SULIT

POLITEKNIK MALAYSIA

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENGAJIAN TINGGI MALAYSIA

JABATAN MATEMATIK, SAINS & KOMPUTER

PEPERIKSAAN AKHIR

**SESI I : 2022/2023**

# DBM10133: MATHEMATICS FOR TECHNOLOGY

**TARIKH : 19 DISEMBER 2022**
**MASA : 8.30 PAGI - 10.30 PAGI (2 JAM)**

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

Struktur (4 soalan)

Dokumen sokongan yang disertakan : Kertas Graf, Formula

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**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
C2

(a) Express each of the following algebraic expressions to the simplest form.
*Nyatakan persamaan algebra berikut dalam bentuk yang termudah.*

i. $\frac{170km}{3h} + \frac{35km}{h}$

[3 marks]
[*3 markah*]

ii. $\frac{14ab^2 \times 3bc^2}{35a^3b^3}$

[4 marks]
[*4 markah*]

CLO1
C2

(b) Transform the following equations so that the variable in the bracket will be the subject of formula.
*Tukarkan persamaan berikut supaya pembolehubah di dalam kurungan menjadi perkara subjek bagi formula.*

i. $h - 3 = \frac{\sqrt{(k+1)}}{2}$ [k]

[3 marks]
[*3 markah*]

ii. $\frac{5p-4}{p-q} = 3$ [p]

[5 marks]
[*5 markah*]

CLO1
C3

(c) Solve the simultaneous linear equations below by using the substitution method.

*Selesaikan persamaan linear serentak di bawah menggunakan kaedah penggantian.*

$$-7x - 2y = -13$$
$$x - 2y = 11$$

[10 marks]

[*10 markah*]

## QUESTION 2

*SOALAN 2*

CLO1
C3

a) Figure 1(a) shows a right angled triangle KLM. Calculate

*Dalam rajah 1(a) menunjukkan sebuah segitiga bersudut tegak KLM. Kirakan.*

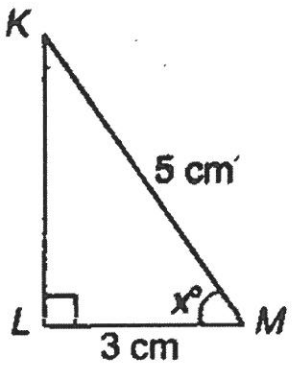



Figure 1(a)/ *Rajah 1(a)*

i. the length of $KL$

*panjang* $KL$

[3 marks]

[*3 markah*]

ii. the value of $\cos x$

*nilai bagi* $\cos x$

[2 marks]

[*2 markah*]

iii. based on your answer in (ii) calculate the value of $x$

*berdasarkan jawapan anda di (ii), kirakan nilai* $x$

[2 marks]

[*2 markah*]

CLO1
C3

(b) Figure 2(b) shows ABCD as a parallelogram. AFB and EFG are straight lines. Calculate

*Rajah 2(b), ABCD ialah sebuah segi empat selari. AFB dan EFG ialah garis lurus. Kirakan*

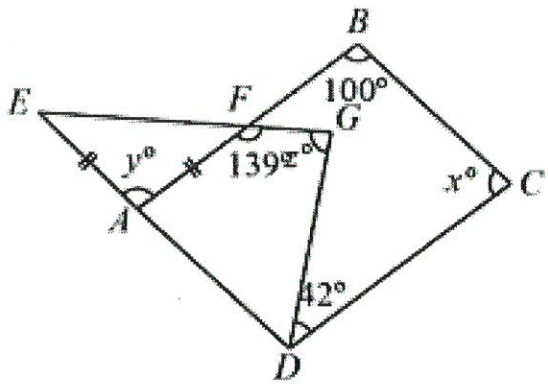



Figure 2(b)/ *Rajah 2(b)*

i. the value of $x^0$

*nilai bagi* $x^0$

[2 marks]

[*2 markah*]

ii. the value of $y^0$

*nilai bagi* $y^0$

[4 marks]

[*4 markah*]

iii. the value of $z^0$

*nilai bagi* $z^0$

[2 marks]

[*2 markah*]

CLO1
C3

(c) The arc length of a sector is 45 $cm$ with radius of 15 $cm$. Determine
*Panjang lengkuk bagi suatu sektor adalah* 45 $cm$ *dengan jejari* 15 $cm$. *Tentukan*

*i.* the angle in degree and area of the sector
*sudut dalam darjah dan luas sektor tersebut*

[7 marks]
[*7 markah*]

*ii.* the area of the circle
*luas bulatan tersebut*

[ 3 marks]
[*3 markah*]

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

CLO1
C3

Below is a floor plan of a house. It is labeled with the measurements of each room found in the house. Use Figure 3(a) to answer question 3 (a) and 3 (b).

