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 & KOMPUTER

PEPERIKSAAN AKHIR

SESI II : 2023/2024

DBM10133 : MATHEMATICS FOR TECHNOLOGY

TARIKH : 05 JUN 2024
MASA : 8.30 PAGI - 10.30 PAGI (2 JAM)

Kertas ini mengandungi **SEBELAS (11)** halaman bercetak.

Struktur (4 soalan)

Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

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) Simplify each of the following algebraic expressions.

Permudahkan persamaan algebra berikut.

i. $\frac{7u^3v^2w^8}{28v^4w^5}$

[3 marks]

[*3 markah*]

ii. $\frac{3x}{x+4} \div \frac{x^2}{2x+8}$

[4 marks]

[*4 markah*]

CLO1 (b) Change the following equations so that x will be the subject of the formula.

Tukarkan persamaan berikut supaya x menjadi perkara rumus.

i. $3y = \sqrt{5x} - 9a$

[3 marks]

[*3 markah*]

ii. $y + 1 = \frac{2x-10}{x+1}$

[5 marks]

[*5 markah*]

CLO1 (c) Solve the simultaneous equations below by using **ELIMINATION METHOD**.
Selesaikan persamaan serentak di bawah menggunakan ***KAEDAH PENGHAPUSAN.***

$$3x - 2y = 1$$

$$2x + y = 10$$

[10 marks]
[*10 markah*]

QUESTION 2

SOALAN 2

CLO1

(a) In the following diagram, ABE and BCD are a right-angled triangle. Given that $DE = 3cm$, calculate:

Dalam rajah dibawah, ABE dan BCD adalah sebuah segitiga bersudut tegak. Diberi DE = 3cm, Hitung:

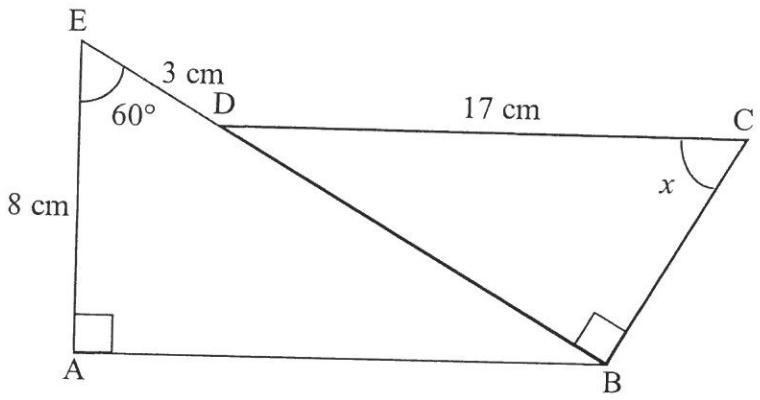


Figure 2(a) / *Rajah 2(a)*

i. Length of BD, in cm

Panjang BD, dalam cm

[4 marks]

[*4 markah*]

ii. The value of x

Nilai x

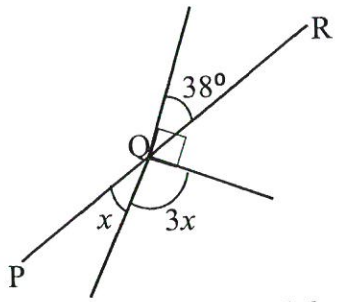
[3 marks]

[*3 markah*]

CLO1 (b) Refer to the following diagram.

Rujuk rajah berikut.

i. In Figure 2(b) below, PQR is a straight line. Calculate the value of x.



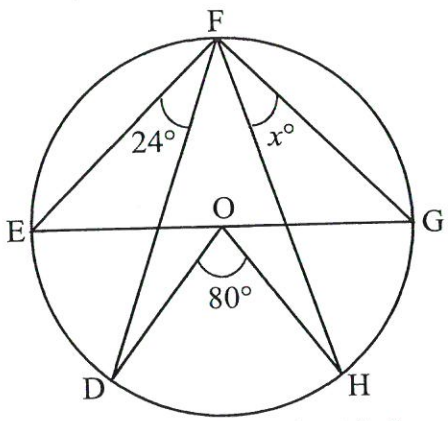
Dalam Rajah 2(b) di bawah, PQR ialah garis lurus. Hitungkan nilai x.

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

[4 marks]

[4 *markah*]

ii. In Figure 2(c), O is the centre of the circle. Calculate the value of x.



Dalam Rajah 2(c), O adalah pusat bagi bulatan. Hitungkan nilai x.

