

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 II : 2022/2023

DBM10133: MATHEMATICS FOR TECHNOLOGY

TARIKH : 8 JUN 2023

MASA : 8.30 PG - 10.30 PG (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)

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 as the simplest single fraction.

Nyatakan yang berikut sebagai pecahan tunggal termudah.

i. $\frac{4x}{8} - \frac{x}{6} 1001$

[4 marks]

[4 markah]

ii. $\frac{7x}{xy} \div \frac{6y}{3}$

[3 marks]

[3 markah]

CLO1

- (b)

R

arrange the each of the following to make x the subject of the formula.

Susun semula setiap yang berikut untuk menjadikan x sebagai subjek formula.

i. $y = \frac{5x-7}{3}$

[3 marks]

[3 markah]

ii. $f = \frac{x}{g} - 3x$

CLO1

[5 marks]

[5 markah]

(c)

S

olve the simultaneous equation below by using **SUBSTITUTION METHOD**.

*Selesaikan persamaan serentak di bawah dengan menggunakan **KAEDAH PENGANTIAN**.*

$$y - 4x = -3$$

$$3y + 2x = 5$$

[10 marks]

[10 markah]

QUESTION 2

SOALAN 2

CLO1

(a)

I

In Figure 2(a) below, calculate:

Dalam Rajah 2(a) di bawah, kirakan:

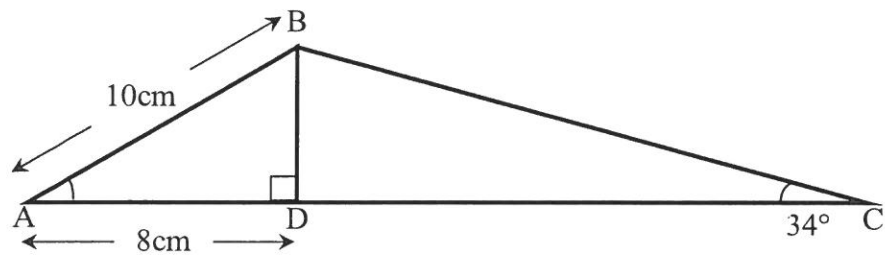


Figure 2(a) / Rajah 2(a)

i.

t

the length of BD.

panjang BD.

[3 marks]

[3 markah]

ii.

t

the length of BC.

panjang BC.

[4 marks]

[4 markah]

CLO1 (b)

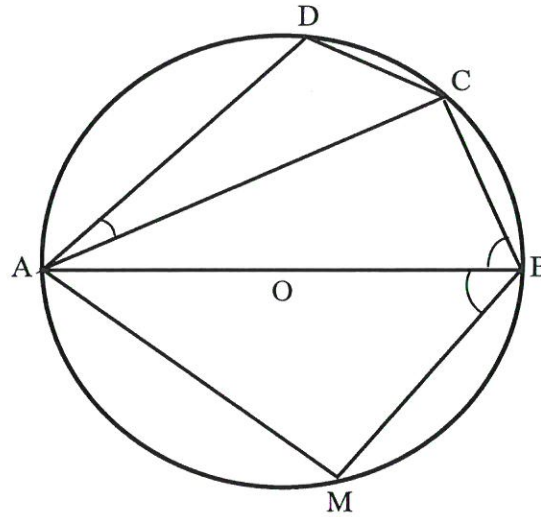


Figure 2(b) / Rajah 2(b)

In the Figure 2(b), AB is a diameter of a circle with centre O. If $\angle ABC = 55^\circ$, $\angle CAD = 25^\circ$ and $\angle ABM = 50^\circ$. Calculate:

Dalam Rajah 2(b), AB adalah diameter bagi bulatan berpusat O. Jika $\angle ABC = 55^\circ$, $\angle CAD = 25^\circ$ dan $\angle ABM = 50^\circ$. Hitung:

- i. $\angle BAC$ dan $\angle BAM$

[4 marks]
[4 markah]
- ii. $\angle ACD$

[4 marks]
[4 markah]

