SULIT **1449/2**
Matematik
Kertas 2
2015
$2\frac{1}{2}$ jam

NAMA :

TINGKATAN :

JABATAN PENDIDIKAN NEGERI PERAK

MOCK TEST 2
SIJIL PELAJARAN MALAYSIA

MATEMATIK
TINGKATAN LIMA
Kertas 2
Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini mengandungi dua bahagian :* **Bahagian A** *dan* **Bahagian B**. *Jawab* **semua** *soalan daripada* **Bahagian A** *dan* **empat** *soalan dalam* **Bahagian B**.

2. *Jawapan hendaklah ditulis dengan jelas dalam ruang yang disediakan dalam kertas soalan. Tunjukkan langkah-langkah penting. Ini boleh membantu anda untuk mendapatkan markah.*

3. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*

4. *Satu senarai rumus disediakan di halaman 2 & 3.*

5. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*

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

Kertas soalan ini mengandungi 32 halaman bercetak.

  [Lihat halaman sebelah

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

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

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

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

5 Distance / *Jarak*

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

6 Midpoint / *Titik tengah*

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

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

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

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

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

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

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

10 Pythagoras Theorem
Teorem Pithagoras
$c^2 = a^2 + b^2$

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

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

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

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

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

  [Lihat halaman sebelah

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 $= \pi r^2$
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
Isipadu prisma tegak = luas keratan rentas $\times$ *panjang*

7 Volume of cylinder $= \pi r^2 h$
Isipadu silinder $= \pi j^2 t$

8 Volume of cone $= \frac{1}{3}\pi r^2 h$
Isipadu kon $= \frac{1}{3}\pi j^2 t$

9 Volume of sphere $= \frac{4}{3}\pi r^3$
Isipadu sfera $= \frac{4}{3}\pi j^3$

10 Volume of right pyramid $= \frac{1}{3} \times$ base area $\times$ height

Isipadu piramid tegak $= \frac{1}{3} \times$ *luas tapak* $\times$ *tinggi*

11 Sum of interior angles of a polygon
Hasil tambah sudut pedalaman poligon
$= (n-2) \times 180°$

  [Lihat halaman sebelah

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

$\dfrac{\textit{panjang lengkuk}}{\textit{lilitan bulatan}} = \dfrac{\textit{sudut pusat}}{360^\circ}$

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

$\dfrac{\textit{luas sektor}}{\textit{luas bulatan}} = \dfrac{\textit{sudut pusat}}{360^\circ}$

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

Faktor skala, $k = \dfrac{PA'}{PA}$

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

  [Lihat halaman sebelah

Section A
Bahagian A

[52 marks]
[52 markah]

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

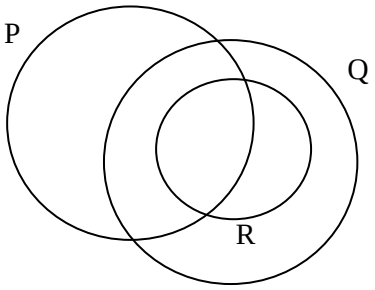
1. The Venn Diagram shows set P, set Q and set R. Given the universal set $\xi = P \cup Q \cup R$.
In Diagram, shade the region that represents the set
Gambar rajah Venn di bawah menunjukkan set P, set Q dan set R. Diberi set semesta $\xi = P \cup Q \cup R$.
Pada Rajah, lorek rantau yang mewakili set
(a) $Q \cap R$,

(b) $P' \cap (Q \cup R)$.

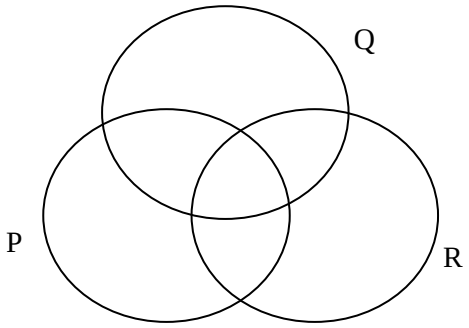
[3 marks / *markah*]

Answer /*Jawapan*:

(a)



(b)



  [Lihat halaman sebelah

2. The total price of a shirt and a belt is RM55. Mr Lee buys 3 shirts and 2 belts with a total price of RM145. Calculate the price of a shirt and a belt.
Jumlah harga bagi sehelai baju dan seutas tali pinggang ialah RM55. Encik Lee membeli 3 helai baju dan 2 utas tali pinggang dengan jumlah harga RM145. Hitung harga bagi sehelai baju dan seutas tali pinggang.

[4 marks / *markah*]

Answer /*Jawapan*:

3. The diagram 3 shows a right cylinder with a diameter of $(x + 3)$ cm.
Rajah 3 di bawah menunjukkan sebuah silinder tegak dengan diameter $(x + 3)$ cm.

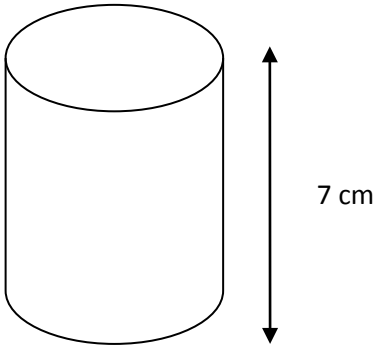


Diagram 3
Rajah 3

Given the volume of the cylinder is 88 cm^3. Form a quadratic equation in general form. Hence, calculate the diameter of the cylinder.

Diberi isi padu silinder itu ialah 88 cm^3. Bentuk satu persamaan kuadratik dalam bentuk am. Seterusnya, hitung diameter silinder itu.

Use $\pi = \frac{22}{7}$.

Gunakan $\pi = \frac{22}{7}$.

[4 marks / *markah*]

Answer /*Jawapan*:

  [Lihat halaman sebelah

4. Diagram 4 in the answer space shows a right prism with horizontal base PQRS. V is the midpoint of PS.

Rajah 4 di dalam ruangan jawapan menunjukkan sebuah prisma tegak dengan tapak segi empat tepat PQRS adalah mengufuk. V ialah titik tengah PS.

(a) On the Diagram 4, mark the angle between line UV and the plane RSTU.
Pada Rajah 4, tandakan sudut di antara garis UV dan satah RSTU.

(b) Hence, calculate the angle between line UV and the plane RSTU
Seterusnya, hitung sudut di antara garis UV dengan satah RSTU.

