

Nama: _____

Kelas: _____

SULIT
1449/2
Matematik
Kertas 2
Oktober
2020

1449/2



$2\frac{1}{2}$ jam

MAKTAB RENDAH SAINS MARA

PEPERIKSAAN AKHIR SIJIL PENDIDIKAN MRSM 2020

MATEMATIK

Kertas 2

Dua jam tiga puluh minit

STEPS- WHAT THE FUTURE HOLDS

**JANGAN BUKA KERTAS
PEPERIKSAAN INI SEHINGGA
DIBERITAHU**

1. Tuliskan nama dan kelas anda pada ruang yang disediakan.
2. Kertas peperiksaan ini adalah dalam dwibahasa.
3. Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.
5. Calon dikehendaki membaca maklumat di halaman belakang kertas peperiksaan ini.

Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	3	
	2	5	
	3	5	
	4	6	
	5	4	
	6	5	
	7	5	
	8	4	
	9	6	
	10	4	
	11	5	
B	12	12	
	13	12	
	14	12	
	15	12	
	16	12	
Jumlah			

Kertas peperiksaan ini mengandungi 48 halaman bercetak

**MATHEMATICAL FORMULAE
RUMUS MATEMATIK**

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.

Rumus-rumus berikut boleh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

**RELATIONS
PERKAITAN**

1 $a^m \times a^n = a^{m+n}$

10 Pythagoras Theorem

Teorem Pithagoras

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

2 $a^m \div a^n = a^{m-n}$

3 $(a^m)^n = a^{mn}$

$$11 P(A) = \frac{n(A)}{n(S)}$$

4 $A^{-1} = \frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

$$12 P(A') = 1 - P(A)$$

5 Distance / jarak

$$13 m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

6 Midpoint / Titik tengah

$$14 m = -\frac{y - \text{intercept}}{x - \text{intercept}}$$

$$(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$m = -\frac{\text{pintasan} - y}{\text{pintasan} - x}$$

7 Average speed = $\frac{\text{distance travelled}}{\text{time taken}}$

Purata laju = $\frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}$

8 Mean = $\frac{\text{sum of data}}{\text{number of data}}$

Min = $\frac{\text{hasil tambah nilai data}}{\text{bilangan data}}$

9 Mean = $\frac{\text{sum of } (\text{midpoint} \times \text{frequency})}{\text{sum of frequencies}}$

Min = $\frac{\text{hasil tambah } (\text{nilai titik tengah kelas} \times \text{kekerapan})}{\text{hasil tambah kekerapan}}$

**SHAPES AND SPACE
BENTUK DAN RUANG**

- 1 Area of trapezium = $\frac{1}{2} \times$ sum of parallel sides \times height
 $Luas trapezium = \frac{1}{2} \times$ hasil tambah dua sisi selari \times tinggi
- 2 Circumference of circle = $\pi d = 2\pi r$
 $Lilitan bulatan = \pi d = 2\pi j$
- 3 Area of circle = πr^2
 $Luas bulatan = \pi j^2$
- 4 Curved surface area of cylinder = $2\pi rh$
 $Luas permukaan melengkung silinder = 2\pi jt$
- 5 Surface area of sphere = $4\pi r^2$
 $Luas permukaan sfera = 4\pi j^2$
- 6 Volume of right prism = cross sectional area \times length
 $Isi padu prisma tegak = luas keratan rentas \times panjang$
- 7 Volume of cylinder = $\pi r^2 h$
 $Isi padu silinder = \pi j^2 t$
- 8 Volume of cone = $\frac{1}{3}\pi r^2 h$
 $Isi padu kon = \frac{1}{3}\pi j^2 t$
- 9 Volume of sphere = $\frac{4}{3}\pi r^3$
 $Isi padu sfera = \frac{4}{3}\pi j^3$
- 10 Volume of right pyramid = $\frac{1}{3} \times$ base area \times height
 $Isi padu piramid tegak = \frac{1}{3} \times$ luas tapak \times tinggi
- 11 Sum of interior angles of a polygon
 $Hasil tambah sudut pedalaman poligon$
 $= (n - 2) \times 180^\circ$

[Lihat halaman sebelah
SULIT

12
$$\frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$

$$\frac{\text{panjang lengkok}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$$

13
$$\frac{\text{area of sector}}{\text{area of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$

$$\frac{\text{luas sektor}}{\text{luas bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$$

14 Scale factor, $k = \frac{PA'}{PA}$

$$\text{Faktor skala, } k = \frac{PA'}{PA}$$

15 Area of image $= k^2 \times$ area of object
Luas imej $= k^2 \times$ *luas objek*

Section A
Bahagian A
STEPS2020
[52 marks]
[52 markah]

Answer all questions in this section.
Jawab semua soalan dalam bahagian ini.

- 1 Based on the graph in Diagram 1, list all three inequalities which satisfy the shaded region.

Berdasarkan graf dalam Rajah 1, senaraikan tiga ketaksamaan yang memuaskan kawasan yang berlorek.

[3 marks]
[3 markah]

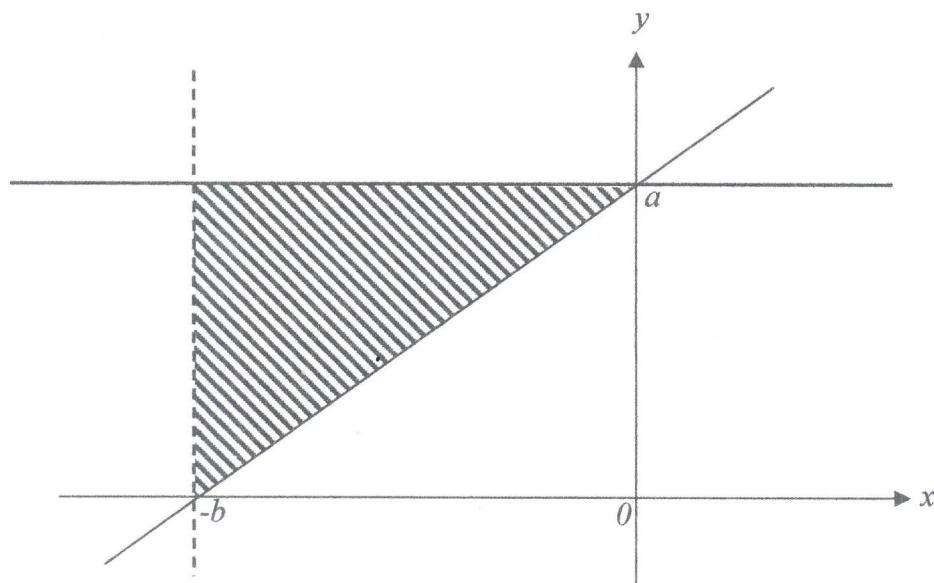


Diagram 1
Rajah 1

Answer / Jawapan :

- 2 The ratio of the selling price of 2 pieces of shirt to a piece of tracksuit bottom is 3:1.
The total price for 8 pieces of shirt and 2 tracksuit bottoms is RM 350.
Using matrix method, find the price, in RM of a shirt and a tracksuit.

Nisbah harga jualan bagi 2 helai baju kepada sehelai seluar sukan ialah 3:1.

Jumlah harga bagi 8 helai baju dan 2 helai seluar sukan ialah RM 350.

Menggunakan kaedah matriks, cari harga, dalam RM, bagi sehelai baju dan sehelai seluar sukan.

[5 marks]
[5 markah]

Answer / Jawapan :

- 3 Diagram 2 shows the speed – time graph of a motorcyclist in a period of 60 seconds.

Rajah 2 menunjukkan graf laju – masa bagi penunggang motosikal dalam masa 60 saat.

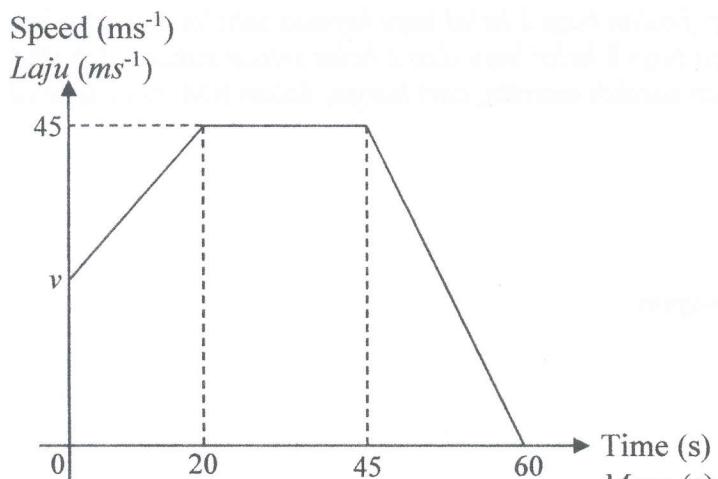


Diagram 2

Rajah 2

Given that the total distance travelled by the motorcyclist is 2022.5 m.