CLO1

(c)

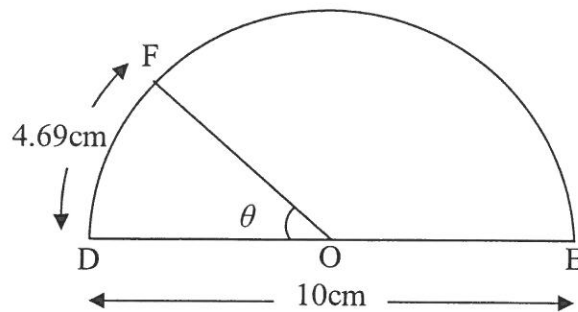


Figure 2(c) / Rajah 2 (c)

Figure 2(c) shows a semi-circle with center O and diameter, $DOE = 10\text{ cm}$.

Given that, the arc length of DF is 4.69 cm . Calculate:

Rajah 2(c) menunjukkan sebuah semi bulatan berpusat O dengan diameter $DOE = 10\text{ cm}$. Diberi, panjang lengkok DF adalah 4.69 cm . Hitungkan:

i.

value θ in radian

nilai θ dalam radian

[3 marks]

[3 markah]

ii.

the arc length of EF

panjang lengkok EF

[4 marks]

[4 markah]

iii.

the area of sector OEF

luas sektor OEF

[3 marks]

[3 markah]

QUESTION 3

SOALAN 3

CLO1

(a)

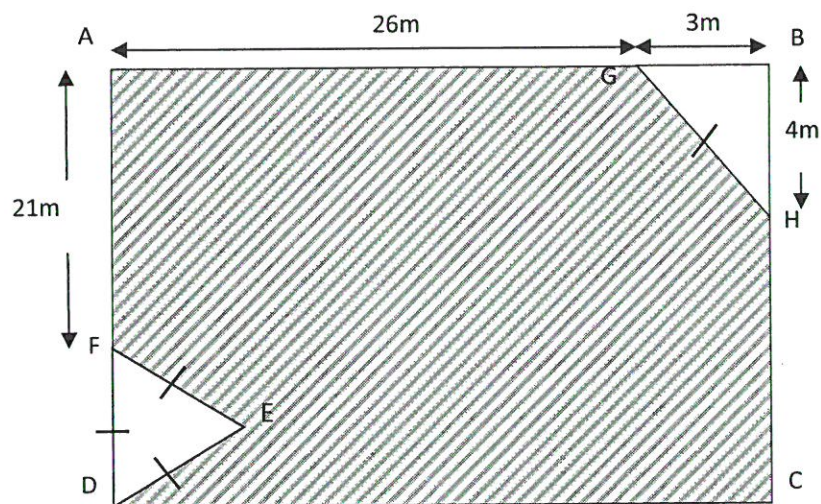


Figure 3(a) / Rajah 3(a)

The shaded area in Figure 3(a) shows a sketch of a recreational park. The shape of this recreational park is a combination of rectangle ABCD, equilateral triangle DEF, and right-angled triangle GBH. Ali has made a run around the recreation park as far as 4 laps. Calculate:

Kawasan berlorek dalam Rajah 3(a) menunjukkan lakaran sebuah taman rekreasi. Bentuk taman rekreasi ini adalah gabungan segi empat tepat ABCD, segi tiga sama DEF, dan segi tiga bersudut tegak GBH. Seorang lelaki telah membuat larian mengelilingi taman rekreasi sejauh 4 pusingan. Hitungkan:

- i. Perimeter of the recreational park.
Perimeter taman rekreasi tersebut.

[6 marks]

[6 markah]

- ii. Ali's total running distance.
Jumlah jarak larian Ali.

[1 mark]

[1 markah]

CLO1

- (b) Figure 3(b) shows a cylinder with a height of 10 meters. If the surface radius of the cylinder is 4 meters, determine:

Rajah 3(b) menunjukkan sebuah silinder dengan ketinggian 10 meter.