[3 marks / *markah*]

Answer /*Jawapan*:

(a)

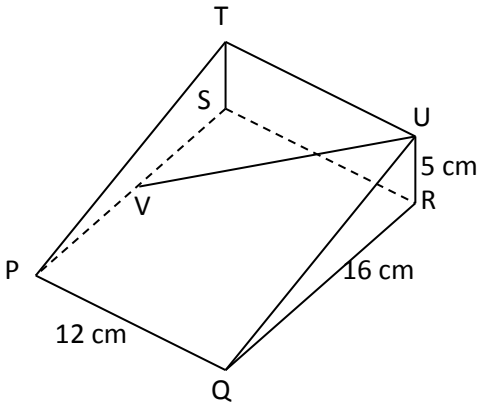
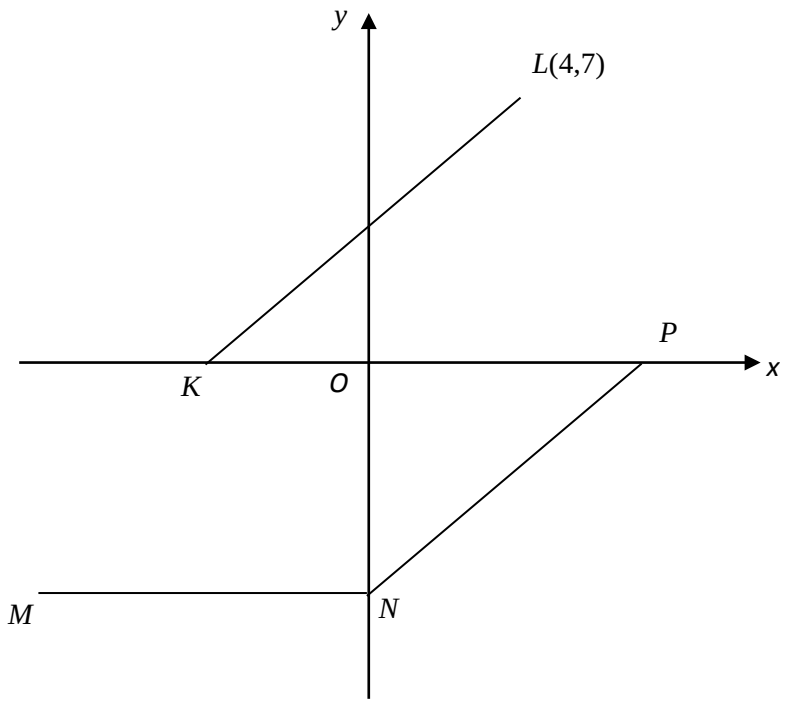


Diagram 4
Rajah 4

(b)

5. In Diagram 5, *O* is the origin, point *K* and point *P* lie on the *x*-axis and point *N* lies on the *y*-axis. Straight line *KL* is parallel to straight line *NP* and straight line *MN* is parallel to the *x*-axis. The equation of straight line *NP* is $x-2y-18=0$

Dalam Rajah 5, O ialah asalan, titik K dan titik P terletak pada paksi-x dan titik N terletak pada paksi-y. Garis lurus KL adalah selari dengan garis lurus NP dan garis lurus MN adalah selari dengan paksi-x. Persamaan garis lurus NP ialah $x-2y-18=0$



(a) State the equation of the straight line *MN*.
Nyatakan persamaan garis lurus MN.

(b) Find the equation of the straight *KL* and hence, state the coordinate of the point *K*.
Cari persamaan garis lurus KL dan seterusnya, nyatakan koordinat titik K.

[5 marks / *markah*]

  [Lihat halaman sebelah

Answer /*Jawapan*:

(a)

(b)

6. Diagram 6 shows the speed-time graph of the movements of two particles, *K* and *L*, for a period of 15 seconds.
Rajah 6 menunjukkan graf laju-masa bagi pergerakan dua zarah, K dan L, dalam tempoh masa 15 *saat*.

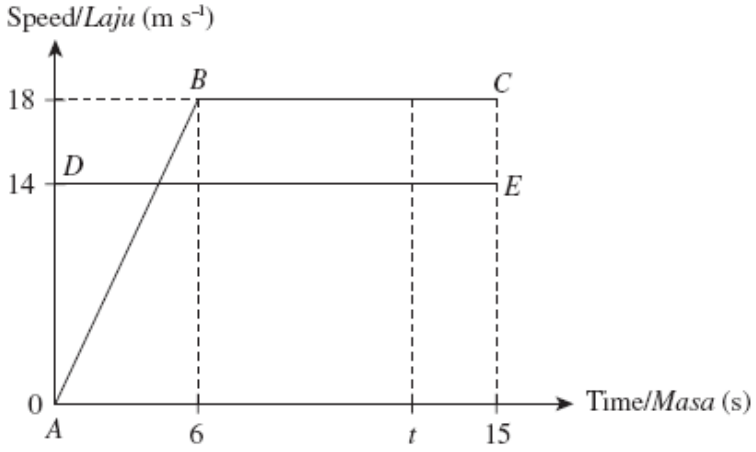


Diagram 6 / *Rajah 6*

ABC is the speed-time graph of particle *K* and *DE* is the speed-time graph of particle *L*.
ABC ialah graf laju-masa bagi zarah K dan DE ialah graf laju-masa bagi zarah L.

(a) Calculate the distance, in m, travelled by particle *K* in the first 6 seconds.
Hitung jarak, dalam m, *yang dilalui oleh zarah K dalam tempoh masa* 6 *saat yang pertama*.

(b) Calculate the average speed, in m s^{-1}, of particle *K* for the period of 15 seconds.
Hitung purata laju, dalam m s^{-1}, *zarah K dalam tempoh masa* 15 *saat*.

(c) At *t* seconds, the distances travelled by particles *K* and *L* are equal.
Calculate the value of *t*.
Pada t saat, jarak yang dilalui oleh zarah K dan L adalah sama.
Hitung nilai t.

[6 marks / *markah*]

  [Lihat halaman sebelah

Answer /*Jawapan*:
(a)

(b)

(c)

  [Lihat halaman sebelah

7. (a) State whether the following statement is true or false.
Nyatakan sama ada pernyataan berikut adalah benar atau palsu.

(i) $x(x - 2) = 0$ is a linear equation.
$x(x - 2) = 0$ ialah satu persamaan linear.

(ii) All squares have 4 lines of symmetry.
Semua segiempat sama mempunyai 4 garis simetri.

(b) Write down two implications based on the following statement:
Tulis dua implikasi berdasarkan pernyataan berikut:

sin $\theta = 0.5$ if and only if $\theta = 30°$.
sin $\theta = 0.5$ jika dan hanya jika $\theta = 30°$.

(c) It is given that the exterior angle of a regular polygon of n sides is $\frac{360°}{n}$

Make one conclusion by deduction on the size of the exterior angle of a regular octagon.

Diberi bahawa sudut peluaran sebuah poligon sekata dengan n sisi ialah $\frac{360°}{n}$.

Buat satu kesimpulan secara deduksi tentang saiz sudut peluaran bagi sebuah oktagon sekata.

[5 marks / *markah*]

Answer /*Jawapan*:

(a) (i) …….

(ii) …….

(b) Implication 1 / *Implikasi 1*: ……

……

Implication 2 / *Implikasi 2*: ……

……

(c)

  [Lihat halaman sebelah

8. (a)

It is given that $\begin{pmatrix} -\frac{3}{2} & -\frac{5}{2} \\ -2 & n \end{pmatrix}$ is the inverse matrix of $\begin{pmatrix} 6 & -5 \\ -4 & 3 \end{pmatrix}$.

