

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 I : 2024/2025

DBM10133: MATHEMATICS FOR TECHNOLOGY

TARIKH : 02 DISEMBER 2024

MASA : 2.30 PETANG – 4.30 PETANG (2 JAM)

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

Sruktur (4 soalan)

Dokumen sokongan yang disertakan : Kertas Graf dan Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answers **ALL** questions.

ARAHAN:

Bahagian ini mengandungi EMPAT (4) soalan berstruktur. Jawab SEMUA soalan.

QUESTION 1**SOALAN 1**

- CLO1 (a) Express each of the following algebraic expressions to the simplest form.
Nyatakan persamaan algebra berikut dalam bentuk yang termudah.

(i) $\frac{2}{3m} - \frac{1}{2m}$

[3 marks]
[3 markah]

(ii) $\frac{2}{5m^2} \div \frac{6n^2}{m}$

[4 marks]
[4 markah]

- CLO 1 (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) $np - 2(n + p) = p$ [p]

[4 marks]
[4 markah]

(ii) $x = \frac{y^2 + x}{3}$ [y]

[4 marks]
[4 markah]

- CLO 1 (c) Solve the simultaneous linear equations below by using the elimination method.
Selesaikan persamaan linear serentak di bawah dengan menggunakan kaedah penghapusan.

$$3x + 2y = 12$$

$$5x - y = 7$$

[10 marks]

[10 markah]

QUESTION 2**SOALAN 2**

- CLO1 (a) Figure 2(a) shows ABC is a straight line. Calculate :
Dalam rajah 2(a) menunjukkan ABC ialah garis lurus. Kirakan :

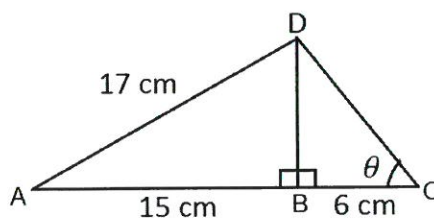


Figure 2(a) / Rajah 2(a)

- (i) the length of BD.
panjang BD.

[3 marks]

[3 markah]

- (ii) the value of θ .
nilai bagi θ .

[4 marks]

[4 markah]

- CLO 1 (b) (i) Figure 2(b)(i) shows PQ and RS are straight lines. Calculate the value of x and y .

Rajah 2(b)(i) menunjukkan PQ dan RS adalah garis lurus. Kirakan nilai bagi x dan y .

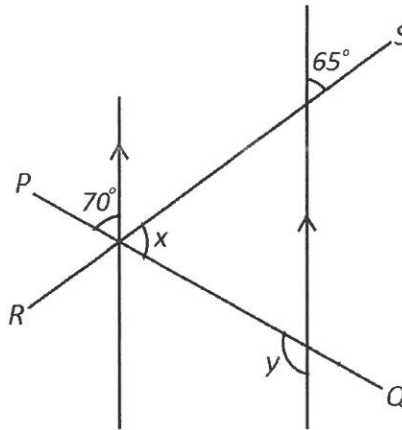


Figure 2(b)(i) / Rajah 2(b)(i)

[4 marks]

[4 markah]

- (ii) Figure 2(b)(ii) shows points A, B, C and D are on the circumference of a circle and RS is a tangent at point D. Calculate the value of x and y .

Rajah 2(b)(ii) menunjukkan titik A, B, C dan D berada pada lilitan bulatan dan RS adalah tangen pada titik D. Kirakan nilai x dan y .