Sekiranya jejari permukaan silinder adalah 4 meter, tentukan:

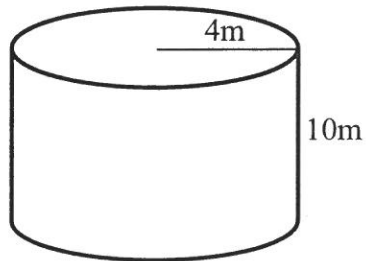


Figure 3(b) / Rajah 3(b)

- i. Total surface area of the cylinder

Jumlah luas permukaan silinder

[6 marks]

[6 markah]

- ii. Volume of the cylinder

Isipadu silinder

[2 marks]

[2 markah]

CLO1

(c)

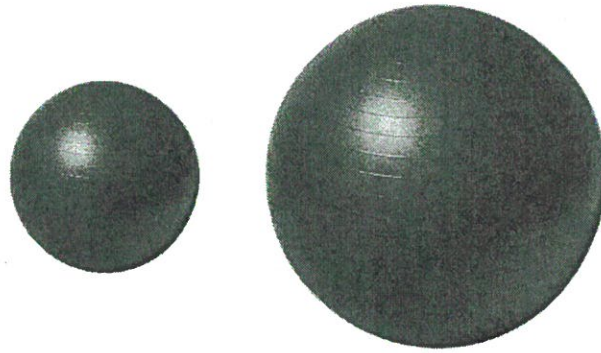


Figure 3(c) / Rajah 3(c)

Figure 3(c) shows two exercise balls that are mathematically similar, with a scale factor ratio of 1:3. Calculate:

Rajah 3(c) menunjukkan dua biji bola latihan yang serupa secara matematik, dengan nisbah faktor skala 1:3. Hitungkan:

- i. the radius of the large ball if given its surface area, $8100\pi \text{ cm}^2$
jejari bola besar itu jika diberi luas permukaannya $8100\pi \text{ cm}^2$

[4 marks]

[4 markah]

- ii. the volume of the small ball
isipadu bola kecil

[6 marks]

[6 markah]

QUESTION 4

SOALAN 4

CLO1

- (a) Figure 4(a) shows a straight line AB at the Cartesian plane. Determine:
Rajah 4(a) menunjukkan garis lurus AB pada satah Cartesian. Tentukan:

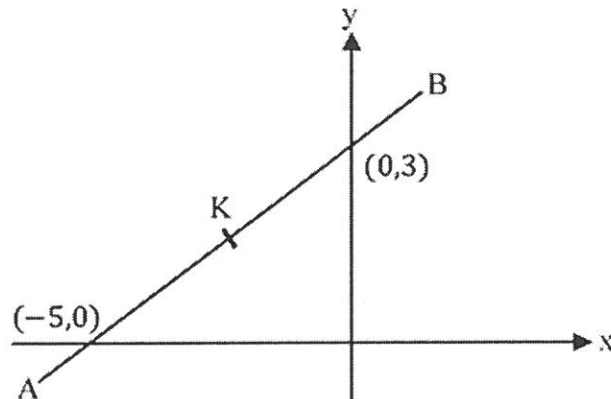


Figure 4 (a)/Rajah 4(a)

- i. y-intercept, the gradient, and the equation of the straight-line AB
pintasan-y, kecerunan, dan persamaan garis lurus AB

[2 marks]

[2 markah]

- ii. if K is the midpoint of line AB, determine the coordinates of K.
jika K adalah titik tengah bagi garis AB, tentukan koordinat K

[5 marks]

[5 markah]

