NAMA   : í ..

ANGKA GILIRAN   : í í í í í í í í í í   TINGKATAN 5 : í ....

PERSIDANGAN KEBANGSAAN
PENGETUA-PENGETUA SEKOLAH MENENGAH
NEGERI KEDAH DARUL AMAN

PROGRAM PENINGKATAN PRESTASI AKADEMIK SPM 2013   **1449/2**
MATEMATIK
Kertas 2

$2\frac{1}{2}$ jam   **Dua jam tiga puluh minit**

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

		Untuk Kegunaan Pemeriksa	
Bahagian	Soalan	Markah Penuh	Markah diperoleh
A	1	3	
	2	3	
	3	4	
	4	4	
	5	4	
	6	5	
	7	5	
	8	6	
	9	6	
	10	6	
	11	6	
B	12	12	
	13	12	
	14	12	
	15	12	
	16	12	
JUMLAH MARKAH			

1   *Tulis* **nama**, **tingkatan** *dan* **angka giliran** *anda pada ruang yang disediakan.*

2   *Kertas soalan ini adalah dalam dwibahasa.*

3   *Soalan dalam bahasa Melayu mendahului soalan yang sepadan dalam bahasa Inggeris.*

4   *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Melayu atau bahasa Inggeris.*

5   *Calon dikehendaki membaca arahan di halaman belakang kertas soalan ini.*

Kertas soalan ini mengandungi **32** halaman bercetak.

www.tutormansor.com

RUMUS MATEMATIK
MATHEMATICAL FORMULAE

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

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

PERKAITAN
RELATIONS

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

5. Jarak / *Distance* $= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

6. Titik Tengah / *midpoint*, $(x, y) = \left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2} \right)$

7. Purata laju $= \dfrac{\text{jarak yang dilalui}}{\text{masa yang diambil}}$

   Average speed $= \dfrac{distance\ travelled}{time\ taken}$

8. Min $= \dfrac{\text{hasil tambah nilai data}}{\text{bilangan data}}$

   Mean $= \dfrac{sum\ of\ data}{number\ of\ data}$

9. Min $= \dfrac{\text{hasil tambah (nilai titik tengah kelas} \quad \text{kekerapan)}}{\text{hasil tambah kekerapan}}$

   Mean $= \dfrac{sum\ of\ (class\ mark\ \times\ frequency)}{sum\ of\ frequencies}$

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

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

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

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

14. $m = -\dfrac{\text{pintasan-y}}{\text{pintasan-x}}$

    $m = -\dfrac{y\text{-}intercept}{x\text{-}intercept}$

www.tutormansor.com

BENTUK DAN RUANG
SHAPES AND SPACE

1 Luas trapezium = $\frac{1}{2}$ × hasil tambah dua sisi selari × tinggi

   Area of trapezium = $\frac{1}{2}$? sum of parallel sides ? height

2 Lilitan bulatan = $\pi d = 2\pi j$
   Circumference of circle = $\pi d = 2\pi r$

3 Luas bulatan = πj^2
   Area of circle = πr^2

4 Luas permukaan melengkung silinder = $2\pi jt$
   Curved surface area of cylinder = $2\pi rh$

5 Luas permukaan sfera = $4\pi j^2$
   Surface area of sphere = $4\pi r^2$

6 Isipadu prisma tegak = Luas keratan rentas × panjang
   Volume of right prism = cross sectional area × length

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

8 Isipadu kon = $\frac{1}{3} j^2 t$

   Volume of cone = $\frac{1}{3} r^2 h$

9 Isipadu sfera = $\frac{4}{3} j^3$

   Volume of sphere = $\frac{4}{3} r^3$

10 Isipadu piramid tegak = $\frac{1}{3}$? luas tapak ? tinggi

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

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

12 $\frac{\text{panjang lengkok}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^o}$

   $\frac{arc\ length}{circumference\ of\ circle} = \frac{angle\ subtended\ at\ centre}{360°}$

13 $\frac{\text{luas sektor}}{\text{luas bulatan}} = \frac{\text{sudut pusat}}{360^o}$

   $\frac{area\ of\ sector}{area\ of\ circle} = \frac{angle\ subtended\ at\ centre}{360°}$