Find the value of *n*.

Diberi bahawa $\begin{pmatrix} -\frac{3}{2} & -\frac{5}{2} \\ -2 & n \end{pmatrix}$ *ialah matriks songsang bagi* $\begin{pmatrix} 6 & -5 \\ -4 & 3 \end{pmatrix}$.

Cari nilai n.

(b) Table 8 shows the number of seats sold and the total revenue generated in a concert.
Jadual 8 menunjukkan bilangan tempat duduk yang terjual dan jumlah pendapatan yang dijana di dalam sebuah konsert.

Cost / *Harga*	**Number of Seats / *Bilangan tempat duduk***	**Total revenue / *Jumlah pendapatan (RM)***
RM25	*x*	*25 x*
RM105	*y*	*105 y*
Total / *Jumlah*	78	4 830

Table 8 / Jadual 8

A total of 78 seats for a concert are sold, producing a total revenue of RM4 830. If seats cost either RM25 or RM105, using the matrix method, how many RM25 seats and how many RM105 seats were sold?
Sejumlah 78 tempat duduk telah terjual untuk sebuah konsert dan menghasilkan pendapatan sebanyak RM 4 830. Jika tempat duduk yang terjual berharga sama ada RM25 atau RM105, dengan menggunakan kaedah matriks, berapakah jumlah tempat duduk yang berharga RM25 dan RM105 yang telah terjual?

[6 marks / *markah*]

Answer /*Jawapan*:

(a)

(b)

  [Lihat halaman sebelah

9.

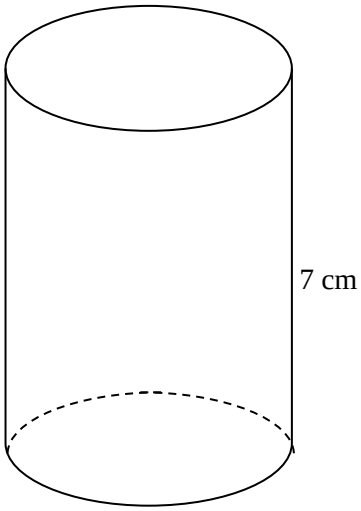


Diagram 9(i)/*Rajah 9 (i)*

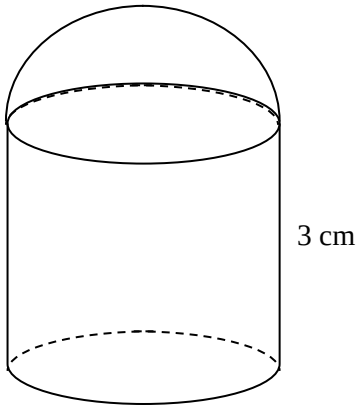


Diagram 9(ii) / *Rajah 9 (ii)*

Diagram 9 (i) shows a solid cylinder with radius 3 cm.
Diagram 9 (ii) shows a cylinder which is joined to a solid hemisphere with the radius for both is 3 cm.

By using $\pi = \frac{22}{7}$, calculate the difference in the volume of the two solids .

Rajah 9 (i) menunjukkan satu pepejal berbentuk silinder dengan jejari 3 cm.
Rajah 9 (ii) menunjukkan satu silinder yang dicantumkan dengan pepejal berbentuk hemisfera dengan ukuran jejari bagi kedua-duanya adalah 3 cm.

Dengan mengunakan $\pi = \frac{22}{7}$, *hitungkan beza isipadu kedua-dua pepejal itu.*

[4 marks / *markah*]

Answer /*Jawapan*:

  [Lihat halaman sebelah

10. Diagram 10 shows semi circle *PQR* with centre *O* and a sector of a circle sektor *TRS* with centre T such that T is the mid point of *OR*.
Rajah 10 menunjukkan semi bulatan PQR berpusat O dan sektor bulatan TRS berpusat T dengan keadaan T ialah titik tengah OR.

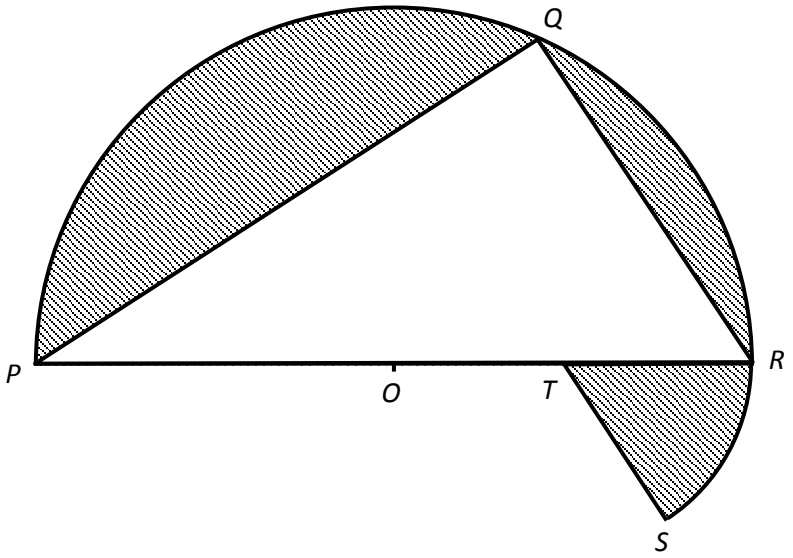


Diagram 10/*Rajah 10*

OP = 5 cm, *QR* = 6 cm and $\angle RTS = 60^o$.
OP = 5 cm, QR = 6 cm dan $\angle RTS = 60^o$.

By using $\pi = \frac{22}{7}$, calculate
Dengan menggunakan $\pi = \frac{22}{7}$, *hitungkan*

(a) the perimeter, in cm, for the whole diagram
perimeter, dalam cm, seluruh rajah itu,

(b) the area, in cm^2, the shaded region
luas, dalam cm^2, *kawasan yang berlorek itu.*

[6 marks / *markah*]

Answer /*Jawapan*:
(a)

(b)

  [Lihat halaman sebelah

11.