- CLO1 (b) i. Draw the graph of $y = 8 - 3x - 2x^2$ in the domain $-4 \leq x \leq 1$.
Lukis graf bagi $y = 8 - 3x - 2x^2$ dalam domain $-4 \leq x \leq 1$.
 [6 marks]
 [6 markah]
- ii. Based on the graph in (i), determine the coordinates at x-axis.
Berdasarkan graf di (i), tentukan koordinat pada paksi-x
 [2 marks]
 [2 markah]
- CLO1 (c) i. Given $y = -5x + 8$ and $y = x^2 - 11$. Complete the table below.
Diberi $y = -5x + 8$ dan $y = x^2 - 11$. Lengkapkan jadual di bawah.
- | | | | | | | | |
|----------------|----|----|----|----|---|----|-----|
| x | -8 | -6 | -4 | -2 | 0 | 2 | 4 |
| $y = -5x + 8$ | | 38 | 28 | 18 | 8 | -2 | -12 |
| $y = x^2 - 11$ | 53 | | 5 | | | -7 | 5 |
- [2 marks]
 [2 markah]
- ii. Based on the information in (i), draw both functions on the same axis.
Berdasarkan maklumat di (i), lukis kedua-dua fungsi pada paksi yang sama.
 [6 marks]
 [6 markah]
- iii. Based on your graph in (ii), write the coordinates of the intersection points that occur.
Berdasarkan graf anda di (ii), tuliskan koordinat bagi titik persilangan yang terbentuk.

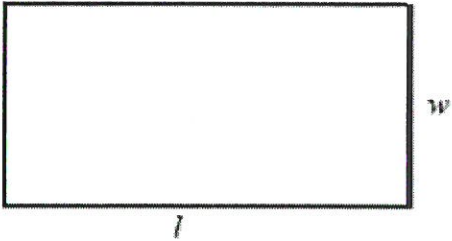
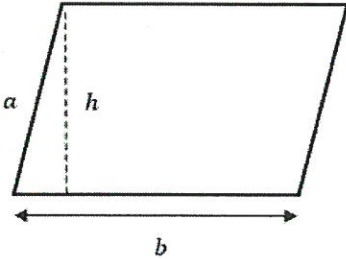
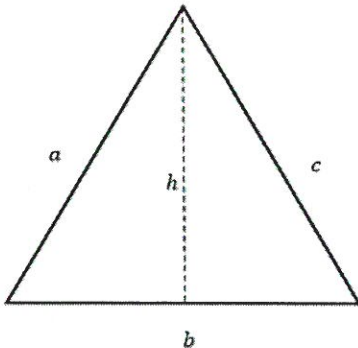
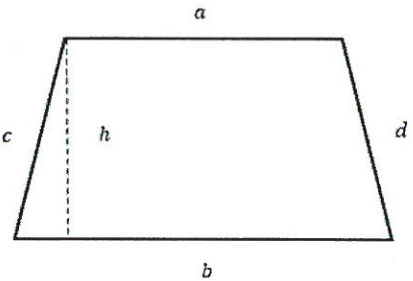
[2 marks]

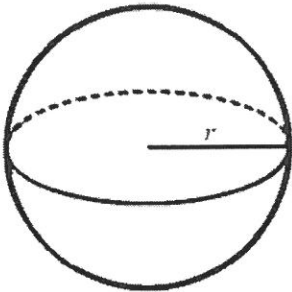
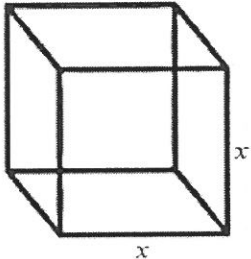
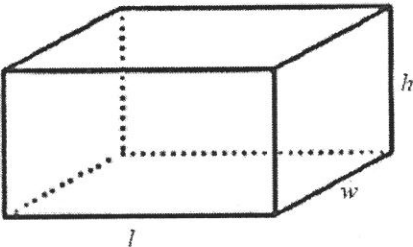
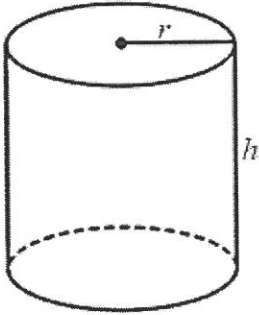
[2 *markah*]