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

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

15 Luas imej = k^2 × luas objek
   Area of image = k^2 × area of object

www.tutormansor.com

Bahagian A
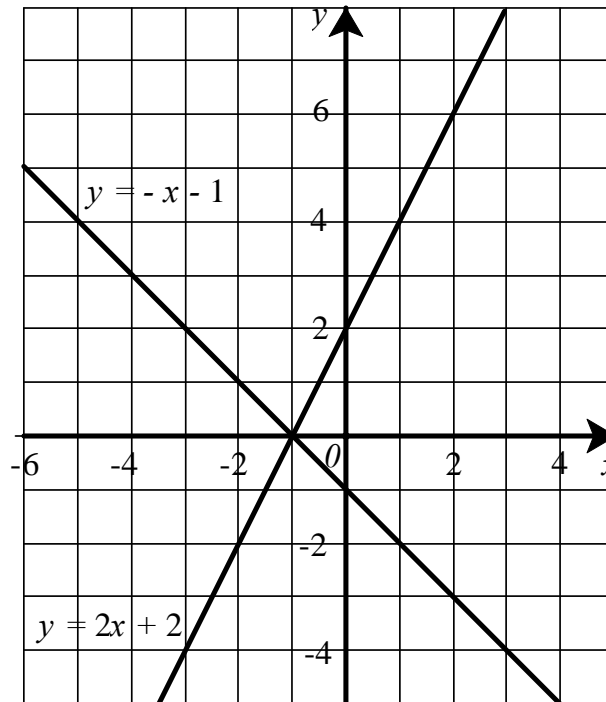*Section* **A**

[52 marks / *markah*]

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

1   Pada graf di ruang jawapan, lorek rantau yang memuaskan ketiga-tiga ketaksamaan $y \le 2x + 2$, $y \ge$ ó x ó 1 dan $x < 1$.

On the graph in the answer space, shade the region which satisfies the three inequalities $y \le 2x + 2$, $y \ge$ ó x ó 1 dan $x < 1$.
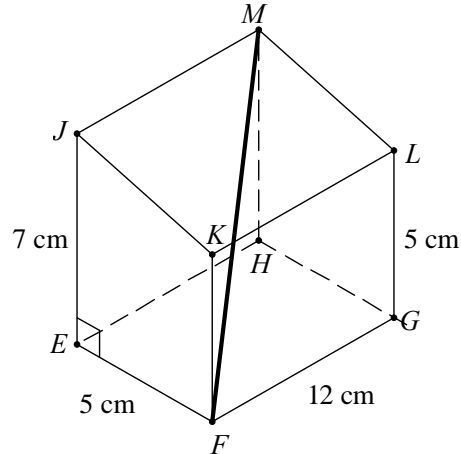
[3 markah/ *marks*]

Jawapan / *Answer*:

www.tutormansor.com

2   Rajah 2 menunjukkan sebuah prisma tegak dengah tapak segiempat tepat
    mengufuk *EFGH*. Trapezium *EFKJ* ialah keratan rentas seragamnya.

    *Diagram 2 shows a right prism with horizontal rectangular base EFGH.
    Trapezium EFKJ is its uniform cross-section.*

Rajah 2
Diagram 2

(a)   Namakan sudut di antara garis *MF* dengan satah *EFGH*.

      Name the angle between the line MF and the plane EFGH.

(b)   Hitung sudut di antara garis *MF* dengan satah *EFGH*..

      Calculate the angle between the line MF and the plane EFGH.

[3 markah/ *marks*]

Jawapan / *Answer* :

(*a*)

(*b*)

3 Selesaikan persamaan kuadratik berikut:

Solve the following quadratic equation:

$$9x(x+2) = 4 + 18x$$

[4 markah/ *marks*]

Jawapan / *Answer* :

4 Hitung nilai x dan nilai y yang memuaskan persamaan linear serentak berikut:

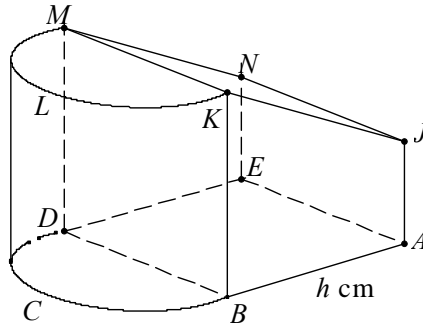*Calculate the value of x and of y that satisfy the following simultaneous linear equations*:

$$x + 3y = 11$$
$$7x + \frac{3}{2}y = -1$$

[4 markah/ *marks*]

Jawapan / *Answer* :

www.tutormansor.com

Untuk
Kegunaan
Pemeriksa
*For
Examiner's
Use*

5   Rajah 5 menunjukkan suatu pepejal yang terdiri daripada cantuman sebuah separuh silinder kepada sebuah prisma tegak. *ABKJ* ialah keratan rentas prisma tegak itu. *MK* ialah diameter separuh silinder itu. .