Diberi jumlah jarak yang dilalui oleh penunggang motosikal itu ialah 2022.5 m.

Calculate

Hitung

- (a) the rate of change of speed, in ms⁻², in the last 5 seconds,
kadar perubahan laju, dalam ms⁻², dalam 5 saat terakhir,
- (b) the value of v .
nilai v.

[5 marks]

[5 markah]

Answer / Jawapan :

(a)

(b)

- 4 Diagram 3 shows a wheel of luck which is divided into 12 sectors.

Rajah 3 menunjukkan sebuah roda cabutan bertuah yang terbahagi kepada 12 sektor.

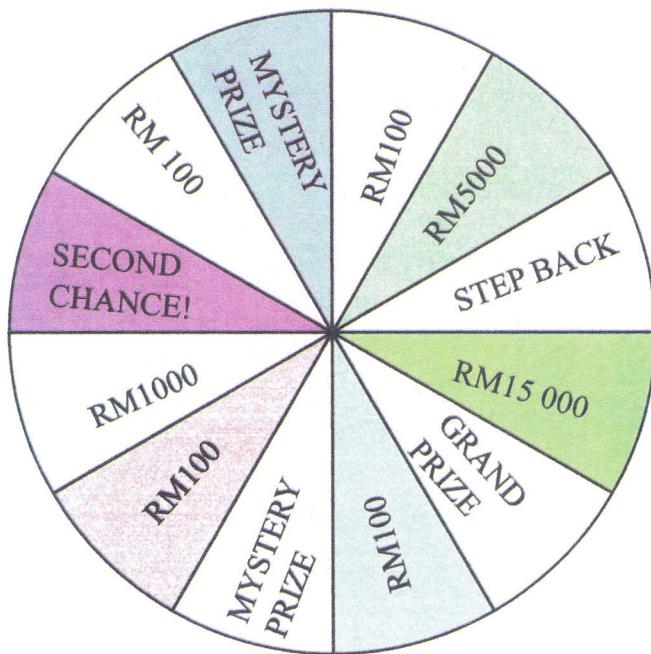


Diagram 3

Rajah 3

Andrew is qualified to the final round of a competition. If Andrew spins the wheel and he gets "SECOND CHANCE!" or "STEP BACK", he will be given a chance to spin again.

Andrew layak memasuki pusingan akhir dalam sebuah pertandingan. Jika Andrew memutar roda dan mendapat sektor "SECOND CHANCE!" atau "STEP BACK", dia diberikan peluang untuk memutar roda sekali lagi.

- (a) Find the probability that Andrew directly gets “MYSTERY PRIZE” on his first spin.

Cari kebarangkalian bahawa Andrew mendapat “MYSTERY PRIZE” pada putaran pertama.

[1 mark]
[1 markah]

- (b) Find the probability that Andrew gets “RM 100” and “RM 5000”,

Cari kebarangkalian bahawa Andrew mendapat “RM 100” dan “RM 5000”. [2 marks]
[2 markah]

- (c) Andrew is allow to spin wheel of luck at most twice. Once Andrew gets “GRAND PRIZE”, he must stop the game.

Find the probability that Andrew gets the “GRAND PRIZE”.

Andrew dibenarkan memutar roda cabutan bertuah selebih-lebihnya dua kali.

Andrew mesti menamatkan permainan apabila dia mendapat “GRAND PRIZE”.

Cari kebarangkalian Andrew mendapat “GRAND PRIZE”.

[3 marks]
[3 markah]

Answer / Jawapan :

(a)

(b)

(c)

[Lihat halaman sebelah

- 5 In Diagram 4, ABE is a right-angled triangle and $BCDE$ is a trapezium.

Dalam Rajah 4, ABE ialah sebuah segi tiga bersudut tegak dan $BCDE$ ialah sebuah trapezium.

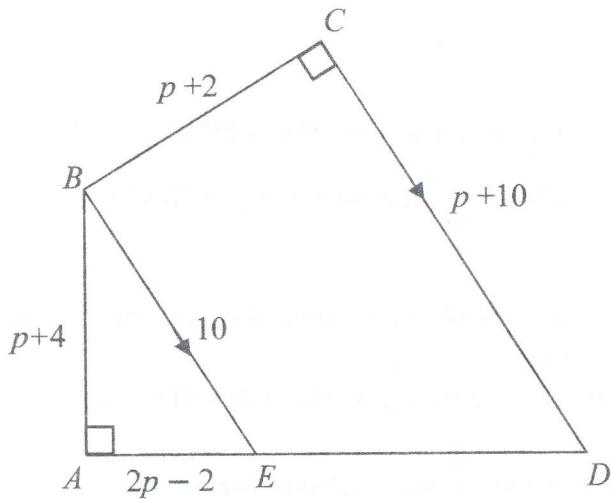


Diagram 4
Rajah 4

Given that the area of trapezium $BCDE$ is three times the area of triangle ABE .
Find the value of p .

Diberi bahawa luas kawasan trapezium $BCDE$ ialah tiga kali ganda luas segitiga ABE .
Cari nilai p .

[4 marks]
[4 markah]

- 6 (a) Determine whether the following statement is true or false.

Tentukan sama ada pernyataan berikut benar atau palsu.

Zero and one are positive integers
Sifar dan satu adalah integer positif

[1 mark]

[1 markah]

- (b) State the converse of the following statement and hence determine whether its converse is true or false.

Nyatakan *akas bagi pernyataan berikut dan seterusnya tentukan sama ada akas itu benar atau palsu.*

If the length of a side of a cube is 4 cm, then its volume is 64 cm^3 .

Jika panjang sisi sebuah kubus ialah 4 cm, maka isipadunya ialah 64 cm^3 .

[2 marks]

[2 markah]

- (c) The perimeter of a circle can be determined by using $n\pi$, where n is the diameter. Make one conclusion by deduction for a circle which has radius of 6 cm.

Perimeter bagi sebuah bulatan boleh ditentukan dengan menggunakan $n\pi$, dimana n ialah diameter. Buat satu kesimpulan secara deduksi untuk sebuah bulatan yang mempunyai jejari 6 cm.

[2 marks]

[2 markah]

- 7 Diagram 5 shows a parallelogram $ABEF$ drawn on a Cartesian plane. FE is parallel to AB .

Rajah 5 menunjukkan sisi empat selari $ABEF$ yang dilukis pada suatu satah Cartesian. FE adalah selari dengan AB .

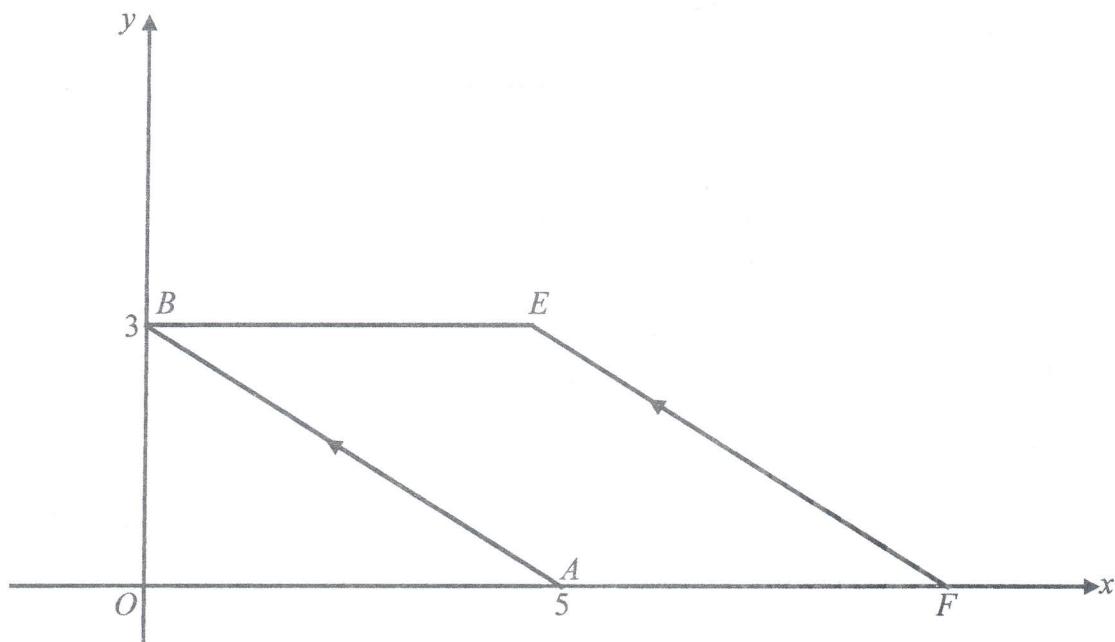


Diagram 5
Rajah 5

Given that $AF = 5$ units.