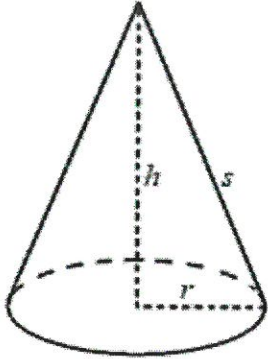
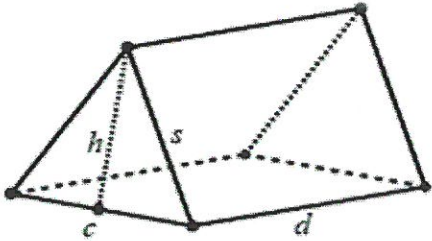
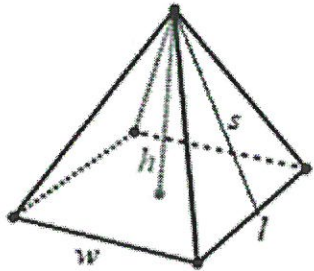
SOALAN TAMAT

FORMULAE TABLE
DBM 10133 MATHEMATICS FOR TECHNOLOGY

<u>Phythagoras Theorem</u> $a^2 + b^2 = c^2$ <u>Trigonometric Functions</u> $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}} \quad \text{SOH}$ $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}} \quad \text{CAH}$ $\tan \theta = \frac{\text{opposite}}{\text{adjacent}} \quad \text{TOA}$ <u>Radian to Degree</u> $\theta^\circ = \text{value in radian} \times \frac{180^\circ}{\pi}$ <u>Degree to Radian</u> $\theta_{\text{rad}} = \text{value in degree} \times \frac{\pi}{180^\circ}$	<u>Arc Length</u> $s = r\theta \quad \text{if } \theta \text{ in radian}$ $s = \frac{\theta}{360^\circ} \pi d \quad \text{if } \theta \text{ in degree}$ <u>Area of Sector</u> $\text{Area of sector} = \frac{1}{2} r^2 \theta \quad \text{if } \theta \text{ in radian}$ $\text{Area of sector} = \frac{\theta}{360^\circ} \pi r^2 \quad \text{if } \theta \text{ in degree}$ <u>Area of Segment</u> $\text{Area of segment} = \frac{1}{2} r^2 (\theta_1 - \sin \theta_2)$ θ_1 must be in radian θ_2 must be in degree $\begin{aligned} \text{Area of segment} \\ = \frac{1}{2} r^2 \left[\left(\theta \times \frac{\pi}{180^\circ} \right) - \sin \theta \right] \end{aligned}$ 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	$\left(x_{\text{mid}} = \frac{x_1 + x_2}{2}, y_{\text{mid}} = \frac{y_1 + y_2}{2} \right)$
Distance	$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Vertex	$\text{Vertex point} = (h, k)$ $\left(h = \frac{-b}{2a}, k = f(h) \right)$
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 	$SA = 2(lw + wh + lh)$	$V = lwh$ 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  A diagram of a cone. A vertical dashed line from the apex to the center of the base is labeled h. A horizontal dashed line from the center of the base to the edge is labeled r. A solid line along the side of the cone is labeled s.	$SA = \pi rs + \pi r^2$	$V = \frac{1}{3} \pi r^2 h$
Prism  A diagram of a triangular prism. A vertical dashed line from the top face to the bottom face is labeled h. A solid line on the bottom triangular face is labeled c. A solid line representing the length of the prism is labeled d. A solid line on the side face is labeled s.	$SA = ch + cd + 2sd$	$V = \frac{1}{2} ch \times d$
Pyramid  A diagram of a square pyramid. A vertical dashed line from the apex to the center of the base is labeled h. A solid line on the base is labeled w. A solid line along the side of the pyramid is labeled s. A solid line on the base is labeled l.	$SA = wl + 2ls$	$V = \frac{1}{3} wl \times h$