centre of the circle by the arc is  $175^\circ$ . Find radius of the circle

Sebuah bulatan mempunyai panjang lengkok 14.8 cm. Jika sudut terangkum di pusat bulatan oleh arka adalah  $175^\circ$ . Cari jejari bulatan

[3 marks]  
[3 markah]

CLO2  
C3

- f) A circular sector with radius 7.5cm, if the sector is  $32.4\text{cm}^2$ . Find the angle of the sector in degrees

Sebuah sektor bulat dengan jejari 7.5cm. jika sektornya ialah  $32.4\text{cm}^2$ . Cari sudut sektor dalam darjah.

[4 marks]  
[4 markah]

FORMULA SHEET FOR MATHEMATICS –DBM1042SOLVING QUADRATIC EQUATION

$$ax^2 - bx + c = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

SURFACE AREA AND VOLUME**Cylinder :**

$$A = 2\pi r h + 2\pi r^2$$

$$V = \pi r^2 h$$

**Cone:**

$$A = \pi r s + \pi r^2$$

$$V = \frac{1}{3}\pi r^2 h$$

**Sphere:**

$$A = 4\pi r^2$$

$$V = \frac{4}{3}\pi r^3$$

**Pyramid:**

$$A = \text{Area of four triangles} + \text{area of base}$$

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

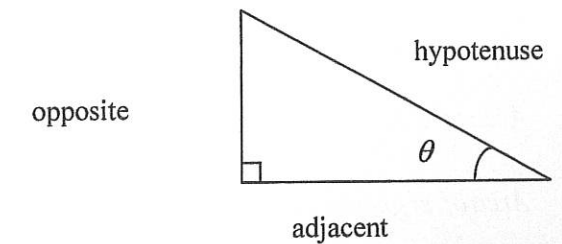
**Prism**

$$A = \text{Area of 3 rectangular faces} + \text{area of 2 triangular faces}$$

$$V = \text{Area triangle} \times \text{length}$$

**Area Triangle**

$$\text{Area of triangle} = \frac{1}{2} ab \sin C$$

TRIGONOMETRY

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

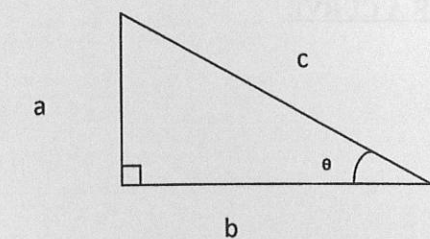
$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\operatorname{cosec} \theta = \frac{1}{\sin \theta}$$

$$\cot \theta = \frac{1}{\tan \theta}$$

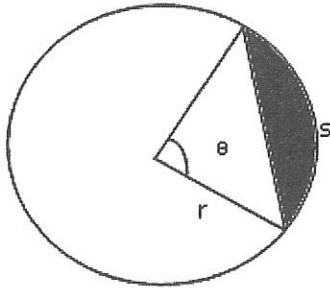
$$\sec \theta = \frac{1}{\cos \theta}$$



$$c^2 = a^2 + b^2$$



## MEASUREMENT



*Arc length of a circle,  $s = r\theta$*

*Area of a sector,  $A = \frac{1}{2}r^2\theta$*

*Area of segment,  $A = \frac{1}{2}r^2\theta - \frac{1}{2}r^2 \sin \theta$*

## INTEGRATION

### INDEFINITE INTEGRAL

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

$$\int ax^n dx = \frac{ax^{n+1}}{n+1} + C, n \neq -1$$

$$\int (ax+b)^n dx = \frac{(ax+b)^{n+1}}{a(n+1)} + C, n \neq -1$$

### DEFINITE INTEGRAL

$$\int_a^b f(x) dx = [F(x)]_a^b = F(b) - F(a)$$

### AREA UNDER A CURVE

Along x-axis

$$A = \int_a^b y dx$$

Along y-axis

$$A = \int_c^d x dy$$

## VOLUME OF SOLID OF REVOLUTION

Along x-axis

$$V = \int_a^b \pi y^2 dx$$

Along y-axis

$$V = \int_c^d \pi x^2 dy$$