Diberi $AF = 5$ unit.

Find

Cari

- (a) the x -intercept of FE ,
Pintasan-x bagi garis lurus FE,
- (b) the equation of the straight line FE .
persamaan garis lurus FE.

[5 marks]
[5 markah]

- 8 Diagram 6 shows a right prism with a rectangular base $EFGH$ on a horizontal plane. Pentagon $EFJKL$ is the uniform cross section for the prism. EL, HM, GP and FJ are vertical edges of the prism.

Rajah 6 menunjukkan sebuah prisma tegak dengan tapak segiempat tepat $EFGH$ di atas satah mengufuk. Pentagon $EFJKL$ adalah keratan rentas seragam bagi prisma tersebut. EL, HM, GP dan FJ adalah sisi tegak prisma itu.

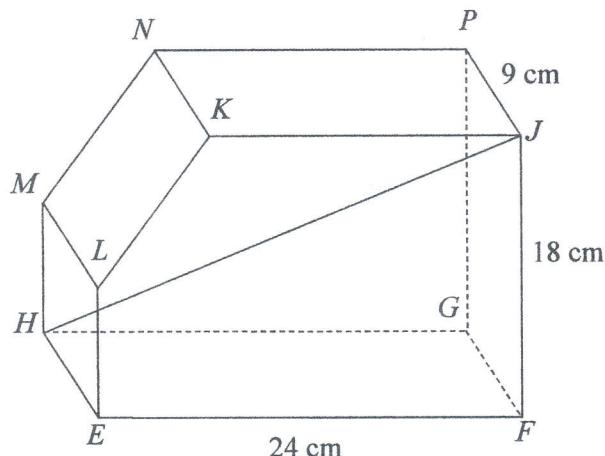


Diagram 6
Rajah 6

- (a) Name the angle between the line JH and the plane $PJFG$.
Namakan sudut antara garis JH dan satah $PJFG$.
- (b) Hence, calculate the angle between the line JH and the plane $PJFG$.
Seterusnya, hitung sudut antara garis JH dan satah $PJFG$.

[4 marks]
[4 markah]

- 9 A landscape designer wants to build a garden consist of grass section, water section and a wooden deck as shown in Diagram 7. XZY and PQR are concentric circles. The diameter of the water section and the garden are 12 m and 36 m respectively. The perpendicular distance from P to the line QR is 9 m.

Seorang pereka landskap merancang untuk membina sebuah taman yang terdiri daripada kawasan rumput, kawasan berair dan dek kayu seperti dalam Rajah 7. XZY dan PQR adalah bulatan sepusat. Diameter kawasan berair dan taman adalah 12 m dan 36 m masing-masing. Jarak serenjang dari P ke garis QR ialah 9 m.

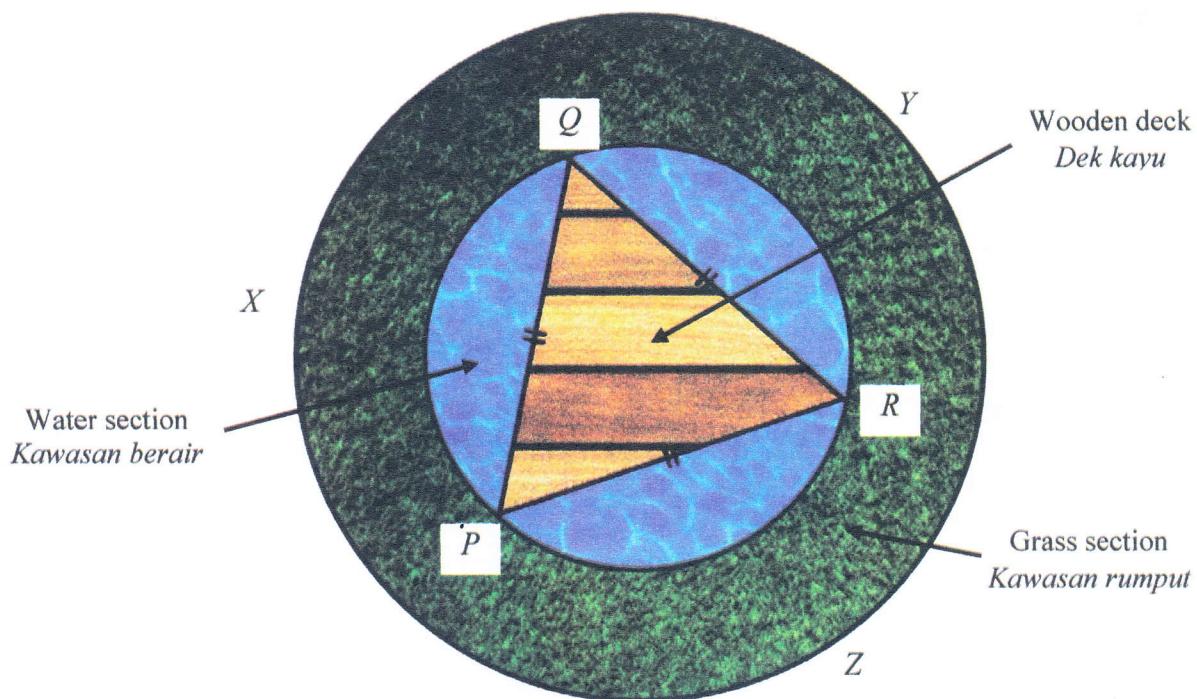


Diagram 7
Rajah 7

- (a) Find the perimeter, in m, of the wooden deck.

Cari perimeter, dalam m, bagi dek kayu.

[3 marks]
[3 markah]

- (b) Find the area, in m^2 , of the grass section. (Use $\pi = \frac{22}{7}$)

Cari luas, dalam m^2 , kawasan rumput. (Guna $\pi = \frac{22}{7}$)

[3 marks]
[3 markah]

- 10 Calculate the value of x and of y that satisfy the following simultaneous linear equations:
Hitung nilai x dan nilai y yang memuaskan persamaan linear serentak berikut:

[4 marks]
[4 markah]

$$6x - 2y = 8$$

$$2(5x+1) - 6x = 2(y+2)$$

Answer / Jawapan :

- 11 Diagram 8 shows a cylindrical stainless steel urn containing coffee, which lies on a horizontal plane.

Rajah 8 menunjukkan sebuah bekas air keluli tahan karat berbentuk silinder yang mengandungi air kopi terletak pada satah mengufuk.

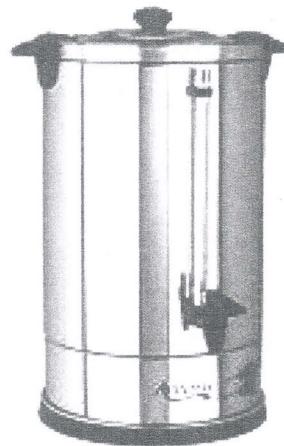


Diagram 8
Rajah 8

It is given that the radius of the urn is 15 cm and the height is 60 cm.
(Dimension of the inner stainless steel urn.)

Using $\pi = \frac{22}{7}$,

*Diberi bahawa jejari bekas air tersebut ialah 15 cm dan tingginya ialah 60 cm.
(Dimensi dalaman bekas air keluli tahan karat)*

Menggunakan $\pi = \frac{22}{7}$,

- (a) Calculate the volume, in cm^3 , of coffee in the urn when it is full.

Hitung isipadu, dalam cm^3 , kopi di dalam bekas air apabila ia penuh.

- (b) Each cup of coffee served has a volume of 130 cm^3 . How many cups of coffee can be served from a half-full urn?

Isipadu untuk satu cawan kopi ialah 130 cm^3 . Berapakah bilangan cawan kopi yang dapat di saji daripada bekas air yang separuh penuh.

[5 marks]
[5 markah]

Section B

Bahagian B

STEPS2020

[48 marks]

[48 markah]

Answer any four questions from this section.

Jawab mana-mana empat soalan dalam bahagian ini.