Diagram 5 shows a solid, formed by joining a half-cylinder to a right prism. ABKJ is the cross-section of the right prism. MK is the the diameter of the half cylinder.

Rajah 5
Diagram 5

Diberi, tinggi *KB* = 20 cm, tinggi *AJ* = 10 cm, panjang *NJ* = 14 cm, panjang *AB* = *h* cm dan isi padu gabungan pepejal itu ialah 6790 cm^3.

Menggunakan $\pi = \dfrac{22}{7}$, hitung

Given, the height of *KB* = 20 cm, the height of *AJ* = 10 cm, the ength of *NJ* = 14 cm, the length of *AB* = *h* cm and t*he volume of the composite solid is* 6790 cm^3.

Using $\pi = \dfrac{22}{7}$, *calculate*

(a)   isi padu, dalam cm^3, separuh silinder itu.

   the volume, in cm^3, *of the half cylinder.*

(b)   panjang, dalam cm, *AB*.

   the length, in cm*, AB.*

[4 markah/ *marks*]

Jawapan / *Answer* :

(*a*)

(*b*)

www.tutormansor.com

6   (*a*)   Tentukan sama ada pernyataan ini benar atau palsu.

$$3^{-2} = \frac{1}{9} \text{ dan } 3^2 = 9$$

Determine whether the statement is true or false.

$$3^{-2} = \frac{1}{9} \ \text{ and } \ 3^2 = 9$$

(*b*)   Tulis akas untuk implikasi berikut. Seterusnya, nyatakan sama ada akas tersebut benar atau palsu.

Write down the converse of the following implication. Hence, state whether the converse is true or false.

Jika $n < 0$ maka n adalah nombor negatif.

If $n < 0$ then n is a negative number .

(*c*)   Tulis Premis 2 untuk melengkapkan hujah berikut.

Write down Premise 2 to complete the following argument.

Premis 1   :   Semua subset bagi set *K* adalah subset bagi set *L*.
Premise 1 :   *All subset of set K are subset of set L.*

Premise 2 / *Premise* 2 : ....

Kesimpulan : Set *R* ialah subset bagi set *L*.
Conclusion   : *Set R is subset of set L.*

(*d*)   Diberi bahawa bilangan subset bagi suatu set yang mempunyai n unsur ialah 2^n. Buat **satu** kesimpulan secara deduksi tentang bilangan subset bagi satu set yang mempunyai 7 unsur.

*It is given that the number of subsets in a set with n elements is 2^n. Make **one** conclusion by deduction on the number of subsets of 7 elements.*

[5 markah/ *marks*]

Jawapan / *Answer* :

Untuk
Kegunaan
Pemeriksa
*For
Examiner's
Use*

(*a*) ……………………………………………………………………

(*b*) ……………………………………………………………………

……………………………………………………………………………

(*c*)   Premise 2 / *Premise* 2 : ....

……………………………………………………………………………

(*d*) ……………………………………………………………………

7   Rajah 7 menunjukkan garis lurus *PQ,* SP dan *SR* yang dilukis pada suatu satah
     Cartesan. Garis lurus *SP* adalah selari dengan paksi-*y* dan garis lurus *PQ* adalah
     selari dengan garis lurus *SR*. Persamaan garis lurus *PQ* ialah $y = \frac{4}{5}x - 2$.

     *Diagram 7 shows straight line PQ, SP and SR drawn on a Cartesian plane.
     Straight line SP is parallel to the y-axis and straight line PQ is parallel to straight
     line SR. The equation of the straight line PQ is* $y = \frac{4}{5}x - 2$.

Rajah 7
Diagram 7

(*a*)   Nyatakan persamaan garis lurus *SP*,

        State the equation of the straight line SP,

(*b*)   Carikan persamaan garis lurus *SR* dan seterusnya , nyatakan pintasan-*y* bagi garis
        lurus itu.

        Find the equation of the straight line SR and hence, state its y-intercept.