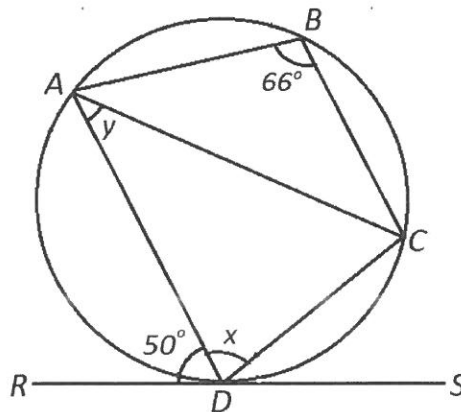


Figure 2(b)(ii) / Rajah 2(b)(ii)

[4 marks]

[4 markah]

CLO 1

- (c) Figure 2(c) shows sector OPQ and ORS, both with centre O. Given that $\angle ROS = 50^\circ$, $OQ = 12$ cm and $QS = 5$ cm.

Rajah 2(c) menunjukkan sektor OPQ dan ORS, kedua-dua berpusat di O.

Diberi bahawa $\angle ROS = 50^\circ$, $OQ = 12$ cm dan $QS = 5$ cm.

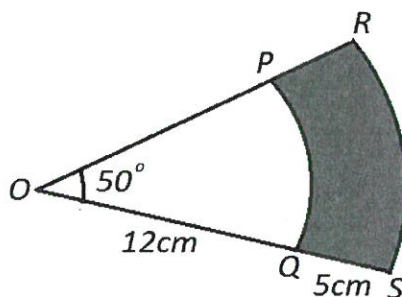


Figure 2(c) / Rajah 2(c)

- (i) Convert 50° to radian.
Tukarkan 50° kepada radian.
- (ii) Calculate the arc length of PQ. (Use $\pi = 3.142$)
Kirakan panjang lengkok PQ. (Gunakan $\pi = 3.142$)
- (iii) Calculate the area of the shaded region. (Use $\pi = 3.142$)
Kirakan luas rantau yang berlorek. (Gunakan $\pi = 3.142$)

[3 marks]
[3 markah]

[3 marks]
[3 markah]

[4 marks]
[4 markah]

QUESTION 3
SOALAN 3

CLO1

- (a) Figure 3(a) shows ABG is a right-angled triangle and BCFG is a square. Calculate :

Rajah 3(a) menunjukkan ABG adalah sebuah segitiga bersudut tegak dan DCFG adalah segi empat sama. Kirakan :

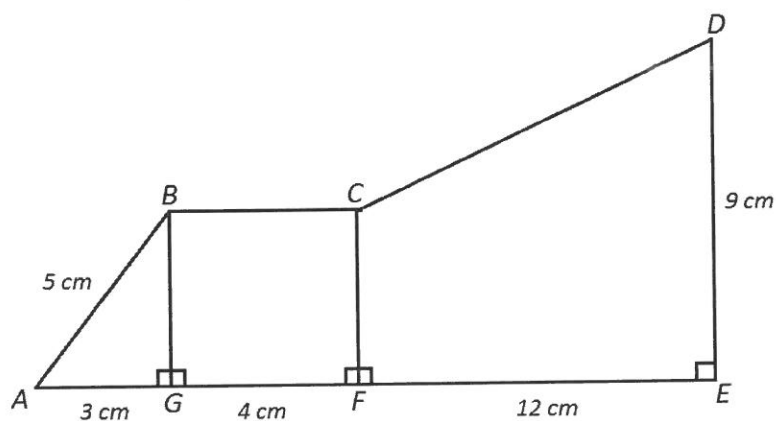


Figure 3(a) / Rajah 3(a)

- (i) the perimeter, in cm, of the whole figure.
perimeter, dalam cm, keseluruhan rajah tersebut.

[3 marks]
[3 markah]

- (ii) the area of the whole figure.
luas keseluruhan rajah.

[4 marks]
[4 markah]

CLO1

- (b) The composite shape in Figure 3(b) was made by attaching a cone to the top of a cylinder. The base of the cylinder has diameter 30 m, the slanting height of the cone is 17 m, and the height of the cylinder is 10 m.

Bentuk komposit dalam Rajah 3(b) dibuat dengan memasang kon pada bahagian atas silinder. Tapak silinder mempunyai diameter 30 m, ketinggian serong kon ialah 17 m, dan ketinggian silinder ialah 10 m.