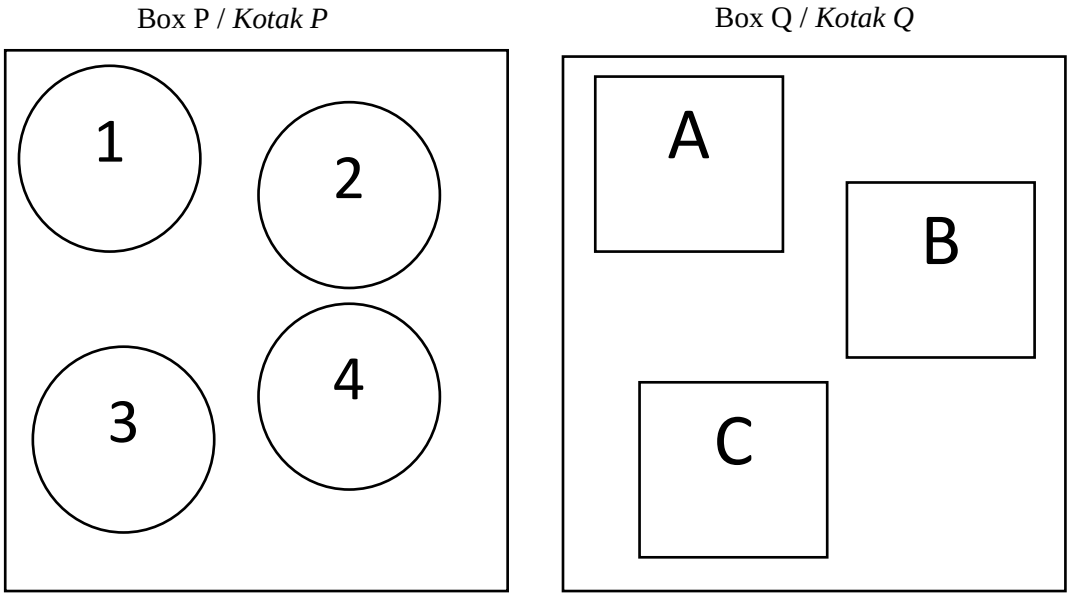


Diagram 11 / *Rajah 11*

Diagram 11 shows the numbered cards in box P and cards labelled A, B and C in box Q. A card is selected at random from box P and then box Q.
Rajah 11 menunjukkan kad-kad bernombor di dalam kotak P dan kad-kad berlabel A, B dan C di dalam kotak Q. Sekeping kad dipilih secara rawak dari kotak P dan kemudian kotak Q.

(a) Complete the possible outcomes in Table 11.
Lengkapkan kesudahan peristiwa yang mungkin di Jadual 11.

(b) By listing all the possible outcomes of the event, find the probability that
Dengan menyenaraikan semua kesudahan suatu peristiwa, cari kebarangkalian bahawa

(i) Card labelled B is selected.
Kad berlabel B dipilih.

(ii) A card with an odd number or the card labelled C is selected.
Kad bernombor ganjil atau kad berlabel C dipilih.

[6 marks / *markah*]

Answer /*Jawapan*:

(a)

		Outcome of Box Q *Kesudahan Kotak Q*		
		A	B	C
Outcome of Box P *Kesudahan Kotak P*	1	(1,A)		
	2			
	3			(3,C)
	4			(4,C)

Table 11 / *Jadual 11*

(b)

(i)

(ii)

  [Lihat halaman sebelah

Section B
Bahagian B
[48 marks]
[48 markah]

Answer any **four** questions from this section.
*Jawab mana-mana **empat** soalan daripada bahagian ini.*

12. (a) Complete Table 12 in the answer space for the equation $y = 3 - 8x + x^3$ by writing down the values of y when $x = -2$ and $x = 2$
Lengkapkan Jadual 12 *di ruang jawapan bagi persamaan* $y = 3 - 8x + x^3$ *dengan menulis nilai-nilai* y *apabila* $x = -2$ dan $x = 2$

[2 marks / *markah*]

(b) For this part of the question, use the graph paper provided.
You may use a flexible curve rule.
Untuk ceraian soalan ini, gunakan kertas graf yang disediakan. Anda boleh menggunakan pembaris fleksibel.

By using a scale of 2 cm to 1 unit on the x-axis and 2 cm to 5 units on the y-axis, draw the graph of $y = 3 - 8x + x^3$ for $-3.5 \le x \le 3.5$
Dengan menggunakan skala 2 cm *kepada* 1 *unit pada paksi-x dan* 2 cm *kepada* 5 unit *pada paksi-y, lukiskan graf* $y = 3 - 8x + x^3$ bagi $-3.5 \le x \le 3.5$

[4 marks / *markah*]

(c) From your graph, find

Daripada graf anda, carikan

(i) the value of y when $x = -0.6$
nilai y apabila $x = -0.6$

(ii) the value of x when $y = -8$
Nilai x apabila $y = -8$

[2 marks / *markah*]

(d) Draw a suitable straight line on your graph to find all values of x which satisfy the equation $x^3 = 13x - 8$ for $-3.5 \le x \le 3.5$
State these values of x.
Lukis satu garis lurus yang sesuai pada graf anda untuk mencari semua nilai x yang memuaskan persamaan $x^3 = 13x - 8$ bagi $-3.5 \le x \le 3.5$
Nyatakan nilai-nilai x itu.

[4 marks / *markah*]

  [Lihat halaman sebelah

Answer /*Jawapan*:

(a)

x	–3.5	–3	–2	–1.5	–1	1	2	3	3.5
y	–11.9	0		11.6	10	–4		6	17.9

Table 12 / *Jadual* 12

(b) Refer graph.

Rujuk graf.

(c) (i) x = ...

(ii) y = …….

(d) x = …….....……..., …….....……...,

…….....……..

  [Lihat halaman sebelah

13. (a) Transformation T is a translation $\begin{pmatrix}-1\\3\end{pmatrix}$ and transformation R is an anticlockwise rotation of 90° about the centre (–1, –2).
Penjelmaan T ialah translasi $\begin{pmatrix}-1\\3\end{pmatrix}$ *dan penjelmaan R ialah putaran 90° lawan arah jam pada pusat (–1, –2).*
State the coordinates of the image of point (3, 1) under each of the following transformations:
Nyatakan koordinat imej bagi titik (3, 1) di bawah setiap penjelmaan berikut:
(i) T^2
(ii) R^2

(b) Diagram shows three quadrilaterals, ABCD, EFGH and JKLM, drawn on a Cartesean plane.
Rajah menunjukkan tiga sisi empat, ABCD, EFGH dan JKLM, dilukis pada satah Cartes.

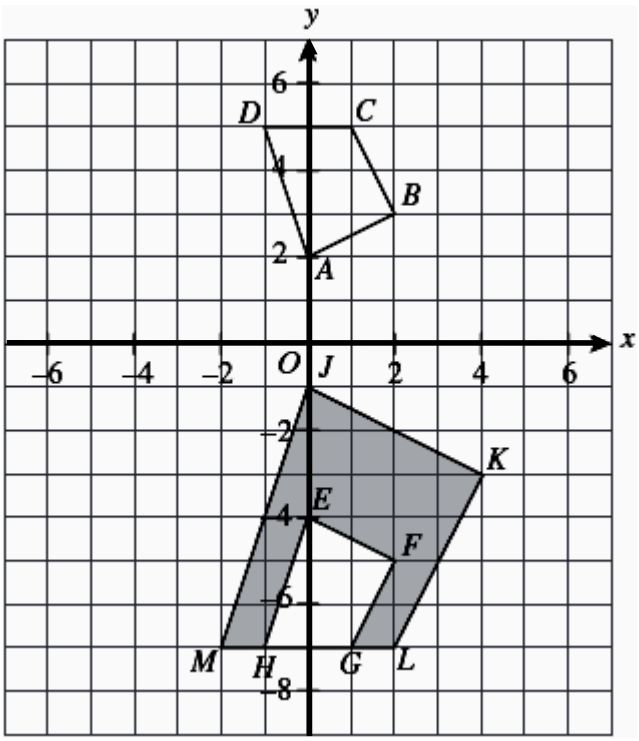


Diagram 13/*Rajah 13*

(i) *JKLM* is the image of *ABCD* under the combined transformations *QP*.
JKLM ialah imej bagi ABCD di bawah penjelmaan gabungan QP.