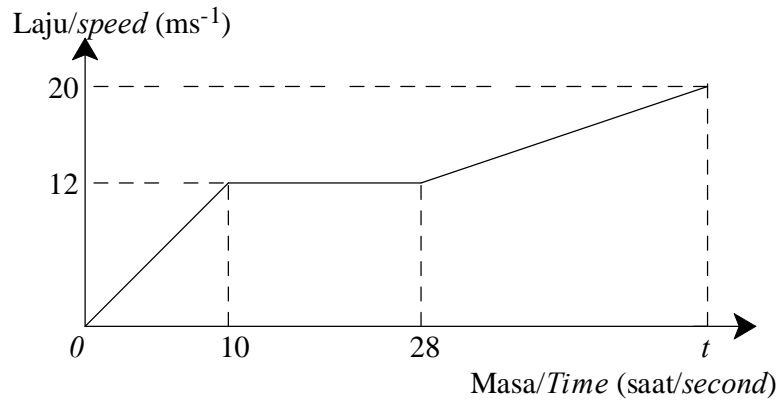   [5 markah/ *marks*]

Jawapan / *Answer* :

(*a*)

(*b*)

8   Rajah 8 menunjukkan graf laju-masa bagi pergerakan satu zarah dalam tempoh *t* saat.

   Diagram 8 *shows a speed-time graph for the movement of a particle for a period of t seconds*

Rajah 8
Diagram 8

Jumlah jarak yang dilalui oleh zarah itu ialah 468 m.

The total distance travelled by the particle is 468 m.

(*a*)   Nyatakan laju seragam, dalam ms^{-1}, zarah itu.

   State the uniform speed, in ms^{-1}, *of particle.*

(*b*)   Hitung kadar perubahan laju, dalam ms^{-2}, zarah itu dalam 10 s pertama.

   Calculate the rate of change of speed, in ms^{-2}, *of particle for the first* 10 *s.*

(c)   Hitung nilai *t*.

   Calculate the value of t.
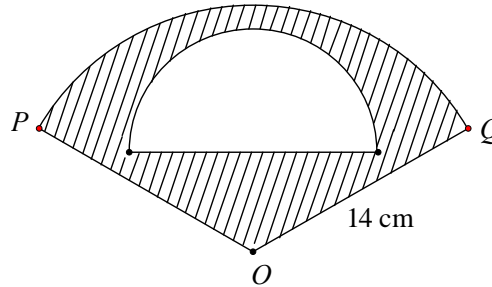
(6 markah/ *marks)*

Jawapan / *Answer* :

(*a*)

(*b*)

(*c*)

9   Rajah 9 menunjukkan sektor *OPQ* berpusat *O* dan sebuah semibulatan dengan
     diameter 14 cm. Diberi bahawa ∠*POQ* = 120°.

Diagram 9 *shows sector OPQ with centre O and a semicircle with diameter* 14 cm.
It is given that ∠*POQ* = 120°.

Rajah 9
Diagram 9

Menggunakan $\quad = \dfrac{22}{7}$, hitung

Using $\quad = \dfrac{22}{7}$, *calculate*

(*a*)   perimeter, dalam cm, kawasan yang berlorek,

         the perimeter, in cm*, of the shaded region.*

(*b*)   luas, dalam cm², kawasan yang berlorek.

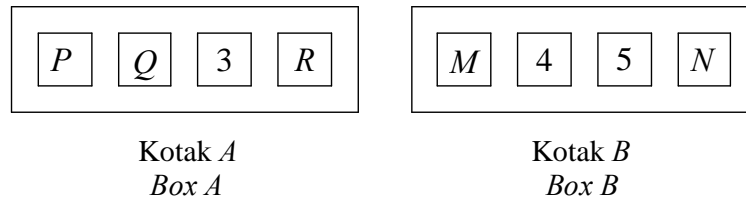   *the area, in* cm², *of the shaded region.*

[6 markah/ *marks*]

Jawapan/ *Answer*:

(*a*)

(*b*)

www.tutormansor.com

Untuk
Kegunaan
Pemeriksa
*For
Examiner's
Use*

10 Rajah 10 menunjukkan lapan kad yang berlabel di dalam dua kotak

Diagram 10 shows eight labelled cards in two boxes.

| P | Q | 3 | R | | M | 4 | 5 | N |

Kotak *A*   Kotak *B*
Box *A*   Box *B*

Rajah 10
Diagram 10

Sekeping kad dipilih secara rawak daripada setiap kotak itu.

A card is picked at random from each of the boxes.

(a) Senaraikan ruang sample.

List the sample space.

(b) Senaraikan semua kesudahan peristiwa yang mungkin dan cari kebarangkalian bagi peristiwa tersebut bahawa

List all the possible outcomes and find the probability of the events that

   (i) kedua-dua kad dilabel dengan nombor,

   both card are labelled with a number,

   (ii) sekeping kad dilabel dengan huruf dan kad yang satu lagi dilabel dengan nombor.