Figure 2(c) / *Rajah 2(c)*

[4 marks]

[*4 markah*]

CLO1 (c) Figure 2(d) below shows two concentric circles centered at O with respective radii of 7 cm and 14 cm. Calculate:

Rajah 2(d) di bawah menunjukkan dua bulatan sepusat yang berpusat di O dengan jejari masing-masing 7 cm dan 14 cm. Kirakan:

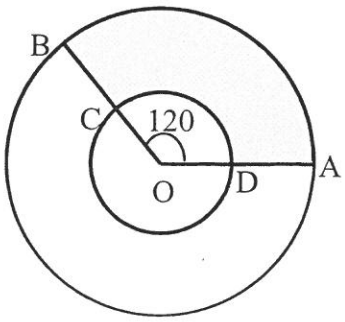


Figure 2(d) / *Rajah 2(d)*

i. The length of arc AB.
Panjang lengkok AB.

[3 marks]
[*3 markah*]

ii. Perimeter of the shaded region ABCD.
Perimeter kawasan berlorek ABCD.

[3 marks]
[*3 markah*]

iii. Area of the shaded region ABCD.
Luas kawasan berlorek ABCD.

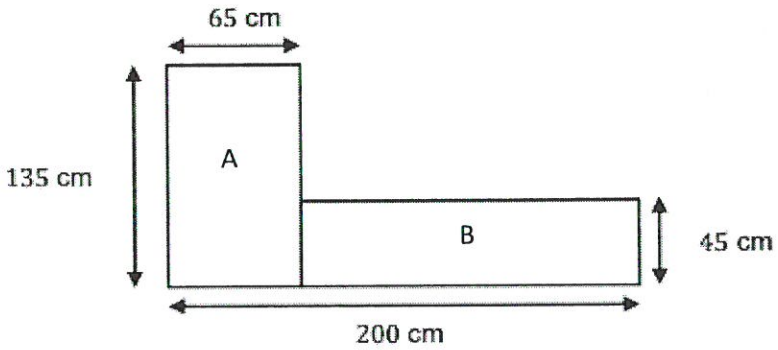
[4 marks]
[*4 markah*]

QUESTION 3

SOALAN 3

CLO1 (a) Figure 3(a) shows two rectangles, A and B. Calculate the perimeter of:

Rajah 3(a) menunjukkan dua buah segi empat tepat A dan B. Hitungkan perimeter:



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

i. Rectangle A

Segi empat tepat A

[3 marks]

[*3 markah*]

ii. Rectangle B

Segi empat tepat B

[4 marks]

[*4 markah*]

CLO1

(b) Figure 3(b) shows a structure made from a cylinder and a hemisphere with both of their radius are 7 cm. The cylinder has a length of 12 cm. Calculate the:
Rajah 3(b) menunjukkan sebuah struktur binaan daripada sebuah silinder dan separa bulatan, dengan kedua-duanya mempunyai radius 7 cm. Silinder mempunyai panjang 12 cm. Kirakan:

i. Surface area of hemisphere and cylinder
Luas permukaan separa bulatan dan silinder

[4 marks]
[4 markah]

ii. Total surface area of the solid
Jumlah luas permukaan keseluruhan pepejal

[4 marks]
[4 markah]

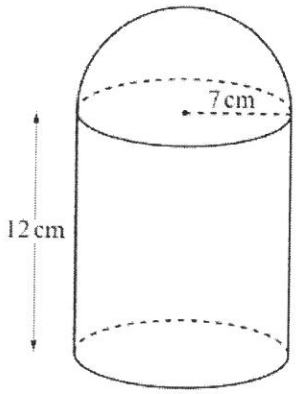


Figure 3(b) / *Rajah 3(b)*

CLO1 (c) i. Figure 3(c) shows a solid which is the combination of a half cylinder and a right prism. Given that $AF = 7\ cm$ and AF is the diameter of the half cylinder. Calculate the volume of the solid.

Rajah 3(c) menunjukkan sebuah pepejal yang terdiri daripada gabungan separuh silinder dan sebuah prisma tegak. Di beri $AF = 7\ cm$ *dan AF ialah diameter silinder itu. Hitung isipadu pepejal itu.*

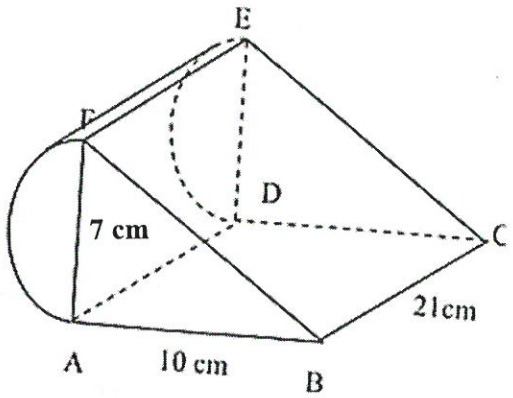


Figure 3(c) / *Rajah 3(c)*

[7 marks]

[*7 markah*]

ii. A cone with a radius of 6 cm and a height of 21 cm has a volume of 792 cm^3 . Calculate the volume of a cone with a diameter of 30 cm and a height of 14 cm.