*Di bawah menunjukkan pelan lantai bagi sebuah rumah. Padanya telah di labelkan pengukuran bagi setiap bilik yang dijumpai di dalam rumah tersebut. Gunakan Rajah 3(a) untuk menjawab soalan 3(a) and 3(b).*

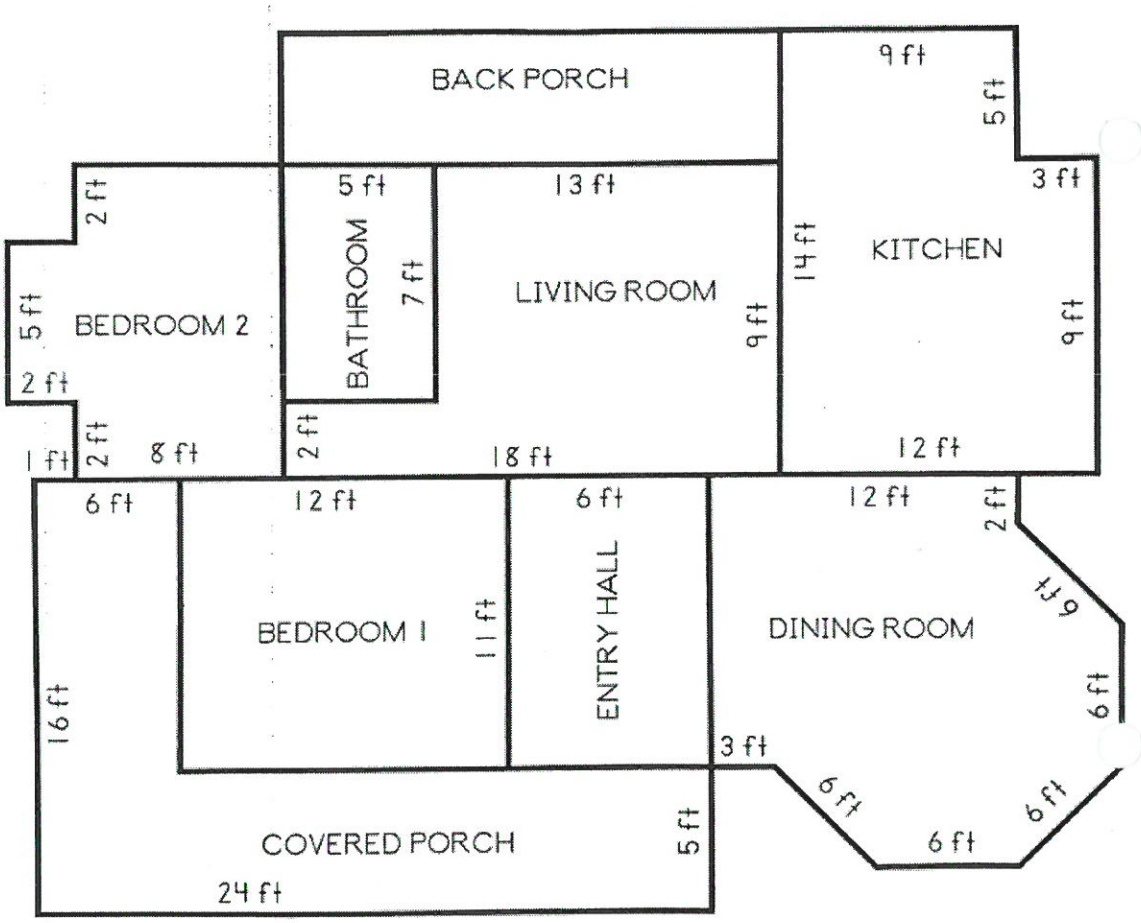



Figure 3(a)/ *Rajah 3(a)*

CLO1
C3

(a) Calculate the perimeter of the house.
*Hitung perimeter bagi rumah tersebut.*

[7 marks]
[*7 markah*]

CLO1
C3

(b) Calculate the area of the bathroom, bedroom 1, entry hall and living room.
*Kirakan keluasan untuk tandas, bilik tidur 1, ruang masuk dan ruang*

[8 marks]
[*8 markah*]

CLO1
C3

(c) Figure 3(c) shows a pyramid with 20 meters height. If the length of the pyramid surface is 10 meters, determine:

*Rajah 3(c) menunjukkan sebuah piramid dengan ketinggian 20 meter. Sekiranya panjang permukaan piramid adalah 10 meter, tentukan:*