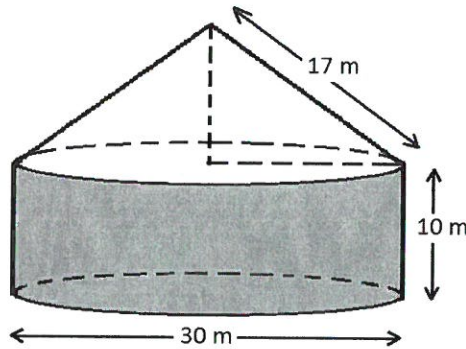


Figure 3(b) / Rajah 3(b)

Calculate :

Kirakan :

- (i) the height of the cone.
ketinggian kon.

[3 marks]
[3 markah]

- (ii) the volume of the whole composite. (Use $\pi = 3.142$)
isipadu keseluruhan komposit. (Gunakan $\pi = 3.142$)

[5 marks]
[5 markah]

CLO1

(c) Figure 3(c) shows a solid formed by joining a cuboid and a right prism.

Calculate :

Rajah 3(c) menunjukkan sebuah pepejal yang terbentuk dengan mencantumkan sebuah kuboid dan sebuah prisma tegak. Kirakan :

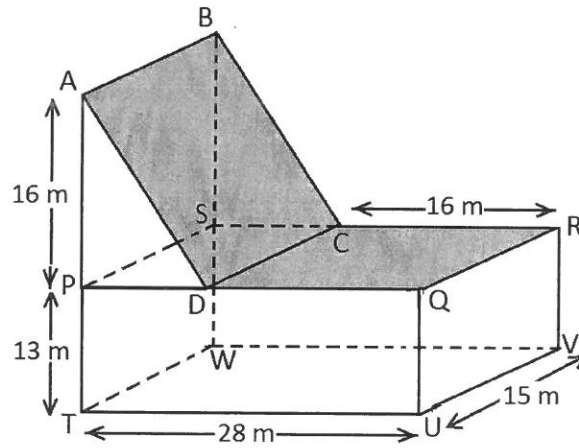


Figure 3(c) / Rajah 3(c)

(i) the length of AD.

panjang AD.

[3 marks]

[3 markah]

(ii) the total surface area of the solid.

jumlah luas permukaan pepejal itu.

[7 marks]

[7 markah]

QUESTION 4
SOALAN 4

CLO1

- (a) Figure 4(a) shows the straight line AB on a Cartesian plane. Calculate :
Rajah 4(a) menunjukkan garis lurus AB pada satah Cartesian. Kira :

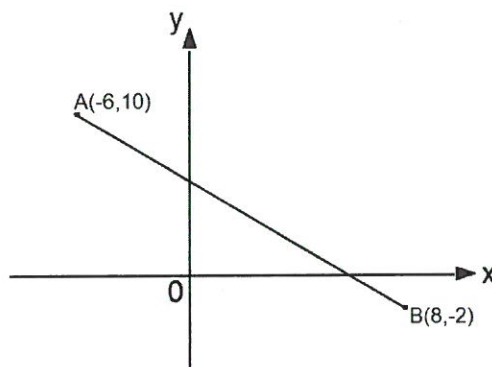


Figure 4(a) / Rajah 4(a)

- (i) the midpoint of AB.
titik tengah bagi AB.
- (ii) the distance between A and B.
jarak di antara A dan B.

[3 marks]
 [3 markah]

[4 marks]
 [4 markah]

CLO1

- (b) Given a quadratic function $y = x^2 - 5x + 3$.
Diberi fungsi kuadratik $y = x^2 - 5x + 3$.

- (i) Construct a table of values for the function $y = x^2 - 5x + 3$ where
 $0 \leq x \leq 5$.
*Bina satu jadual nilai bagi fungsi $y = x^2 - 5x + 3$ di mana
 $0 \leq x \leq 5$.*

[4 marks]
 [4 markah]

- (ii) Draw the graph of function $y = x^2 - 5x + 3$ for $0 \leq x \leq 5$.