Describe in full, the transformation:
Huraikan selengkapnya penjelmaan:
(a) **P**
(b) **Q**

  [Lihat halaman sebelah

(ii) It is given that the shaded region represents a region of area 16.5 m^2.
Calculate the area, in m^2, of the region represented by the quadrilateral ABCD.
Diberi bahawa kawasan berlorek mewakili suatu kawasan yang mempunyai luas 16.5 m^2.
Hitung luas, dalam m^2, kawasan yang diwakili oleh sisi empat ABCD.

[12 marks / *markah*]

Answer /*Jawapan*:

(a) (i)

(ii)

b) (i)

(ii)

  [Lihat halaman sebelah

14. The data in Diagram 14 shows the marks of 30 students in a monthly test.
Data dalam Rajah 14 *menunjukkan markah bagi* 30 *orang pelajar dalam satu ujian.*

68	80	75	75	91	85	67	81	81	88
85	70	80	78	82	88	83	85	87	94
70	77	95	80	84	75	90	74	80	89

Diagram 14 / *Rajah* 14

(a) Based on the data in Diagram 14 and by using a class interval of 5, complete Table 14 provided in the answer space.
Berdasarkan data dalam Rajah 14 *dan dengan menggunakan saiz selang kelas* 5*, lengkapkan Jadual* 14 *pada ruang jawapan.*

[4 marks / *markah*]

(b) Based on Table in (a), calculate the estimated mean mark of a student.
Berdasarkan Jadual di (a), *hitungkan min anggaran markah bagi seorang pelajar.*

[3 marks / *markah*]

(c) By using a scale of 2 cm to 5 marks on the horizontal axis and 2 cm to 1 student on the vertical axis, draw a histogram for the data.

Dengan menggunakan skala 2 *cm kepada* 5 *markah pada paksi mengufuk dan* 2 *cm kepada* 1 *orang pelajar pada paksi mencancang, lukiskan satu histogram bagi data itu.*

[4 marks / *markah*]

(d) State one information obtained based on histogram in (c).
Berdasarkan histogram di (c), *nyatakan satu maklumat yang diperoleh.*

[1 mark / *markah*]

  [Lihat halaman sebelah

Answer /*Jawapan*:

(a)(i)

Class Interval ***Selang Kelas***	**Midpoint** ***Titik Tengah***	**Frequency** ***Kekerapan***
65– 69		

Table 14 / *Jadual* 14

(b)

(c) Refer graph/*Rujuk graf*

(d)

  [Lihat halaman sebelah

15.(a) You are **not** allowed to use graph paper to answer this question.
*Anda **tidak** dibenarkan menggunakan kertas graf untuk menjawab soalan ini.*

Diagram 15.1 shows a solid right prism with a rectangular base PQRS on a horizontal table. PQDEVU is the uniform cross-section of the prism. Rectangle TUVW is an inclined plane. Rectangle DEFG is a horizontal plane. PU, ST, QD, RG, EV and FW are vertical edges.
Rajah 15.1 *menunjukkan sebuah pepejal berbentuk prisma tegak dengan tapak segi empat tepat* PQRS *terletak di atas meja mengufuk. Permukaan* PQDEVU *ialah keratan rentas seragamnya. Segi empat* TUVW *ialah satah condong. Segi empat tepat* DEFG *ialah satah mengufuk. Tepi* PU, ST, QD, RG, EV *dan* FW *adalah tegak.*

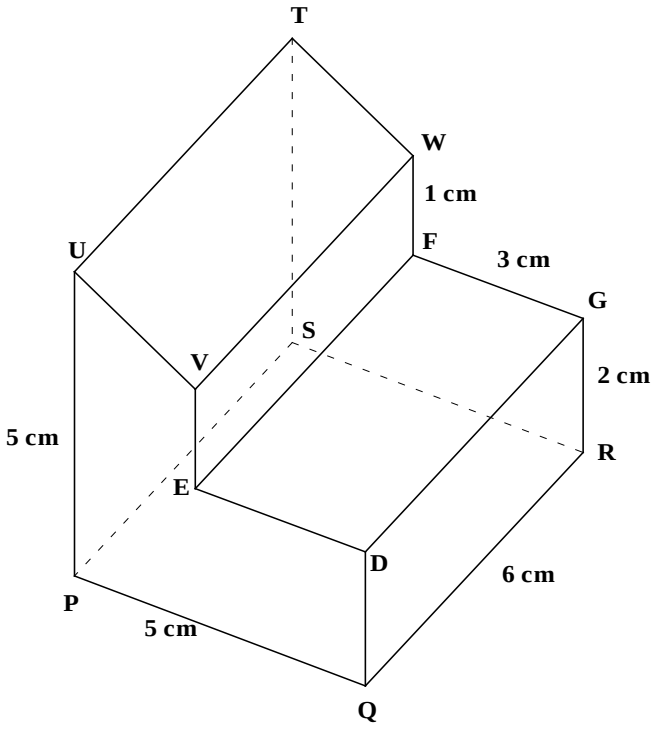


Diagram 15.1
Rajah 15.1

Draw to full scale, the plan of the solid.
Lukis dengan skala penuh, pelan pepejal itu.

[3 marks / *markah*]

Answer / *Jawapan*:

(a)

  [Lihat halaman sebelah

(b) Another solid prism with trapezium ABPM as the uniform cross section is joined to the solid in Diagram 15.1 at the vertical plane BCSP to form a combined solid as shown in Diagram 15.2.
Sebuah pepejal lain berbentuk prisma tegak dengan trapezium ABPM sebagai keratan rentas seragam dicantumkan kepada pepejal dalam Rajah 15.1 *pada satah mencancang* BCSP *untuk membentuk sebuah gabungan pepejal seperti ditunjukkan dalam Rajah* 15.2.