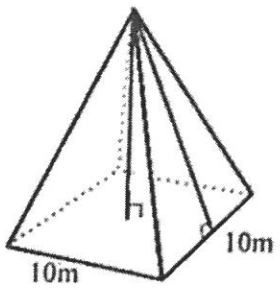



Figure 3(c)/ *Rajah 3(c)*

i. the area of the triangle
*luas segitiga*

[4 marks]
[*4 markah*]

ii. the overall surface area of the pyramid
*luas permukaan keseluruhan piramid*

[4 marks]
[*4 markah*]

iii. the volume of the pyramid
*isipadu piramid*

[2 marks]
[*2 markah*]

**QUESTION 4**
***SOALAN 4***

CLO1
C3

(a) Given two points: $A(1,-2)$ , $B(-3,5)$. Calculate

*Diberi titik:* $A(1,-2)$ , $B(-3,5)$. *Kira*

i. the gradient of point $A$ and $B$
*kecerunan bagi titik A dan B*

[3 marks]
[*3 markah*]

ii. the midpoint of $AB$
*titik tengah AB*

[2 marks]
[*2 markah*]

iii. the distance between $A$ and $B$
*jarak di antara A dan B*

[2 marks]
[*2 markah*]

CLO1
C3

(b) Construct a table of value and sketch the graph for equation $y = 2x^2 - 8x + 6$ to $x$ values from -1 to 4.
*Bina jadual bagi nilai dan lukis graf bagi fungsi* $y = 2x^2 - 8x + 6$ *bagi nilai x daripada - 1 sehingga 4*

[8 marks]
[*8 markah*]

CLO1
C3

(c) Complete the table below for $y = x - 2$ and $y = x^2 - 4x - 2$.
*Lengkapkan jadual di bawah bagi* $y = x - 2$ *dan* $y = x^2 - 4x - 2$.

i.

| $x$ | $-1$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| $y = x - 2$ | | $-2$ | | 0 | | 2 | | 4 |

| $x$ | $-1$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| $y = x^2 - 4x - 2$ | 3 | | $-5$ | | $-5$ | | 3 | |

[2 marks]
[*2 markah*]

ii. Based on the information at (i), sketch both functions on the same graph paper.
*Berdasarkan maklumat pada (i), pada kertas graf yang sama ,lukiskan kedua-dua fungsi.*

[6 marks]
[*6 markah*]

iii. Based on your graph, determine the intersection point.
*Berdasarkan graf anda, dapatkan titik persilangan.*

[2 marks]
[*2 markah*]

**SOALAN TAMAT**

**FORMULAE TABLE**
**DBM 10133 MATHEMATICS FOR TECHNOLOGY**

**Phythagoras Theorem**

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

**Trigonometric Functions**

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

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

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

**Radian to Degree**

$$\theta° = value\ in\ radian \times \frac{180°}{\pi}$$

**Degree to Radian**

$$\theta_{rad} = value\ in\ degree \times \frac{\pi}{180°}$$

**Arc Length**

$s = r\theta$ if $\theta$ in radian

$s = \frac{\theta}{360°}\pi d$ if $\theta$ in degree

**Area of Sector**

$Area\ of\ sector = \frac{1}{2}r^2\theta$ if $\theta$ in radian

$Area\ of\ sector = \frac{\theta}{360°}\pi r^2$ if $\theta$ in degree

**Area of Segment**

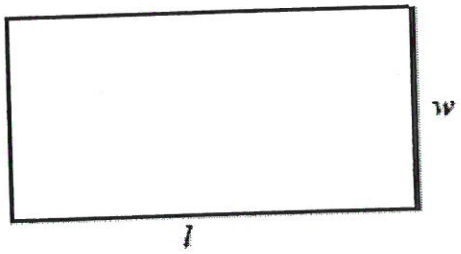
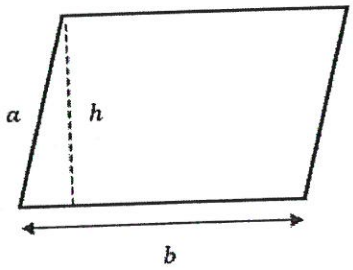
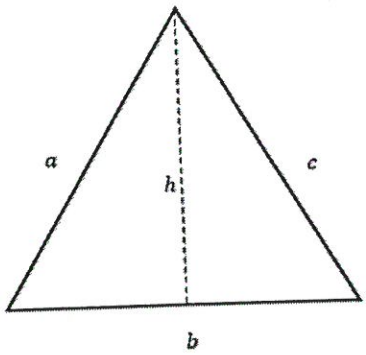
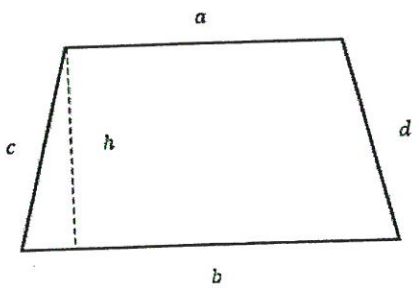
$$Area\ of\ segment = \frac{1}{2}r^2(\theta_1 - \sin\theta_2)$$