Lukiskan graf bagi fungsi $y = x^2 - 5x + 3$ untuk $0 \leq x \leq 5$.

[4 marks]

[4 markah]

CLO1

- (c) (i) Complete the table below for the functions $y = 2x^2 - x - 3$ and $y = -x - 1$.

Lengkapkan jadual di bawah bagi fungsi $y = 2x^2 - x - 3$ dan

$y = -x - 1$

x	-1.5	-1	0	0.5	1	1.5	2
$y = 2x^2 - x - 3$		0	-3		-2		3

x	0	1
$y = -x - 1$	-1	

[4 marks]

[4 markah]

- (ii) Based on the information at (i), draw both functions on the same graph paper.

Berdasarkan maklumat pada (i), lukiskan kedua-dua fungsi tersebut pada kertas graf yang sama.

[4 marks]

[4 markah]

- (iii) Based on your graph, determine the point of intersection of the two functions.

Berdasarkan graf anda, tentukan titik persilangan bagi kedua-dua fungsi tersebut.

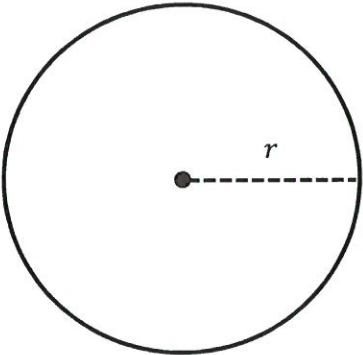
[2 marks]

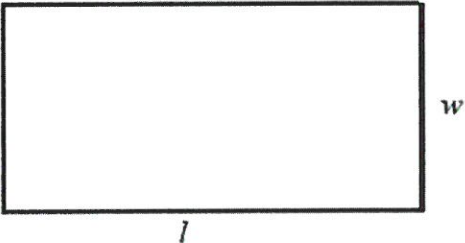
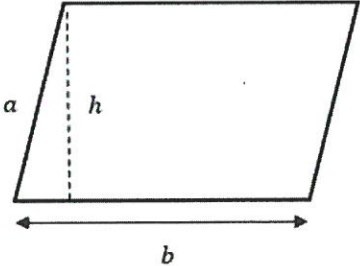
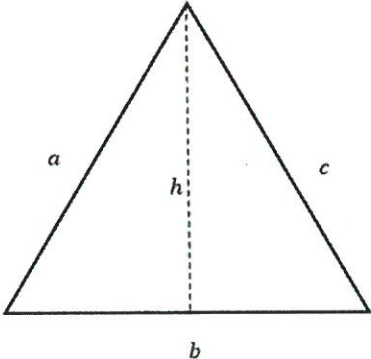
[2 markah]

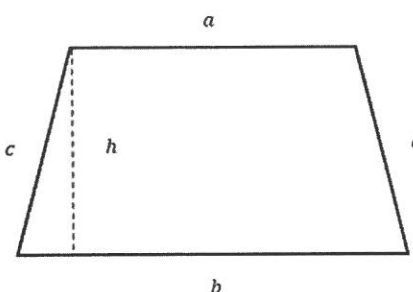
SOALAN TAMAT

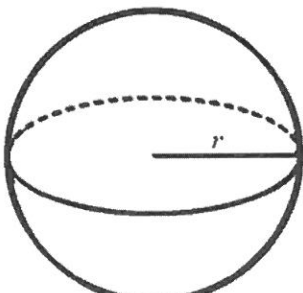
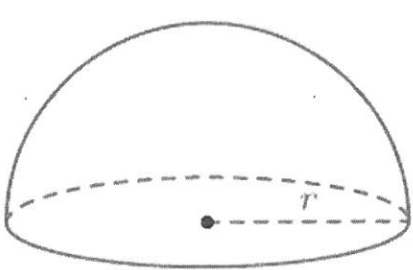
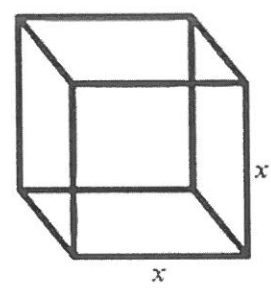
FORMULAE TABLE
DBM 10133 MATHEMATICS FOR TECHNOLOGY