   One card is labelled with a letter and the other card is labelled with a number

[6 markah/ *marks*]

Jawapan / *Answer* :

(*a*)

(*b*) (i)

   (ii)

`

www.*tutormansor*.com

11   Diberi bahawa matriks $P = \begin{pmatrix} 3 & 2 \\ 6 & -1 \end{pmatrix}$

Given that matrix $P = \begin{pmatrix} 3 & 2 \\ 6 & -1 \end{pmatrix}$

(*a*)   Cari matriks songsang bagi *P*.

      Find the inverse matrix of P.

(*b*)   Tulis persamaan linear serentak berikut dalam persamaan matriks:

      Write the following simultaneous linear equations as matrix equation:

$$3x + 2y = 9$$
$$6x - y = -7$$

      Seterusnya, menggunakan kaedah matriks, hitung nilai *x* dan nilai *y*.

      Hence, by using matrix method, calculate the value of x and of y.

[6 markah/ *marks*]

Jawapan / *Answer* :

(*a*)

(*b*)

www.tutormansor.com

Untuk
Kegunaan
Pemeriksa
*For
Examiner's
Use*

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

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

12 (*a*) Lengkapkan Jadual 12 di ruang jawapan pada halaman 16 bagi persamaan
$y = -\dfrac{12}{x}$ dengan menulis nilai-nilai y apabila $x = $ ó 4 dan $x = $ ó 1.5.

Complete Table 12 *in the answer space on page* 16 *for the equation* $y = -\dfrac{12}{x}$

*by writing down the values of y when x = *ó 4 *and x = *ó 1.5.

[2 markah/ *marks*]

(*b*) Untuk ceraian soalan ini, gunakan kertas graf yang disediakan pada
halaman 17. Anda boleh menggunakan pembaris fleksibel.
Dengan menggunakan skala 2 cm kepada 1 unit pada paksi-x dan 2 cm kepada

2 unit pada paksi-y, lukiskan graf $y = -\dfrac{12}{x}$ untuk ó 6 ≤ x ≤ ó 0.75

dan 0 ≤ y ≤ 16.

For this part of question, use the graph paper provided on page **17**.
You may use a flexible curve rule.
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 $y = -\dfrac{12}{x}$ *for* ó 6 ≤ x ≤ ó 0.75 *and* 0 ≤ y ≤ 16.

[4 markah/ *marks*]

(*c*) Dari graf di ruang jawapan 12(*b*), cari
From the graph in the answer space 12(*b*), *find*

(i) nilai y apabila $x = -2 \cdot 5$,

the value of y when x = $-2 \cdot 5$,

(ii) nilai x apabila $y = 14$.

the value of x when y = 14.

[2 markah/ *marks*]

www.tutormansor.com

Untuk
Kegunaan
Pemeriksa
*For
Examiner'
s Use*

(*d*)   Lukis satu garis lurus yang sesuai pada graf di ruang jawapan 12(*b*) untuk mencari satu nilai *x* yang memuaskan persamaan $-2x^2 -12x = 12$ bagi $-6 \le x \le -0 \cdot 75$ dan $0 \le y \le 16$.
Nyatakan nilai-nilai *x* ini.

Draw a suitable straight line on your graph in the answer space 12(*b*) *to find the value of x which satisfy the equation* $-2x^2 -12x = 12$ *for* $-6 \le x \le -0 \cdot 75$ *and* $0 \le y \le 16$.
State these value of x.

[4 markah/ *marks*]

Jawapan / *Answer*:

(*a*)

$$y = -\frac{12}{x}$$

x	ó 6	ó 5	ó 4	ó 3·3	ó 3	ó 2	ó 1·5	ó 1	ó 0·75
y	2	2.4		3.64	4	6		12	16

Jadual 12
Table 12

(*b*)   Rujuk graf di halaman 17.
Refer graph on page 17.

(*c*)   (i)   *y* = ...

     (ii)   *x* = ...

(*d*)   *x* =

Graf untuk Soalan12
Graph for Question 12

www.tutormansor.com

13   Rajah 13 menunjukkan dua titik, *L* dan *M*, dan tiga trapezium, *P,* Q dan *R,* dilukis
      pada suatu satah Cartesan.

      Diagram 13 *shows two points, L and M, and three trapeziums, P, Q and R, drawn
      on a Cartesian plane.*

Rajah 13
Diagram 13

(a)
      Penjelmaan **T** ialah satu translasi $\begin{pmatrix} -2 \\ 1 \end{pmatrix}$.