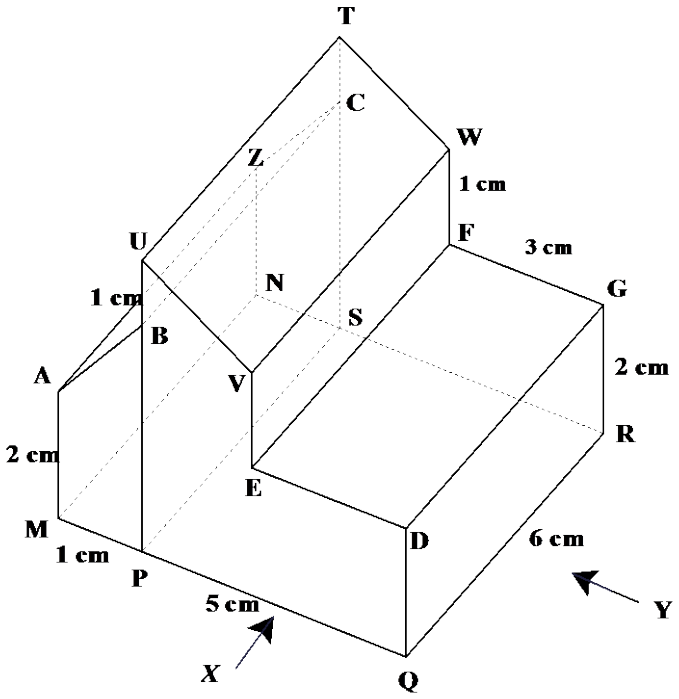


Diagram 15.2
Rajah 15.2

Draw to full scale
Lukis dengan skala penuh

(i) The elevation of the combined solid on a vertical plane parallel to MPQ as viewed from *X*.
Dongakan pepejal gabungan itu pada satah mencancang yang selari dengan MPQ sebagaimana dilihat dari X.

[4 marks / *markah*]

(ii) The elevation of the combined solid on a vertical plane parallel to QR as viewed from Y.
Dongakan pepejal gabungan itu pada satah mencancang yang selari dengan QR sebagaimana dilihat dari Y.

[5 marks / *markah*]

  [Lihat halaman sebelah

Answers/ *Jawapan*:
(b) (i)

(ii)

  [Lihat halaman sebelah

16. In the Diagram 16, *N* is the North Pole, *S* is the South Pole, and *O* is the centre of the earth. *P* (60° *N*, 20° *E*) and *Q* are two points on the surface of the earth such that *PQ* is the diameter of a parallel of latitude.
Dalam Rajah 16, *N ialah Kutub Utara dan S ialah Kutub Selatan, dan O ialah pusat bumi. P* (60° *U*, 20° *T*) *dan Q ialah dua titik di permukaan bumi dengan keadaan PQ ialah diameter selarian latitud.*

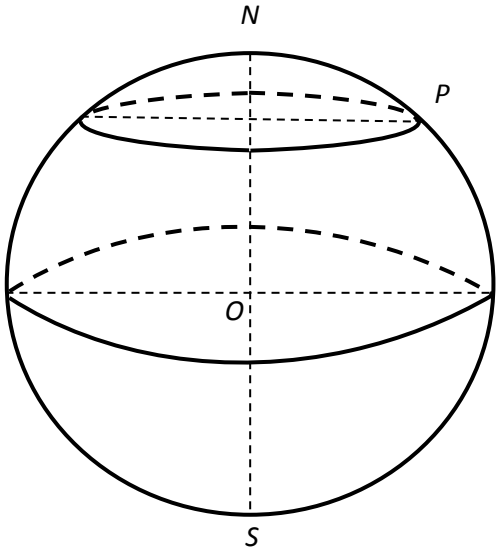


Diagram 16 / *Rajah* 16

(a) *PR* is the diameter of the earth. On the diagram in answer space, mark the positions of *Q* and *R*.
Hence, state the location of *R*.
Diberi PR ialah diameter bumi. Pada rajah di ruangan jawapan, tandakan kedudukan bagi Q dan R.
Seterusnya, nyatakan kedudukan R.

[4 marks / *markah*]

(b) Calculate the shortest distance, in nautical miles, from *P* to *Q* via North Pole.
Hitungkan jarak terpendek, dalam batu nautika, dari P ke Q melalui Kutub Utara.

[2 marks / *markah*]

(c) An aeroplane took off from *P* and flew due west along its parallel of latitude with an average speed of 800 knots. The aeroplane took 4 hours and 30 minutes to reach a point *T*.
Sebuah kapal terbang bertolak dari P arah ke barat di sepanjang selarian latitud sepunya dengan laju purata 800 knot. *Kapal terbang itu mengambil masa 4 jam 30 minit untuk tiba di satu titik T.*

Calculate

Hitung

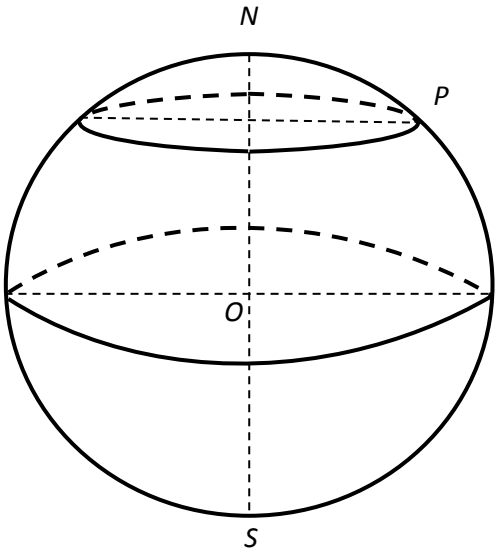
(i) the distance, in nautical miles, from *P* to *T*,
jarak, dalam batu nautika, dari P ke T.

(ii) the longitude of T.
longitud T.

[6 marks / *markah*]

Answer/Jawapan:

(a)



(b)

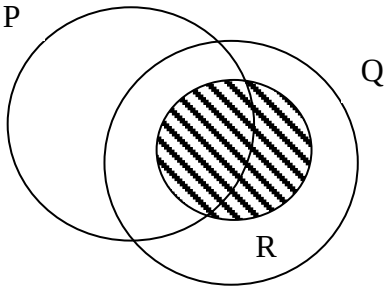
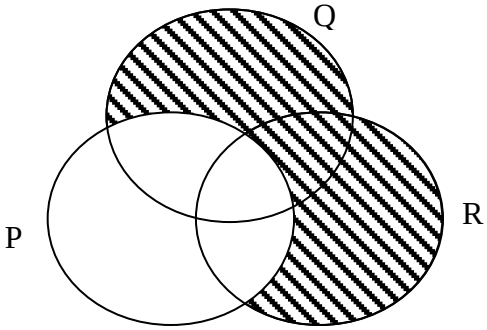
(c) (i)

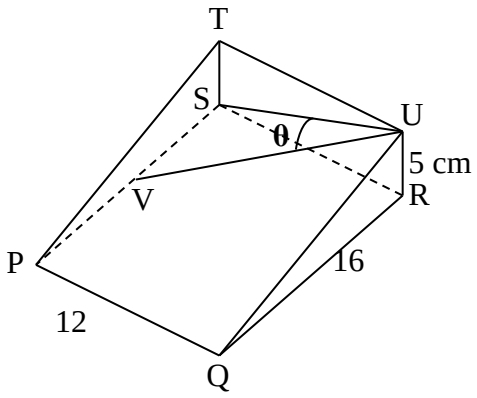
(ii)