Sebuah kon dengan jejari 6 cm dan tinggi 21 cm mempunyai isipadu 792 cm^3 . Hitung isipadu kon dengan diameter 30 cm dan ketinggian 14 cm.

[*3 markah*]

[*3 marks*]

QUESTION 4

SOALAN 4

CLO1 (a) Figure 4(a) shows a right angled triangle ABC in the Cartesian plane. D is the midpoint of the straight line AC. Calculate:

Rajah 4(a) dibawah menunjukkan sebuah segitiga bersudut tegak ABC pada satah Cartesian. D ialah titik tengah bagi garis lurus AC. Kira:

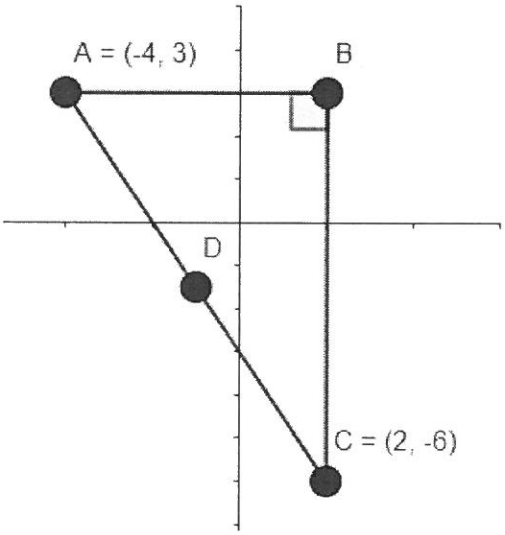


Figure 4(a) / *Rajah 4(a)*

i. The coordinates of point B and D

Koordinat bagi titik B dan D

[4 marks]

[*4 markah*]

ii. The distance between point *A* and *C*

Jarak di antara titik A dan C

[3 marks]

[*3 markah*]

CLO1 (b) Complete the table below for $y = 2x^2 - x - 3$

Lengkapkan jadual dibawah bagi $y = 2x^2 - x - 3$

i.

x	-2	-1	0	1	2	3	4	4.5	5
$y = 2x^2 - x - 3$	7	0	-3		3		25		42

[3 marks]

[*3 markah*]

ii. Based on the information at (i), draw the graph for $y = 2x^2 - x - 3$.

Berdasarkan maklumat pada (i), lukiskan graf bagi $y = 2x^2 - x - 3$

[5 marks]

[*5 markah*]

CLO1 (c) i. Given $y = x$ and $y = x^2 + 2x - 8$. Build table of values for $y = x$ and $y = x^2 + 2x - 8$.

Diberi $y = x$ *dan* $y = x^2 + 2x - 8$. *Bina jadual nilai bagi* $y = x$ *dan* $y = x^2 + 2x - 8$.

[2 marks]

[*2 markah*]

ii. Based on the information at (i), draw 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, find 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 θ in radian

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

Area of Sector

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

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

Area of Segment

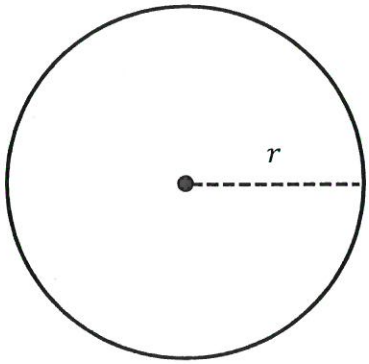
$$Area\ of\ segment = \frac{1}{2}r^2(\theta_1 - \sin\theta_2)$$