- 12 (a) Complete Table 1 in the answer space on page 28 for the equation $y = -x^2 + 4x + 2$. [2 marks]

Lengkapkan Jadual 1 di ruangan jawapan pada mukasurat 28 bagi persamaan $y = -x^2 + 4x + 2$. [2 markah]

- (b) For this part of the question, use the graph paper provided on page 29.
You may use a flexible curve ruler.

Using a scale of 2 cm to 1 unit on the x -axis and 2 cm to 1 unit on the y -axis, draw the graph of $y = -x^2 + 4x + 2$ for $-1 \leq x \leq 5$. [4 marks]

Untuk ceraian soalan ini, gunakan kertas graf yang disediakan pada halaman 29.
Anda boleh menggunakan pembaris fleksibel.

Menggunakan skala 2 cm kepada 1 unit pada paksi- x dan 2 cm kepada 1 unit pada paksi- y , lukis graf $y = -x^2 + 4x + 2$ untuk $-1 \leq x \leq 5$. [4 markah]

- (c) From the graph in 12(b), find

Daripada graf di 12(b), cari

- (i) the value of y when $x = 1.4$,

nilai y apabila $x = 1.4$,

- (ii) the maximum value of x when $y = 4$.

Nilai maksimum bagi x apabila $y = 4$.

[2 marks]

[2 markah]

- (d) Draw a suitable straight line on the graph in 12(b) to find all the values of x which satisfy the equation $x^2 = 3x + 3$ for $-1 \leq x \leq 5$.
State the values of x .

[4 marks]

Lukis satu garis lurus yang sesuai pada graf di 12(b) untuk mencari nilai-nilai x yang memenuhi persamaan $x^2 = 3x + 3$ untuk $-1 \leq x \leq 5$.

Nyatakan nilai-nilai x itu.

[4 markah]

Answer / Jawapan :

(a) $y = -x^2 + 4x + 2$

x	-1	-0.2	0	1	2	3	4	5
y	-3		2	5	6	5		-3

Table 1
Jadual 1

(b) Refer to the graph on page 29.
Rujuk graf pada halaman 29.

(c) (i) $y = \dots\dots\dots\dots$

(ii) $x = \dots\dots\dots\dots, \dots\dots\dots\dots$

(d)

- 13 (a) Transformation \mathbf{F} is a translation $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$.

Transformation \mathbf{G} is a 90° anticlockwise rotation at $(-1,1)$.

Mark the coordinates of the image of point $E (0,-2)$ in Diagram 9 in the answer space provided under each of the following transformations:

Penjelmaan \mathbf{F} ialah satu translasi $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$.

Penjelmaan \mathbf{G} ialah satu putaran 90° arah lawan jam pada titik $(-1,1)$.

Tandakan koordinat imej bagi titik $E (0,-2)$ dalam Rajah 9 di bawah penjelmaan berikut di ruangan jawapan yang disediakan:

(i) \mathbf{G}^2
 \mathbf{G}^2

(ii) \mathbf{GF}
 \mathbf{GF}

[4 marks]
[4 markah]

Answer / Jawapan :

(a) (i) (ii)

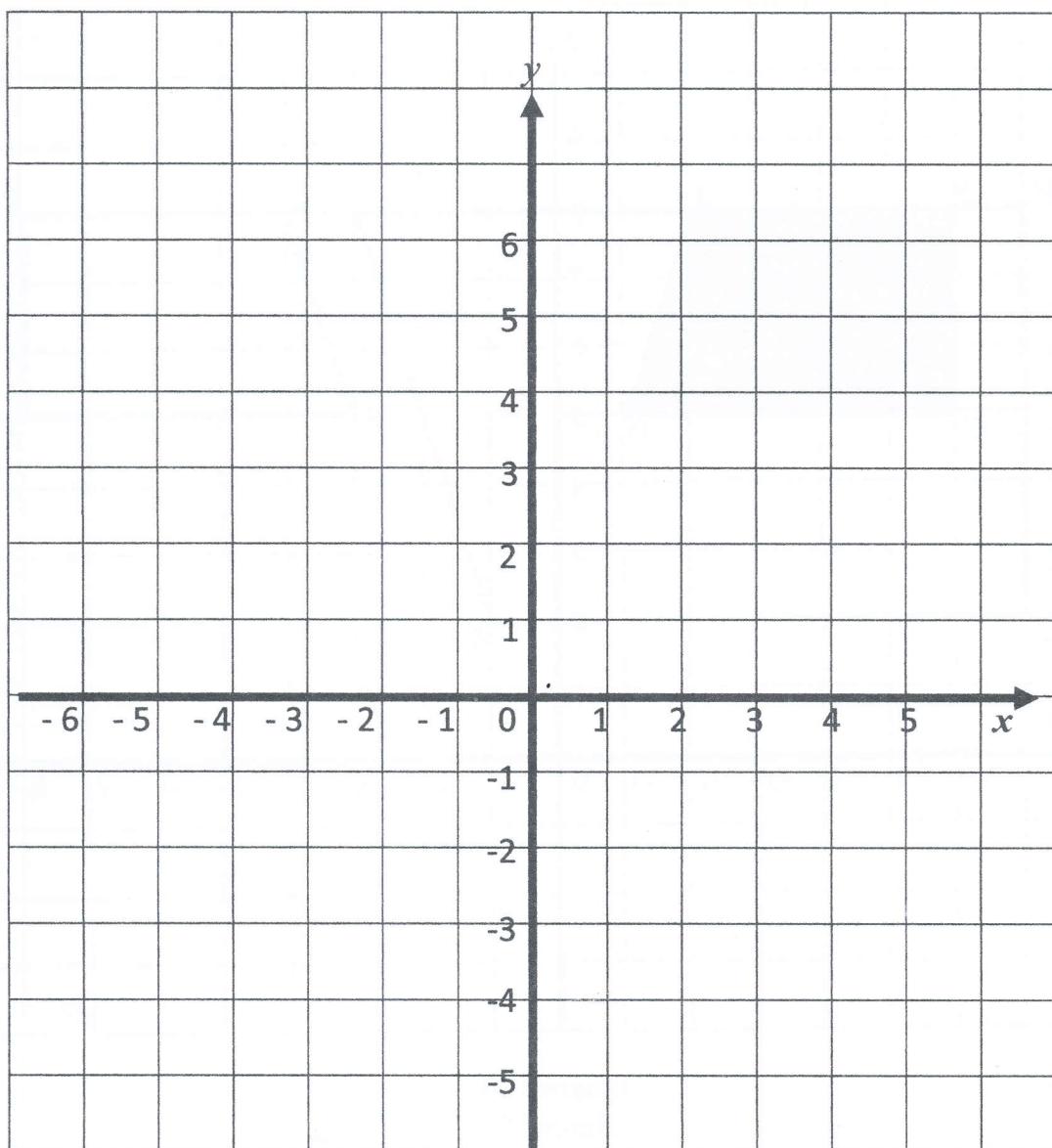


Diagram 9
Rajah 9

- (b) Diagram 10 shows three quadrilaterals, $ABCD$, $PQRS$ and $JKLM$ drawn on a Cartesian plane.

Rajah 10 menunjukkan tiga segi empat $ABCD$, $PQRS$ dan $JKLM$ dilukis pada suatu satah Cartesan.