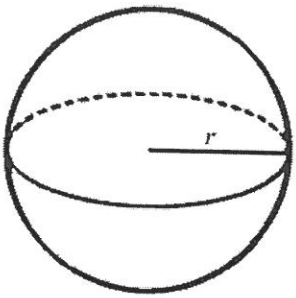
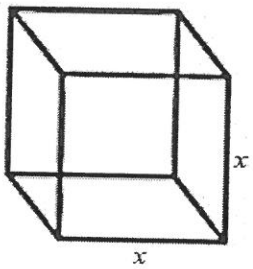
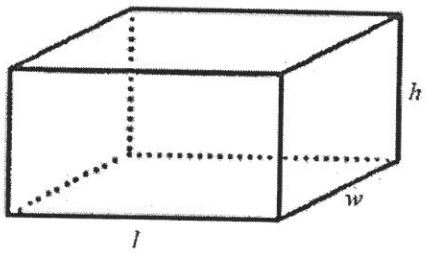
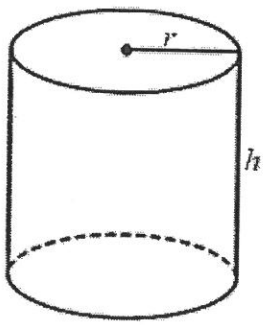
$\theta_1$ must be in radian
$\theta_2$ must be in degree

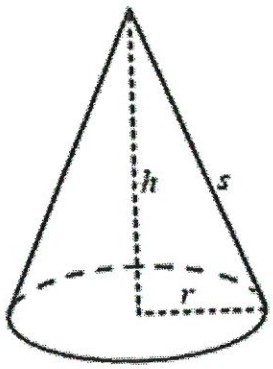
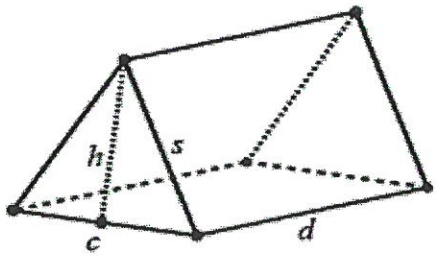
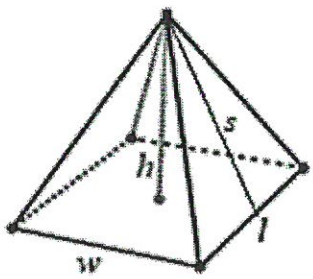
$$Area\ of\ segment = \frac{1}{2}r^2\left[\left(\theta \times \frac{\pi}{180°}\right) - \sin\theta\right]$$

$\theta$ must be in degree

| | |
|---|---|
| Linear | $y = mx + c$ |
| Quadratic | $y = ax^2 + bx + c$ |
| Gradient / Slope | $m = \frac{y_2 - y_1}{x_2 - x_1}$ |
| Midpoint | $\left(x_{mid} = \frac{x_1 + x_2}{2}, y_{mid} = \frac{y_1 + y_2}{2}\right)$ |
| Distance | $AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ |
| Vertex | $Vertex\ point = (h, k)$ $\left(h = \frac{-b}{2a}, k = f(h)\right)$ |
| Intersection Point | $y_1 = y_2$ |

| Shape | Perimeter | Area |
|---|---|---|
| Rectangle   | $P = 2L + 2W$ | $A = L \times W$ |
| Parallelogram   | $P = 2(a + b)$ | $A = b \times h$ |
| Triangle   | $P = a + b + c$ | $A = \frac{1}{2} \times b \times h$ |
| Trapezium / Trapezoid   | $P = a + b + c + d$ | $A = \left(\frac{a+b}{2}\right) \times h$ |

| Shape | Surface Area | Volume |
|---|---|---|
| Sphere   | $SA = 4\pi r^2$ | $V = \frac{4}{3}\pi r^3$ |
| Cube   | $SA = 6x^2$ where $x$ is the edge of the cube | $V = x^3$ where $x$ is the edge of the cube |
| Cuboid   | $SA = 2(lw + wh + lh)$ | $V = lwh$<br>Where $l$ = length, $w$ = width, $h$ = height of the cuboid |
| Cylinder   | $SA = 2\pi r^2 + 2\pi rh$ | $V = \pi r^2 h$ |

| | | |
|---|---|---|
| Cone   | $SA = \pi rs + \pi r^2$ | $V = \frac{1}{3}\pi r^2 h$ |
| Prism   | $SA = ch + cd + 2sd$ | $V = \frac{1}{2}ch \times d$ |
| Pyramid   | $SA = wl + 2ls$ | $V = \frac{1}{2}wl \times h$ |