      Penjelmaan **U** ialah satu putaran 90° ikut arah jam pada pusat *L*.
      Nyatakan koordinat imej bagi titik *M* di bawah penjelmaan berikut:

      Transformation **T** *is a translation* $\begin{pmatrix} -2 \\ 1 \end{pmatrix}$

      Transformation **U** *is a clockwise rotation of* 90° *about centre L.
      State the coordinates of the image of point M under the following
      transformation:*

      (i)   **T**^{2},

      (ii)   **TU.**

                                                                    [4 markah/ *marks*]

      Jawapan / *Answer* :

      (*a*) (i)

            (ii)

www.tutormansor.com

(b) (i) *R* ialah imej bagi *Q* di bawah gabungan penjelmaan **VW.**
Huraikan selengkapnya penjelmaan:

R is the image of Q under the combined transformation **VW**.
Decsribe, in full, the transformation:

(a) **W,**

(b) **V.**

(ii) Diberi bahawa *Q* mewakili suatu kawasan yang mempunyai luas 180 cm², hitung luas, dalam cm², kawasan yang diwakili oleh *R*.

Given Q represents a region of area 180 cm², *calculate the area, in cm²,*
of the region represented by R.

[8 markah/ *marks*]

Jawapan / *Answer* :

(*b*) (i) (*a*)

(*b*)

(ii)

14　Data dalam Rajah 14 menunjukkan markah 30 orang pelajar dalam suatu peperiksaan percubaan.

The data in Diagram 14 *shows the marks for* 30 *students in a trial examination.*

33	37	27	55	75	48	68	30	57	48
54	45	35	78	62	70	52	68	36	58
41	85	48	49	85	44	42	53	63	22

Rajah 14
Diagram 14

(*a*)　Berdasarkan data itu, lengkapkan Jadual 14 pada ruang jawapan yang disediakan halaman 21

Based on the data, complete Table 14 *in the answer space provided on page* 21.

[4 markah / *marks*]

(*b*)　(i)　Nyatakan kelas mod.

State the modal class.

(ii)　Berdasarkan Jadual 14 di 14(a), hitung min anggaran markah bagi seorang murid.

Based on Table 14 *in* 14(a), *calculate the estimated mean of the mark for a student.*

[4 markah / *marks*]

(*c*)　Untuk ceraian soalan ini, gunakan kertas graf yang disediakan di halaman 23.

For this part of the question, use the graph paper provided on page 23.

Dengan menggunakan skala 2 cm kepada 10 markah pada paksi mengufuk dan 2 cm kepada 1 pelajar pada paksi mencancang, lukis satu histogram berdasarkan Jadual 14.

By using the scale of 2 cm *to* 10 *marks on the horizontal axis and* 2 cm *to* 1 *student on the vertical axis, draw a histogram based on Table* 14.

[4 markah/ *marks*]

www.tutormansor.com

Answer / *Jawapan*:

(*a*)   (i)

Markah *Marks*	Titik tengah *Mid-point*	Kekerapan *Frequency*
20 ó 29	24·5	

Table 14
Jadual 14

(*b*)   (i)

      (ii)

(*c*) Rujuk graf pada halaman 23.
     Refer graph on page 23.

.

www.tutormansor.com

Halaman kosong
Blank page

Graf untuk Soalan14
Graph for Question 14

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

(*a*)   Rajah 15.1 menunjukkan sebuah pepejal berbentuk prisma tegak dengan tapak
        segiempat tepat *EFGH* terletak di atas satah mengufuk. Permukaan *FGMLK*
        ialah keratan rentas seragamnya. Tepi *EJ, FK, GM* dan *HN* adalah tegak.
        Segiempat tepat *JKLP* dan *MNPL* adalah satah condong.

        Diagram 15.1 *shows a solid right prism with rectangle base EFGH on a
        horizontal plane. The surface FGMLK is the uniform cross section of the
        prism. EJ, FK, GM and HN are vertical edges. Rectangle JKLP and MNPL
        are inclined plane.*

Rajah 15.1
Diagram 15.1

Tinggi *PL* dari tapak *EFGH* ialah 6 cm.
Lukis dengan saiz penuh, pelan pepejal itu.

The height of PL from base EFGH is 6 cm.
Draw full scale, the plan of the solid.

[3 markah/ *marks*]

www.tutormansor.com

Jawapan / *Answer* :

(*a*)

(*b*) Sebuah pepejal prisma tegak dikeluarkan daripada pepejal pada Rajah 15.1. Pepejal yang tinggal adalah seperti ditunjukkan pada Rajah 15.2. Segiempat tepat *RSVU* adalah satah condong. Tepi *QS* dan *TV* adalah tegak. *QR* = *TU* = *SQ* = *VT* = *RF* = *UG* = 2 cm.