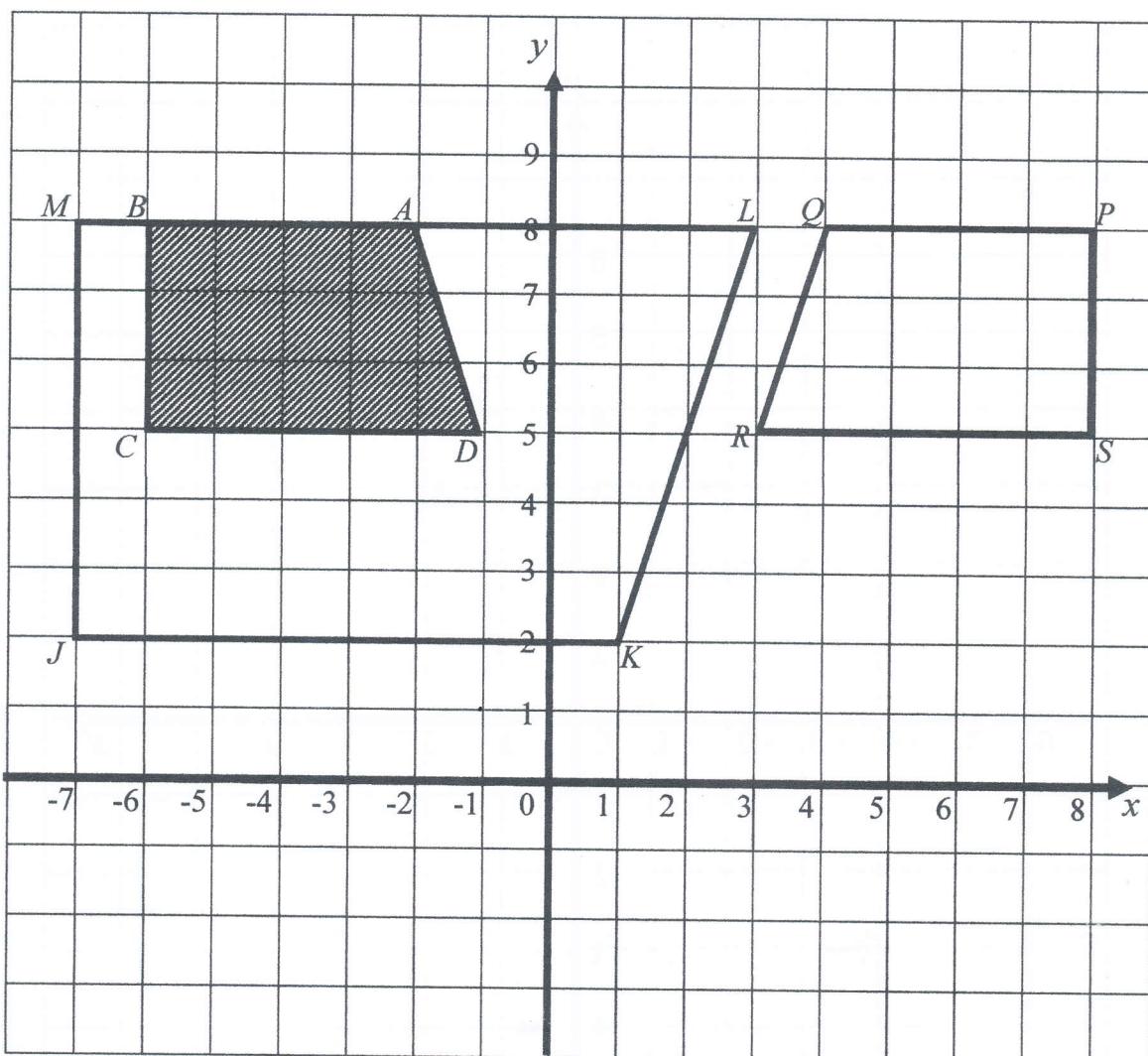


Diagram 10
Rajah 10

- (i) $PQRS$ is the image of $ABCD$ under transformation V and $JKLM$ is the image of $PQRS$ under transformation W .

PQRS ialah imej bagi ABCD di bawah penjelmaan V dan JKLM ialah imej bagi PQRS di bawah penjelmaan W.

Describe in full,
Huraikan selengkapnya,

- (a) the transformation V ,
penjelmaan V,

- (b) the transformation W .
penjelmaan W.

- (ii) It is given that $JKLADCBM$ is 78 unit².
Calculate the area, in unit², of the shaded region.

*Diberi bahawa JKLADCBM ialah 78 unit².
Hitung luas, dalam unit², bagi kawasan yang berlorek.*

[8 marks]
[8 markah]

- 14 $J(15^{\circ}\text{S}, 99^{\circ}\text{W})$, $K(y^{\circ}\text{N}, 99^{\circ}\text{W})$, L and M are four points which lie on the surface of the earth. KM is the diameter of the common parallel of latitude.

$J(15^{\circ}\text{S}, 99^{\circ}\text{B})$, $K(y^{\circ}\text{U}, 99^{\circ}\text{B})$, L dan M adalah empat titik yang terletak pada permukaan bumi. KM ialah diameter selarian latitude sepunya.

- (a) Find the longitude of M .

Cari longitud bagi M .

[2 marks]
[2 markah]

- (b) K lies 4800 nautical miles due north of J measured along the surface of the earth. Calculate the latitude of K .

*K terletak 4800 batu nautika ke arah utara J diukur sepanjang permukaan bumi.
Hitung latitud K .*

[3 marks]
[3 markah]

- (c) Calculate the shortest distance, in nautical miles, from K to M measured along the surface of the earth.

Hitung jarak terpendek, dalam batu nautika, dari K ke M diukur sepanjang permukaan bumi.

[2 marks]
[2 markah]

- (d) An aeroplane took off from L and flew due west to K along the common parallel of latitude. Then it flew due south to J along the same meridian. The total time taken for the whole flight was 20 hours 30 minutes.

Sebuah kapal terbang berlepas dari L dan terbang arah barat ke K di sepanjang selarian latitud sepunya. Kemudian terbang arah selatan ke J di sepanjang meridian yang sama. Jumlah masa yang diambil bagi keseluruhan penerbangan itu ialah 20 jam 30 minit.

- (i) Calculate the distance, in nautical miles, from L to K , if $KL = \frac{2}{3} KM$ measured along common parallel of latitude.

Hitung jarak dalam batu nautika, dari L ke K , jika $KL = \frac{2}{3} KM$ diukur sepanjang selarian latitud sepunya.

- (ii) Calculate the average speed, in knots, of the whole journey.

Hitung laju purata, dalam knot, bagi keseluruhan penerbangan itu.

[5 marks]
[5 markah]

15

You are not allowed to use graph paper to answer this question.

Anda tidak dibenarkan menggunakan kertas graf untuk menjawab soalan ini.

- (a) Diagram 11 shows a composite solid formed by a cuboid and a right prism joined at vertical plane IBE . Right-angled triangle KCD is the uniform cross section of the prism. The composite solid lies on a horizontal ground. $DEIK$ is an inclined plane. The edges AH , FG , EJ , BI and CK are vertical.

Rajah 11 menunjukkan sebuah gabungan pepejal yang terbentuk daripada kuboid dan prisma tegak yang bercantum pada satah mencancang IBE . Segitiga bersudut tegak KCD ialah keratan rentas seragam prisma itu. Pepejal gabungan itu terletak diatas satah mengufuk. $DEIK$ ialah satah condong. Tepi AH , FG , EJ , BI dan CK adalah tegak.

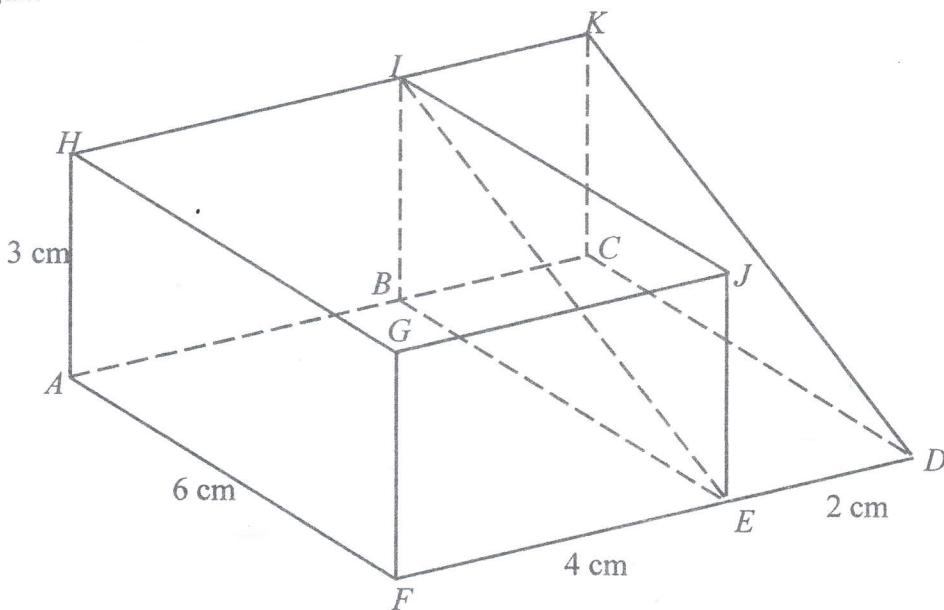


Diagram 11
Rajah 11

Draw, to full scale, the plan of the composite solid.

Lukis, dengan skala penuh, pelan pepejal gabungan itu.

[3 marks]
[3 markah]

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- (b) Another solid right prism is joined to the solid in Diagram 11 at the horizontal plane $HGJI$ as shown in Diagram 12. The composite solid lies on a horizontal plane.

Sebuah pepejal lain berbentuk prisma tegak telah ditambah pada Rajah 11 pada satah $HGJI$ seperti ditunjukkan dalam Rajah 12. Gabungan pepejal itu terletak di atas sebuah satah mengufuk.