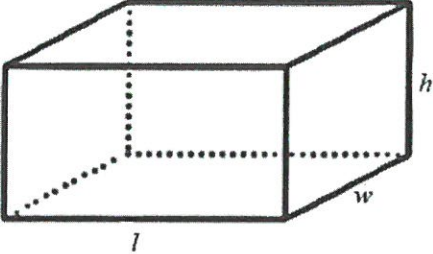
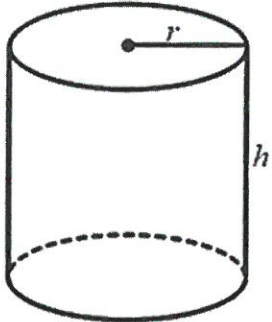
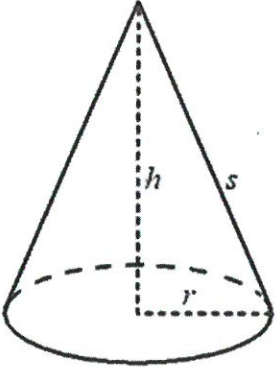
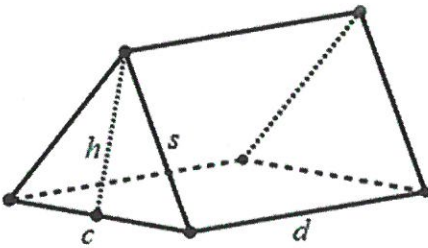
<u>Pythagoras Theorem</u> $a^2 + b^2 = c^2$ <u>Trigonometric Functions</u> $\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}} \quad \text{SOH}$ $\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}} \quad \text{CAH}$ $\tan \theta = \frac{\text{opposite}}{\text{adjacent}} \quad \text{TOA}$ <u>Radian 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	Circumference	Area
 A circle with a center point. A dashed line segment extends from the center to the circumference, labeled with the variable r.	$2\pi r$	πr^2

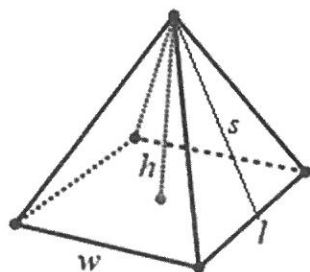
Shape	Perimeter	Area
Rectangle  A rectangle with a horizontal base labeled l and a vertical right side labeled w.	$P = 2l + 2w$	$A = l \times w$
Parallelogram  A parallelogram with a horizontal base labeled b. A dashed vertical line from the top-left vertex to the base is labeled h. The left slanted side is labeled a.	$P = 2(a + b)$	$A = b \times h$
Triangle  A triangle with a horizontal base labeled b. The left slanted side is labeled a and the right slanted side is labeled c. A dashed vertical line from the top vertex to the base is labeled h.	$P = a + b + c$	$A = \frac{1}{2} \times b \times h$

Trapezium / Trapezoid 	$P = a + b + c + d$	$A = \left(\frac{a+b}{2}\right) \times h$
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Shape	Surface Area	Volume
Sphere 	$SA = 4\pi r^2$	$V = \frac{4}{3}\pi r^3$
Hemisphere 	$SA = 2\pi r^2 + \pi r^2$ Or $SA = 3\pi r^2$	$V = \frac{2}{3}\pi r^3$
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



$$SA = wl + 2ls$$

$$V = \frac{1}{3}wl \times h$$