A solid right prism is cut and removed from the solid in Diagram 15.1. The remaining solid is shown in Diagram 15.2. Rectangle RSVU is an inclined plane. QS and TV are vertical edges. QR = TU = SQ = VT = 2 cm.

Rajah 15.2
Diagram 15.2

Lukis dengan saiz penuh,

Draw full scale,

(i) Dongakan gabungan pepejal itu pada satah mencancang yang selari dengan *FG* sebagaimana dilihat dari *X*.

The elevation of the combined solid on a vertical plane parallel to FG as viewed from X.

[4 markah/ *marks*]

(ii) Dongakan pepejal yang tinggal itu pada satah mencancang yang selari dengan *EQ* sebagaimana dilihat dari *Y*.

The elevation of the remaining solid on a vertical plane parallel to EQ as viewed from Y.

[5 markah/ *marks*]

www.tutormansor.com

Jawapan / *Answer* :

Untuk
Kegunaan
Pemeriksa
*For
Examiner's
Use*

(*b*) (i), (ii)

16 Jadual menunjukkan latitud dan longitud tiga titik *P, Q* dan *R* di permukaan bumi.

Table shows the latitudes and the longitudes of three points P, Q and R, on the surface of the earth

Titik *Point*	**Latitud** *Latitude*	**Longitud** *Longitude*
P	30^oS 30^oS	75^oB 75^oW
Q	x^oU x^oN	75^oB 75^oW
R	x^oU x^oN	y^oT y^oE

(*a*) *P* ialah titik di permukaan bumi dengan keadaan *JP* ialah diameter selarian latitud 30^oS.
Nyatakan logitud bagi *J*.

P is a point on the surface of the earth such that JP is the diameter of the common parallel of 30^oS.
State the longitude of J

[2 markah/ *marks*]

(*b*) Hitungkan

Calculate

(i) nilai *x*, jika jarak dari *P* ke utara ke *Q* ialah ialah 3900 batu notika.

the value of x, if the istance from P to the north to Q is 3900 nautical miles.

(ii) Nilai *y*, jika jarak dari *Q* ke timur ke *R* di ukur sepanjang selarian latitud ialah 4669 batu notika.

The value of y, if the distance from Q due east to R measured along the common parallel of latitude is 4669 nautical miles

[6 markah/ *marks*]

(*c*) Sebuah kapal terbang berlepas dari *J* arah ke barat ke *P* mengikut selarian latitud sepunya. Purata laju bagi perjalanan itu ialah 600 knot.

Hitung jumlah masa, dalam jam, yang diambil bagi seluruh penerbangan itu.

An aeroplane took off from J and flew due west to P along the common parallel of latitude.. The average speed for the flight was 600 knots.

Calculate the total time, in hours, taken for the whole flight.

[4 markah/ *marks*]

www.tutormansor.com

Jawapan / *Answer* :

(*a*)

(*b*)   (i)

        (ii)

(*c*)

KERTAS SOALAN TAMAT
END OF QUESTION PAPER

Halaman kosong
Blank page

www.tutormansor.com

Halaman kosong
Blank page

MAKLUMAT UNTUK CALON
INFORMATION FOR CANDIDATES

1. Kertas soalan ini mengandungi dua bahagian: **Bahagian A** dan **Bahagian B**.

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

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

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

3. Tulis jawapan anda pada ruang yang disediakan dalam kertas soalan ini.

    Write your answer in the spaces provided in the question paper.

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

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

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

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

6. Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.

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

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

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

8. Satu senarai rumus disediakan di halaman 2 hingga 3.

    A list of formulae is provided on pages 2 *to* 3.

9. Sifir matematik empat angka boleh digunakan.

    Four-figure mathematical tables can be used.

10. Anda dibenarkan menggunakan kalkulator saintifik.

    You may use a scientific calculator.