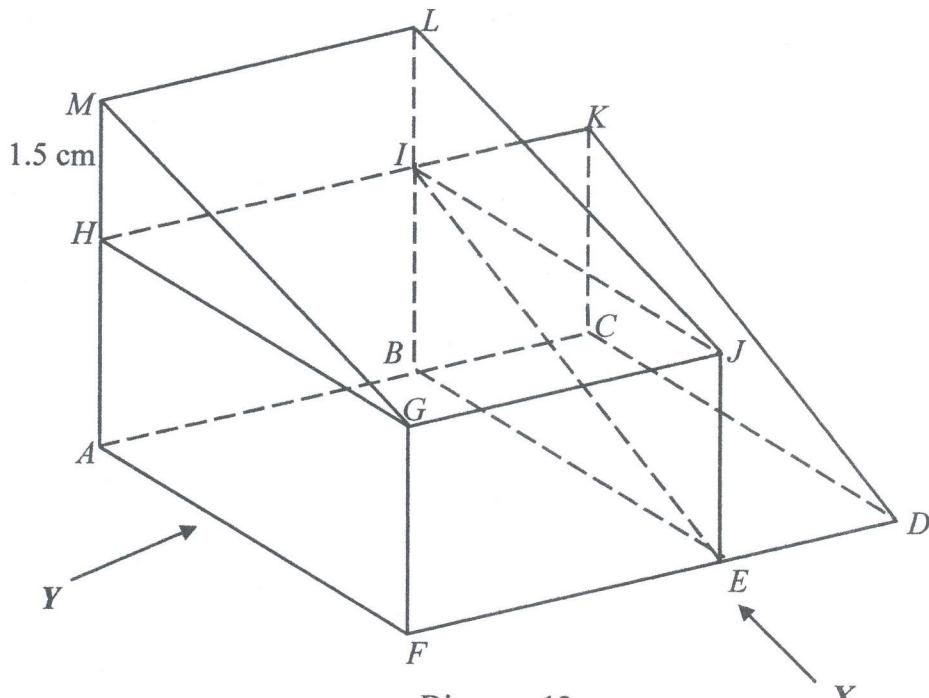


Diagram 12
Rajah 12

Draw to full scale,

Lukis dengan skala penuh,

- (i) the elevation of the composite solid on a vertical plane parallel to DEF as viewed from X .

dongakan pepejal gabungan itu yang selari dengan DEF sebagaimana dilihat dari X .

[4 marks]

[4 markah]

- (ii) the elevation of the composite solid on a vertical plane parallel to AF as viewed from Y .

dongakan pepejal gabungan itu yang selari dengan AF sebagaimana dilihat dari Y .

[5 marks]

[5 markah]

- 16 The data in Diagram 13 shows the mark scored by a group of students in an examination.

Data dalam Rajah 13 menunjukkan markah yang diperoleh sekumpulan pelajar dalam suatu peperiksaan.

76	81	86	90	84	77	27	41	37	46
51	56	33	48	49	53	58	65	44	57
61	64	57	60	50	60	39	59	55	69
62	56	63	62	67	74	66	68	70	71
78	95	80	75	75	84	88	93	50	71

Diagram 13
Rajah 13

- (a) From the Diagram 13 complete Table 2 in the answer space. [4 marks]

Daripada Rajah 13 lengkapkan Jadual 2 di ruang jawapan. [4 markah]

- (b) Calculate the estimated mean of marks of a student in the examination. [3 marks]

Hitungkan min anggaran bagi markah yang diperolehi pelajar dalam peperiksaan tersebut. [3 markah]

- (c) For this part of the question, use the graph paper provided on page 47. By using the scale 2 cm to 10 marks on horizontal axis and 2 cm to 2 students on the vertical axis, draw a histogram for the marks. [4 marks]

Untuk ceraian soalan ini, gunakan kertas graf yang disediakan pada halaman 47. Dengan menggunakan skala 2 cm kepada 10 markah pada paksi mengufuk dan 2 cm kepada 2 pelajar pada paksi mencancang, lukiskan sebuah histogram bagi data di atas.

[4 markah]

- (d) From the histogram, state the number of students who score less than 65 marks.

Daripada histogram, nyatakan bilangan pelajar yang markahnya kurang dari 65 markah.

[1 mark]
[1 markah]

Answer / Jawapan:

(a)

Score <i>Markah</i>	Frequency <i>Kekerapan</i>	Midpoint <i>Titik tengah</i>
56 – 65		

Table 2
Rajah 2

(b)

(c) Refer to the graph on page 47.

Rujuk graf di halaman 47.

(d)

[Lihat halaman sebelah
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INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of two sections: **Section A** and **Section B**.

Kertas peperiksaan ini mengandungi dua bahagian: Bahagian A dan Bahagian B.

2. Answer **all** questions in **Section A** and any **four** questions from **Section B**.

Jawab semua soalan dalam Bahagian A dan mana-mana empat soalan daripada Bahagian B.

3. Write your answers in the spaces provided in the question paper.

Tulis jawapan anda pada ruang yang disediakan dalam kertas peperiksaan ini.

4. Show your working. It may help you to get marks.

Tunjukkan kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.

5. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.

Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baharu.

6. The diagrams in the questions provided are not drawn to scale unless stated.

Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.

7. The marks allocated for each question and sub-part of a question are shown in brackets.

Markah yang diperuntukkan bagi setiap soalan dan ceraian soalan ditunjukkan dalam kurungan.

8. A list of formulae is provided on pages 2 to 4.

Satu senarai rumus disediakan di halaman 2 hingga 4.

9. You may use a scientific calculator.

Anda dibenarkan menggunakan kalkulator saintifik.

10. Hand in this question paper to the invigilator at the end of the examination.

Serahkan kertas peperiksaan ini kepada pengawas peperiksaan pada akhir peperiksaan.

Question	Section A	Marks	
		Sub Mark	Mark
1	$y \leq a$ $x > -b$ $\frac{y}{a} - \frac{x}{b} \geq 1$ or $y \geq \frac{a}{b}x + a$ <u>or</u> equivalent	P1 P1 P1	3
2	$2x:y = 3:1$ $\frac{2x}{y} = \frac{3}{1}$ $2x = 3y$ $2x - 3y = 0$ or $8x + 2y = 350$ <u>or</u> equivalent $\begin{bmatrix} 2 & -3 \\ 8 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 0 \\ 350 \end{bmatrix}$ $\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{(2)(2) - (-3)(8)} \begin{bmatrix} 2 & 3 \\ -8 & 2 \end{bmatrix} \begin{bmatrix} 0 \\ 350 \end{bmatrix}$ Note: 1. * $\begin{bmatrix} inverse \\ matrix \end{bmatrix} \begin{bmatrix} 0 \\ 350 \end{bmatrix}$, award K1 2. Do not accept $* \begin{bmatrix} inverse \\ matrix \end{bmatrix} = \begin{bmatrix} 2 & -3 \\ 8 & 2 \end{bmatrix}$ or $* \begin{bmatrix} inverse \\ matrix \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ The price of a shirt is RM37.50 The price of a tracksuit is RM25.00	P1 P1 K1	5

Note:

1. Award N1 if the answer is left as $\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 37.5 \\ 25 \end{bmatrix}$
2. Accept answer without RM
3. Do not accept any solution solved not using matrix method.