SOALAN TAMAT

MATHEMATICS PAPER 2

Section A

No.	Marking Scheme	Marks	
1.	a)  b)  <u>Note:</u> (QUR) correctly shaded, award 1 mark.	1 2	 **3**
2	$x + y = 55$ or equivalent *or* $3x + 2y = 145$ or equivalent $3x + 3y = 165$ *or* equivalent OR $x = 55 - y$ *or* equivalent (1) OR $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{1(2)-1(3)} \begin{pmatrix} 2 & -1 \\ -3 & 1 \end{pmatrix} \begin{pmatrix} 55 \\ 145 \end{pmatrix}$ (2) $x = 35$ $y = 20$	1 1 1,1	 **4**

3.	$x^2 + 6x - 7 = 0$ $(x+7)(x-1) = 0$ $x = -7, x = 1$ $d = 4$	1 1 1 1	**4**
4. a)		1	
b)	$\tan\theta = \frac{8}{13}$ $\theta = 31.61^0 @ 31^0 36'$	1 1	**3**
5. a)	$0 - 2y - 18 = 0$ $y = -9$ Note : Accept answer without working award 2 marks.	1 1	
b)	$m_{PN} = \frac{1}{2}$ (from equation) *or* $m_{PN} = \frac{0-(-9)}{18-0} = \frac{1}{2}$ $7 = \frac{1}{2}(4) + c$ $y = \frac{1}{2}x + 5$	1 1 1	**5**

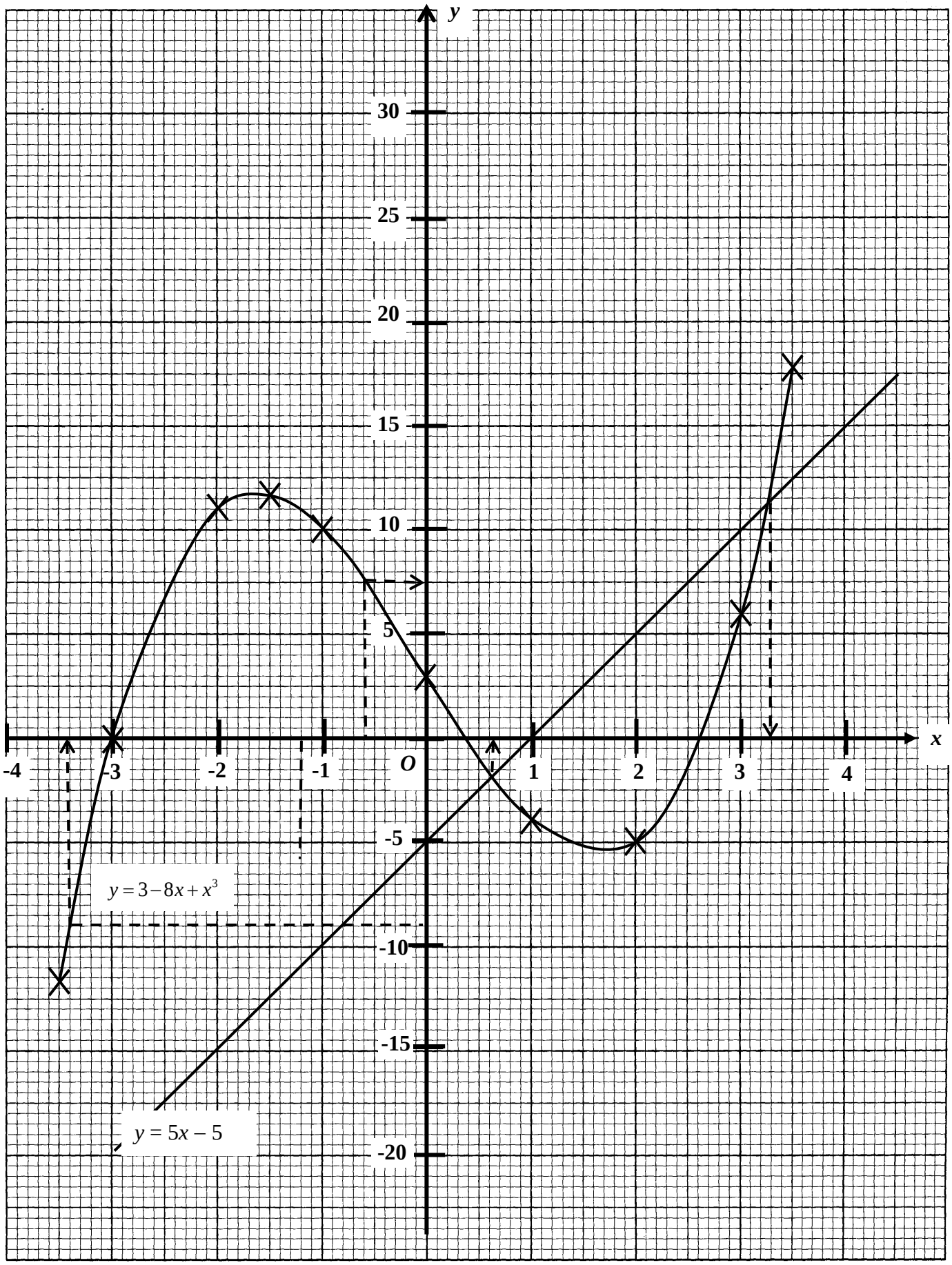
6 a)	$\frac{1}{2} \times 6 \times 18$ 54	1 1	
b)	$\frac{\frac{1}{2}\times(9+15)\times 18}{15}$ $14\frac{2}{5}$ *or* 14.4	1 1	
c)	$14 \times t$ or $\frac{1}{2}(t + t - 6) \times 18$ 13.5	1 1	**6**
7 a)	(i) False (ii) True	1 1	
b)	Implication 1: If sin θ =0.5, then θ =30° Implication 2 : If θ =30°, then sin θ = 0.5	1 1	
c)	$\frac{360}{8}$ or 45°	1	**5**
8. a)	n = - 3 Note : $\frac{1}{(6)(3)-(-5)(-4)}$ * (matrix) *seen* award 1 mark	2	
b)	$\begin{pmatrix}1 & 1\\ 25 & 105\end{pmatrix}\begin{pmatrix}x\\ y\end{pmatrix} = \begin{pmatrix}78\\ 4830\end{pmatrix}$ $\begin{pmatrix}x\\ y\end{pmatrix} = \frac{1}{(1)(105)-(1)(25)}\begin{pmatrix}105 & -1\\ -25 & 1\end{pmatrix}\begin{pmatrix}78\\ 4830\end{pmatrix}$ $x = 42$, $y = 36$	1 1 1,1	**6**