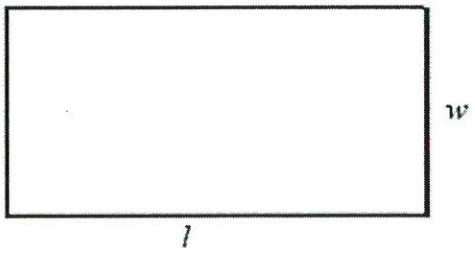
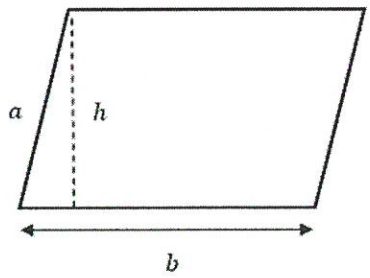
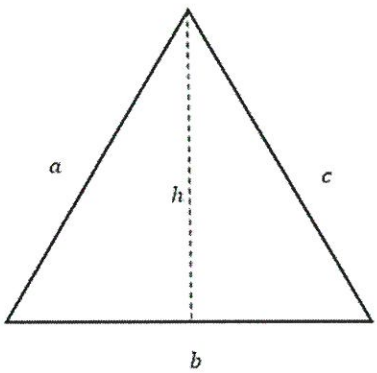
θ_1 must be in radian
θ_2 must be in degree

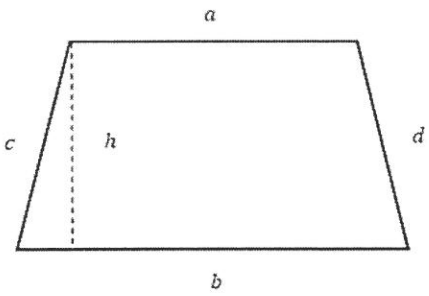
$$Area\ of\ segment = \frac{1}{2}r^2\left[\left(\theta \times \frac{\pi}{180°}\right) - \sin\theta\right]$$

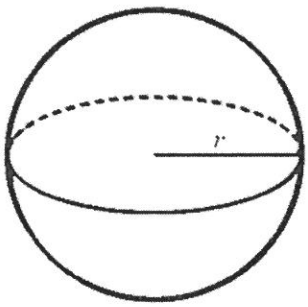
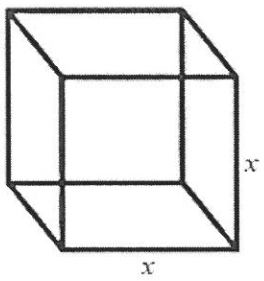
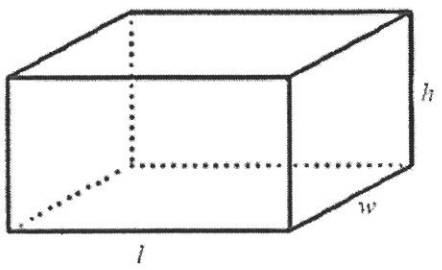
θ must be in degree

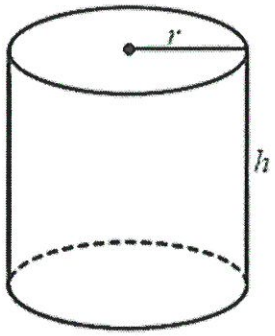
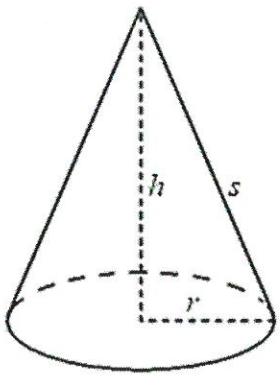
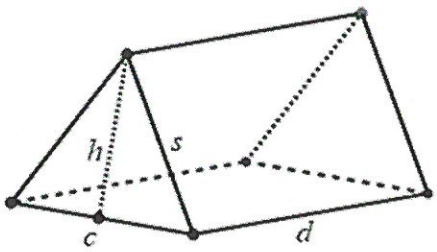
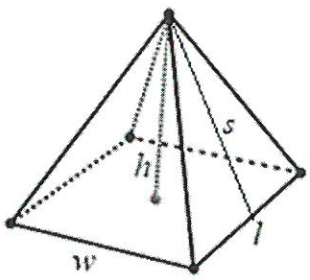
Linear	$y = mx + c$
Quadratic	$y = ax^2 + bx + c$
Gradient / Slope	$m = \frac{y_2 - y_1}{x_2 - x_1}$
Midpoint	$\left(x_{mid} = \frac{x_1 + x_2}{2}, y_{mid} = \frac{y_1 + y_2}{2}\right)$
Distance	$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Vertex	$Vertex\ point = (h, k)$ $\left(h = \frac{-b}{2a}, k =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

Shape	Circumference	Area
	$2\pi r$	πr^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  	$SA = 2(lw + wh + lh)$	$V = lwh$ 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  	$SA = wl + 2ls$	$V = \frac{1}{3}wl \times h$