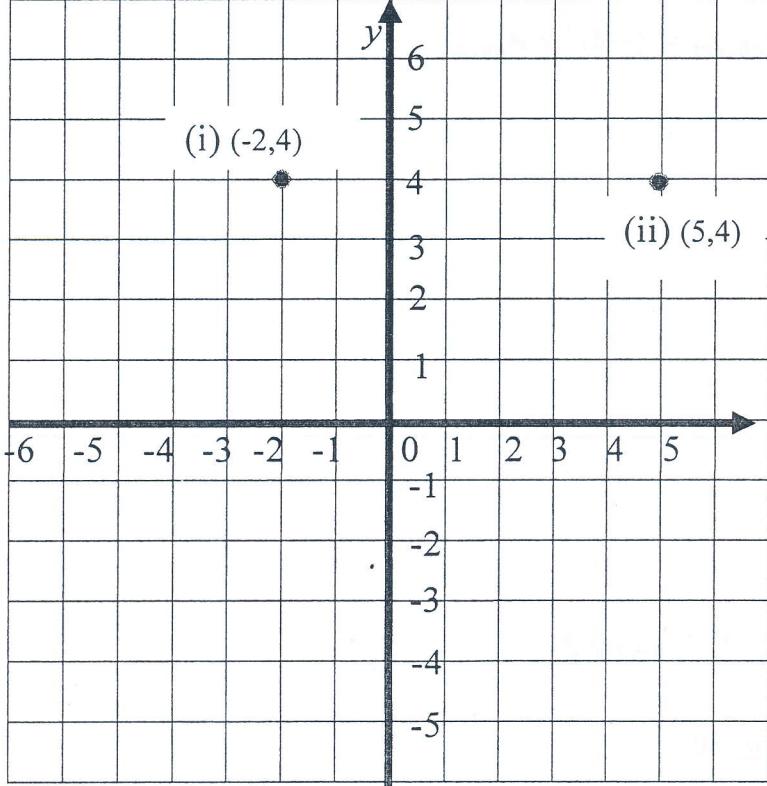
3	(a) $\frac{0-45}{60-45}$ -3		K1 N1	
	(b) $\frac{1}{2}(v+45)(20)$ or $\frac{1}{2}(25+40)(45)$ or equivalent $2022.5 = \frac{1}{2}(v+45)(20) + \frac{1}{2}(25+40)(45)$ or equivalent		K1 K1	5
	11		N1	
4	(a) $\frac{2}{12}$ or equivalent		P1	
	(b) $\frac{4}{12} \times \frac{1}{12}$ $\frac{4}{144}$		K1 N1	6
	(c) $\frac{1}{12}$ or $\left(\frac{1}{12} \times \frac{1}{12}\right)$ or $\left(\frac{4}{12} \times \frac{1}{12}\right)$ or $\left(\frac{2}{12} \times \frac{1}{12}\right)$ $\frac{1}{12} + \left(\frac{1}{12} \times \frac{1}{12}\right) + \left(\frac{1}{12} \times \frac{1}{12}\right) + \left(\frac{2}{12} \times \frac{1}{12}\right) +$ $\left(\frac{4}{12} \times \frac{1}{12}\right) + \left(\frac{1}{12} \times \frac{1}{12}\right) + \left(\frac{1}{12} \times \frac{1}{12}\right) + \left(\frac{1}{12} \times \frac{1}{12}\right)$ $\frac{23}{144}$		K1 K1 N1	

5	$3 \times \frac{1}{2}(p+4)(2p-2)$ or $\frac{1}{2}(20+p)(p+2)$ or $\frac{1}{2}(p+4)(2p-2)$ $5p^2 - 4p - 64 = 0$ $(5p+16)(p-4) = 0$ 4	K1 K1 K1 N1	4
6	(a) False (b) If the volume of a cube is 64 cm^3 , then the length of a side is 4 cm. Note: Accept 1. If its volume is 64 cm^3 then the length of a side of a cube is 4cm 2. If the volume of a cube is 64 cm^3 then the length of its side is 4cm True	P1 K1 N1	5
7	(c) 12π Note: Accept $(6 \times 2)\pi$ award K1	K2	
7	a) 10 b) $m = -\frac{3}{5}$ seen $0 = -\frac{3}{5}(10) + c$ or equivalent $c = 6$ $y = -\frac{3}{5}x + 6$ or equivalent	P1 P1 K1 K1 N1	5

8	<p>(a) $\angle HJG$ or $\angle GJH$</p> <p>(b) $JG = \sqrt{18^2 + 9^2}$ <u>or</u> equivalent $\tan \theta = \frac{24}{\sqrt{405}}$ 50.02° or $50^\circ 1'$</p>	P1 K1 K1 N1	4
9	<p>(a) $(\sqrt{6^2 - 3^2})$ or $9^2 + x^2 = (2x)^2$ <u>or</u> $\sin 60^\circ = \frac{9}{PQ}$ <u>or</u> equivalent $(\sqrt{6^2 - 3^2}) \times 6$ <u>or</u> equivalent $31.18 m$</p> <p>(b) $\left(\frac{22}{7}\right)(18)^2$ or $\left(\frac{22}{7}\right)(6)^2$ $\left(\frac{22}{7}\right)(18)^2 - \left(\frac{22}{7}\right)(6)^2$ <u>or</u> equivalent $905.14 m^2$</p>	K1 K1 N1 K1 K1 N1	6
10	<p>Substitution Method $y = 3x - 4$ or $x = \frac{8+2y}{6}$</p> <p>$4x + 2 = 2(3x - 4) + 4$ or $4\left(\frac{4+y}{3}\right) - 2y = 2$</p> <p>OR</p> <p>Elimination method $4x - 2y = 2$ K1</p> <p>$2x = 6$ K1</p> <p>$x = 3$ N1</p> <p>$y = 5$ N1</p>	K1 K1 4	

11	(a) $\frac{22}{7} \times 15 \times 15 \times 60$ 42428.57	K1 N1	
	(b) $\begin{array}{r} *42428.57 \\ \hline 2 \\ 21214.285 \\ \hline 130 \\ 163 \end{array}$	K1 K1 N1	5

Question	Section B	Marks							
		Sub Mark	Mark						
12									
	(a)	<table border="1" style="margin-left: auto; margin-right: auto;"><tr><td>x</td><td>-0.2</td><td>4</td></tr><tr><td>y</td><td>1.16</td><td>2</td></tr></table>	x	-0.2	4	y	1.16	2	K1 K1
x	-0.2	4							
y	1.16	2							
	(b) <u>Graph</u> Axes are drawn in the correct directions with uniform scales for $-1 \leq x \leq 5$ and $-3 \leq y \leq 6$.		P1						
	All 6 points and *2 points are correctly plotted or the curve passes through all the points for $-1 \leq x \leq 5$ and $-3 \leq y \leq 6$		K2						
	Note :6 or 7 points correctly plotted for $-1 \leq x \leq 5$, award K1		4						
	Smooth and continuous curve without any straight line passing through all 8 correct points given		N1						
	(c) (i) $5.59 \leq y \leq 5.69$	P1	2						
	(ii) $3.36 \leq x \leq 3.46$	P1							
	(d) A straight line $y = x - 1$ is correctly drawn .								

	(Check any two points are plotted or straight lines passes any two correct points and accurate to $\pm \frac{1}{2}$ square grid vertically).	K2	
	Note : Identify equation $y = x - 1$ award K1	N1	4
	$0.74 \leq x \leq 0.84$	N1	
	$3.74 \leq x \leq 3.84$		
	<u>Note :</u> 1. Allow P mark on N mark if value of x and of y are shown on the graph . 2. Values of x and of y are obtained by calculation award P0 or N0. 3. Values of x and of y are obtained from the wrong graph , award P0 or N0.		12
13	(a) 		
	(i) Marked on the diagram	P2	
	Note: (2,2) is marked on the diagram or (-2,4) is seen, award P1		
	(ii) Marked on the diagram	P2	4
	Note: (2,-5) is marked on the diagram or (5,4) is seen , award P1		
	(b)		
	(i)(a) Reflection on the line $x = 1$	P2	

	Note: Reflection, award P1		2
	(i)(b) Enlargement at centre (3,6) with scale factor -2 Note: Enlargement at centre (3,6) or Enlargement with scale factor -2, award P2 Enlargement, award P1	P3	3
	(bii) $78 + A_{object} = (-2)^2 \times A_{object}$ $\frac{78}{3}$ 26	K1 K1 N1	3 3 12
14	(a) $81^\circ E$ Note: 81° or $\theta^\circ E$, award P1	P2	2
	(b) $\frac{4800}{60}$ or 80 80-15 65°N	K1 K1 N1	3 3 2
	(c) $(180 - 65 - 65) \times 60$ or equivalent 3000	K1 N1	2
	(d)(i) $180 \times 60 \times \cos *65$ or 4564.28 $\frac{2}{3}(4564.28)$	K1 K1	3

3042.85

N1

$$(ii) \quad \frac{4800 + *3042.85}{20.5}$$

Average speed = 382.58 knot

K1

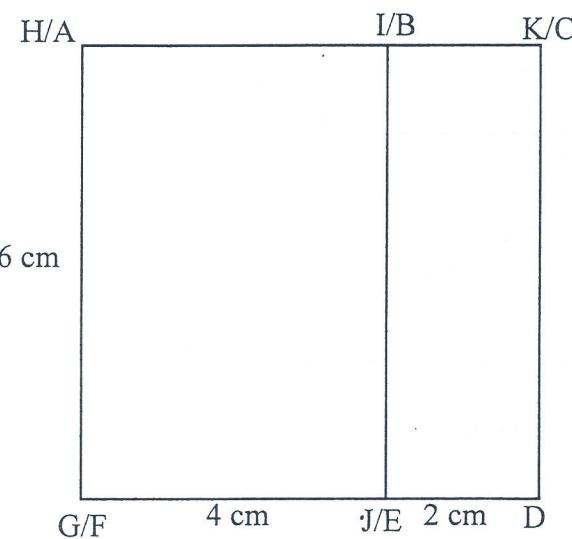
N1

2

12

15

(a)



Correct shape with rectangle GHIJ and JDKI
All solid lines.