9	$\frac{22}{7}\times 3\times 3\times 7$ $\frac{22}{7}\times 3\times 3\times 3$ *or* $\frac{1}{2}\times\frac{4}{3}\times\frac{22}{7}\times 3\times 3\times 3$ $\frac{22}{7}\times 3\times 3\times 7-(\frac{22}{7}\times 3\times 3\times 3+\frac{1}{2}\times\frac{4}{3}\times\frac{22}{7}\times 3\times 3\times 3)$ 56.57 or $\frac{396}{7}$ or $56\frac{4}{7}$	1 1 1 1	**4**
10 a)	$\frac{180}{360}\times 2\times\frac{22}{7}\times 5$ *or* $\frac{60}{360}\times 2\times\frac{22}{7}\times 2.5$ equivalent $\frac{180}{360}\times 2\times\frac{22}{7}\times 5+\frac{60}{360}\times 2\times\frac{22}{7}\times 2.5$ +5 + 2.5 + 2.5 *or* equivalent 28.33 or $28\frac{33}{100}$ or $\frac{2833}{100}$	1 1 1	
b)	$\frac{180}{360}\times\frac{22}{7}\times 5^2$ *or* $\frac{60}{360}\times\frac{22}{7}\times 2.5^2$ *or* equivalent $\frac{180}{360}\times\frac{22}{7}\times 5^2+\frac{60}{360}\times\frac{22}{7}\times 2.5^2-\frac{1}{2}\times 8\times 6$ *or* equivalent 18.56 *or* $18\frac{14}{25}$ *or* $\frac{464}{25}$	1 1 1	**6**
11. a)	Outcome of Box Q / *Kesudahan Kotak Q*: A, B, C Outcome of Box P / *Kesudahan Kotak P*: 1: (1,B) (1,C) 2: (2,A) (2,B) (2,C) 3: (3,A) (3,B) 4: (4,A) (4,B) Note: 1. Accept 2 mistakes for 1 mark.	2	

b)	2. Accept without brackets. i) {(1,B) , (2,B) , (3,B) , (4,B)} $\frac{4}{12}$ or equivalent. ii) {(1,A) , (1,B) , (1,C) , (2,C) , (3,A) , (3,B) , (3,C) , (4,C)} $\frac{8}{12}$ or equivalent.	1 1 1 1	**6**

Section B

12	a)	$y = 11, \quad y = -5$	1,1	
		Note: 1) if points are correctly marked on the graph 2) the curve passes exactly through the points.		
	b)	*Graph :* Axes are drawn in the correct direction with uniform scale. in the range $-3.5 \leq x \leq 3.5$ and $-15 \leq y \leq 17$.	1	
		All 7 points and 2 points* are correctly marked	2	
		Smooth curve and continuously in range of $-3.5 \leq x \leq 3.5$ with no straight line part and passing through all the correct 9 points.	1	
		Note: (i)7 @ 8 points are correctly plotted, award 1 mark (ii)Other scale used, deduct 1 mark.		
	c)	(i) $5.4 \leq y \leq 5.5$	1	
		(ii) $3.3 \leq x \leq 3.4$	1	
	d)	Straight line $y = 5x - 5$ correctly drawn and meet the curve.	2	
		The equation $y = 5x - 5$ award 1 mark		
		The value of x : $3.2 \leq x \leq 3.3$	1	
		$0.6 \leq x \leq 0.7$	1	
		Note: (i) The value of x obtained by calculation, no mark award.		**12**



13 (a)(i)	(1,7) (2,4) seen/ marked award 1	2	
(ii)	(-5,-5) (-4,2) seen/ marked award 1	2	
(b)(i)	P – Reflection in the line y = -1 Q – Enlargement, scale factor = 2, centre (0,-7)	2 3	
(ii)	$x + 16.5 = 2^2x$ $3x = 16.5$ $x = 5.5$	2 1	**12**

14 (a)

	Class Interval	Midpoint	Frequency
I	*65 - 69*	**67**	**2**
II	***70 - 74***	**72**	**3**
III	**75 - 79**	**77**	**5**
IV	**80 - 84**	**82**	**9**
V	**85 - 89**	**87**	**7**
VI	**90 - 94**	**92**	**3**
VII	**95 - 99**	**97**	**1**

Class interval : (II to VII) all correct — 1
Midpoint : (I to VII) all correct — 1
Frequency : (I to VII) all correct — 2

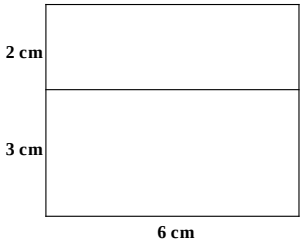
Note : 5 or 6 frequency are correct, award 1 mark

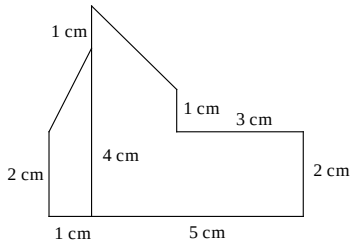
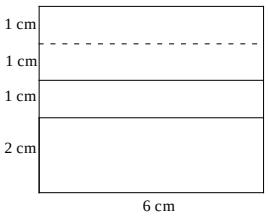
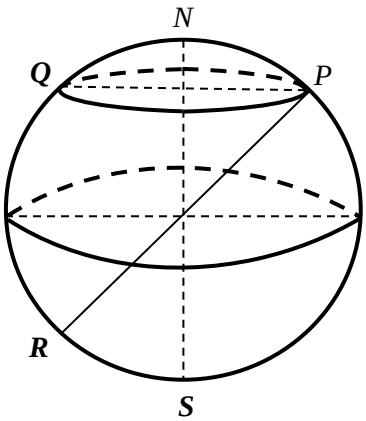
(b)

$$\frac{(67\times 2)+(72\times 3)+(77\times 5)+(82\times 9)+(87\times 7)+(92\times 3)+(97\times 1)}{30}$$ — 2

or $\frac{2455}{30}$

81.83 or $81\frac{5}{6}$ or $\frac{491}{6}$ — 1

	(c) Histogram Axes drawn in the correct direction with uniform scales. *x*-axis is labelled by midpoints / class boundaries / class intervals. All 7 bars are correctly drawn Complete histogram Note: 5 or 6 bars are correctly drawn, award 1 mark. (d) Modal Class = 80 – 84 Note: 1. Accept any reasonable information. 2. Do not accept information without histogram.	1 1 2 1	**12**
15 (a)	**Plan**: The shape must be right with the rectangles. All lines must be fully drawn.  Measurement must be accurate to ± 0.2 cm and all angles at rectangle vertex = $90^o \pm 1$ Note: Correct shape drawn award 1 mark only	3	

b) i	**Elevation X**: The shape must be right with the half of a circle. All lines must be fully drawn.  Measurement must be accurate to ± 0.2 cm and all angles at rectangle vertex = 90° ± 1 Note: Correct shape drawn award 1 mark only	4	
b) ii	**Elevation Y**: The shape must be right with the rectangles. All lines included the dotted lines must be shown completely.  Note: Correct shape drawn award 1 mark only	5	**12**
16 a)	 R (60° S, 160°W) Note : 60°S or 160° W award 1 mark	1 1 2	

b)	60×60	1	
	3600	1	
c) i)	800×4.5	1	
	3600	1	
	$\frac{3600}{\cos 60^{o}}$	2	
ii)	Note: Using Cos 60º award 1 mark		
	$\frac{3600}{60 \times Cos60}$ – 20° or 120° – 20°	1	
	100°W	1	**12**

THE END OF MARKING SCHEME

No 14.