K1

$$GH = IJ = KD > HI = GJ > IK = ED$$

K1

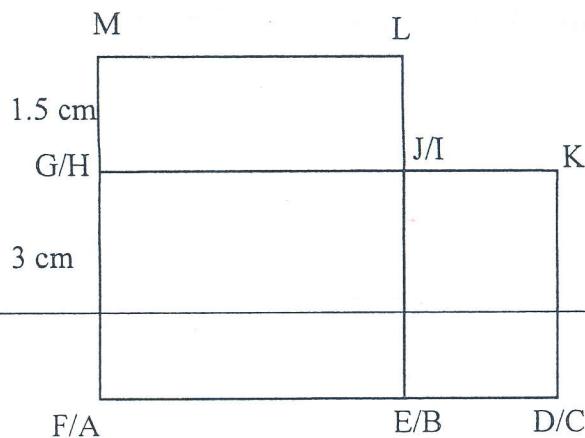
3

Measurement correct to ± 0.2 cm (one way) and all angle at vertices $= 90^\circ \pm 1^\circ$.

N1

(b)

(i)



9

4 cm 2 cm

Correct shape with rectangle LMGJ, GJEF and JKDE

All solid lines.

$$ML = GJ = FE > IK = ED$$

Measurement correct to ± 0.2 cm (one way) and all angle at vertices $= 90^\circ \pm 1^\circ$.

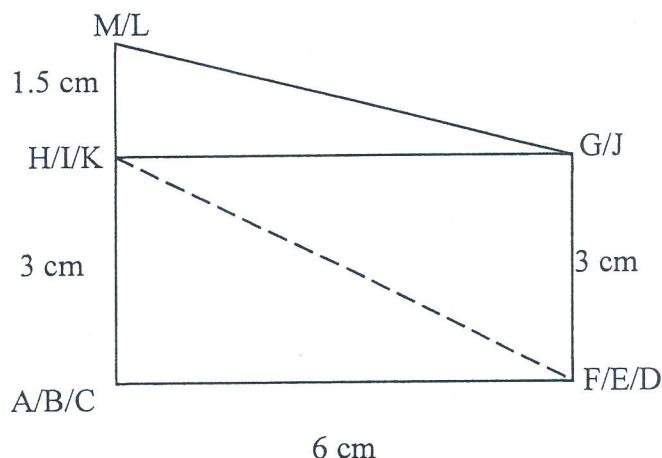
K1

4

K1

N2

(ii)



Correct shape with rectangle AFGH and right angled triangle GHM.

All solid lines. (Ignore dotted line HF)

K1

5

H – F is joined by dashed line to form right angled-triangle AHF

K1

$$AF = HG > AH = FG > HM$$

K1

Measurement correct to ± 0.2 cm (one way) and all angle at vertices $= 90^\circ \pm 1^\circ$.

N2

12

16

(a)

<u>Score</u> <u>Markah</u>	<u>Frequency</u> <u>Kekerapan</u>	<u>Midpoint</u> <u>Midpoint</u>
26 - 35	2	30.5
36 - 45	4	40.5
46 - 55	8	50.5
56 - 65	14	60.5
66 - 75	10	70.5
76 - 85	7	80.5
86 - 95	5	90.5

Score : P1

Midpoint : P1

Frequency : P2

4

Note :

Allow two mistakes in frequency for P1

$$(b) \frac{2 \times 30.5 + 5 \times 40.5 + 19 \times 60.5 + 33 \times 70.5 + 22 \times 80.5 + 7 \times 90.5}{100}$$

K2

Note :

1. Allow two mistakes in *frequency and/ or midpoint for K1.

2. Allow two mistakes for the multiplication of *frequency and midpoint for K1.

N1

3

$$67.50 \quad \text{or} \quad 67\frac{1}{2} \quad \text{or} \quad \frac{135}{2}$$

Note :

Correct answer from incomplete working. Award Kk2

$$\text{e.g. } \frac{6750}{100} = 67.5$$

(c)

Histogram.

Axes are drawn in the correct direction, uniform scale for

$$25.5 \leq x \leq 95.5 \quad \text{and} \quad 0 \leq y \leq *14$$

P1

K2

4

*7 bars correctly drawn using correct values of class boundaries/class interval /midpoint.

Note :

*5 or *6 bars correctly drawn , award **K1**

N1

Correct histogram using the given scale

(d)

28

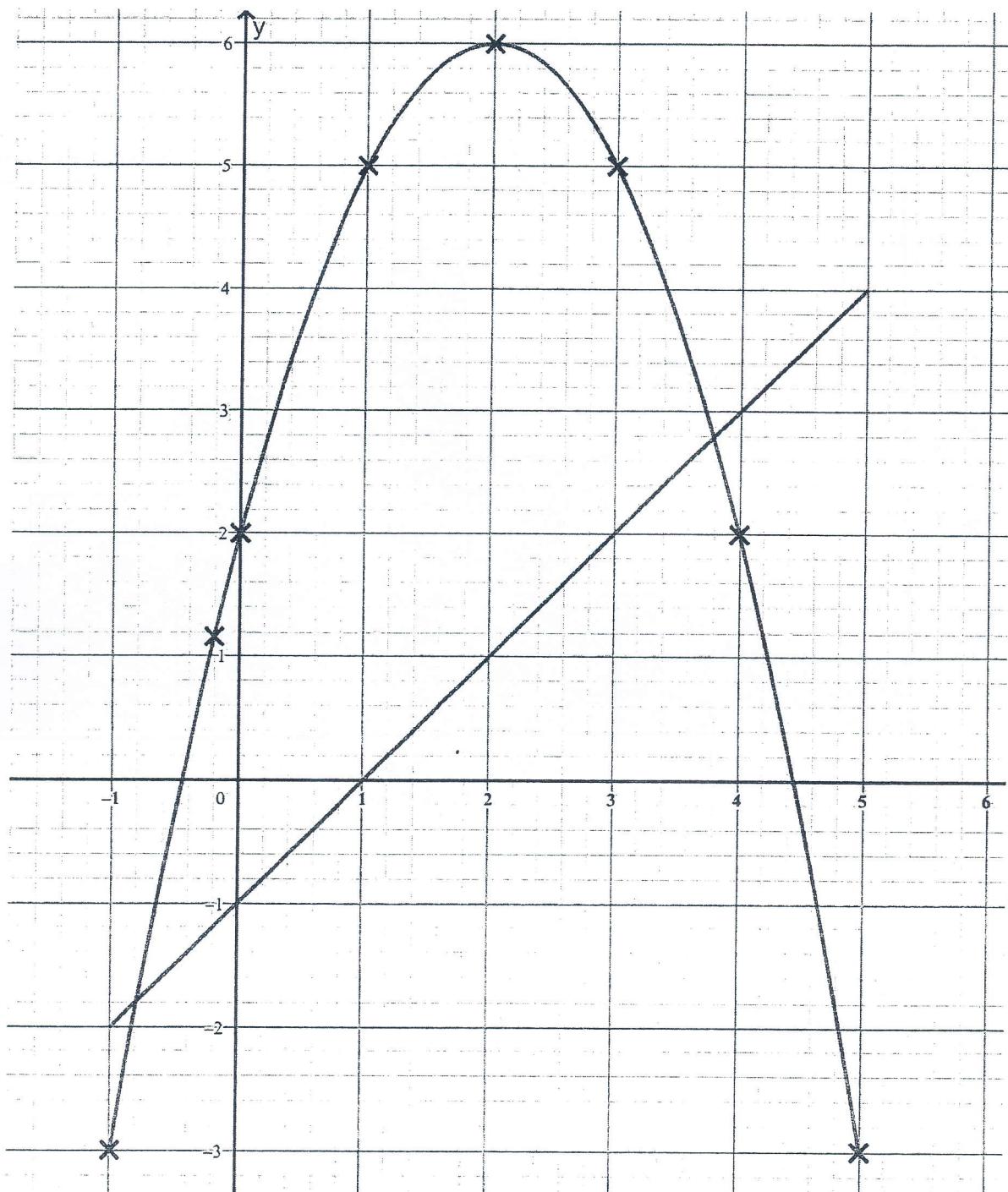
P1

Note : Do not accept answer without a histogram.

1

—
12
—

Graph for question 12
Graf untuk soalan 12



Graph for question 16
Graf untuk soalan 16