11. Serahkan kertas soalan ini kepada pengawas peperiksaan pada akhir peperiksaan.

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

www.*tutormansor*.com

PROGRAM PENINGKATAN PRESTASI AKADEMIK SPM 2013

ANJURAN
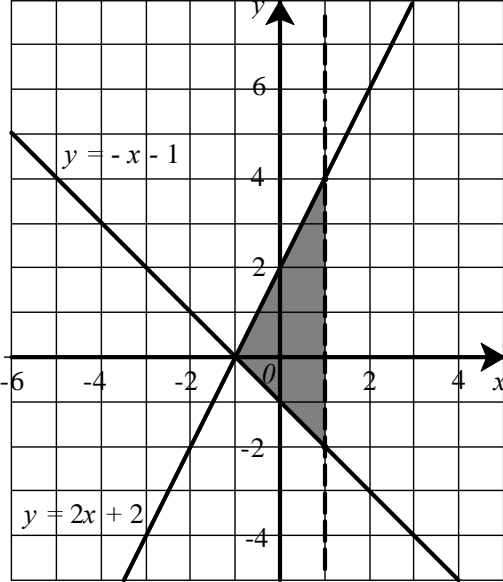
MAJLIS PENGETUA SEKOLAH MALAYSIA (KEDAH)

MODUL   A

MATEMATIK

KERTAS 2

PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan pemarkahan ini mengandungi 14 halaman bercetak

Section A
[52 *marks*]

Question	Solution and Mark Scheme	Marks	
1	Straight dotted line $x = 1$ correctly drawn. Region correctly shaded Note: 1 Accept solid line $x = 1$ for K1 2 Award P1 to shaded region bounded by two correct lines, including part of **R**. (Check one vertex from any two correct lines	K1 P2	3
2(*a*) (*b*)	$\angle MFH$ $\tan \angle MFH = \dfrac{7}{13}$ *or* equivalent $28.3°$ *or* $28° \, 18'$	P1 K1 N1	3

Question	Solution and Mark Scheme	Marks	
3	$9x^2 - 4 = 0$	K1	
	$(3x-2)(3x+2) = 0$ _or_ equivalent	K1	
	$x = \dfrac{2}{3}$ _or_ 0.67	N1	
	$x = -\dfrac{2}{3}$ _or_ 60.67	N1	**4**
	<u>Note</u> : 1. Accept without $\doteq 0\emptyset$ 2. Accept two terms on the same side, in any order. 3. $(x - 0\cdot 67)(x + 0\cdot 67)$ with $x = 0\cdot 67, x = -0\cdot 67$ award Kk2		
4	$14x + 3y = -2$ _or_ $7x + 21y = 77$ _or_ equivalent	K1	
	<u>Note</u> : Attempt to equate one of the coefficients the unknowns, award K1 <u>OR</u> $x = 11 - 3y$ _or_ $y = \dfrac{11 - x}{3}$ _or_ $x = \dfrac{-1 - \frac{3}{2}y}{7}$ _or_ $y = \dfrac{2(-1 - 7x)}{3}$ _or_ equivalent (K1) <u>Note</u> : Attempt to make one of the unknowns as the subject award K1.		
	$-13x = 13$ _or_ $\dfrac{39}{2}y = 78$ _or_ equivalent <u>OR</u> $\begin{pmatrix} x \\ y \end{pmatrix} = \dfrac{1}{(1)\left(\frac{3}{2}\right) - (3)(7)} \begin{pmatrix} \frac{3}{2} & -3 \\ -7 & 1 \end{pmatrix} \begin{pmatrix} 11 \\ -1 \end{pmatrix}$ (K2) <u>Note</u> : Attempt to write without equation, award (K1)	K1	
	$x = -1$ $y = 4$	N1 N1	4
	<u>Note</u> : $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -1 \\ 4 \end{pmatrix}$ as final answer, award N1		

Question	Solution and Mark Scheme	Marks	
5(*a*)	$\frac{1}{2} \times \frac{22}{7} \times \frac{14}{2} \times \frac{14}{2} \times 20$	K1	
	1540	N1	
(*b*)	$\frac{1}{2} \times \frac{22}{7} \times \frac{14}{2} \times \frac{14}{2} \times 20 + \frac{1}{2} \times (20+10) \times AB \times 14 = 6790$	K1	**4**
	25	N1	
	<u>Note</u> : 1. Accept π for K mark. 2. Correct answer from incomplete working, award Kk2.		
6	(*a*) benar / true	P1	

	(*b*) Jika *n* adalah nombor negatif maka $n < 0$.
	       If n is a negative number then $n < 0$.
	       benar / true
		P1	

	(*c*) Set R ialah subset bagi set K *Set R is subset of set K*	P1	5
	(*d*) Bilangan subset bagi suatu set yang mempunyai 7 unsur ialah 2^7 *The number of subsets in a set with n elements is 2^7.*	K1	
	$2^7 = 128$	N1	
7	(*a*) $x = -5$	P1	
	(*b*) $M_{SR} = M_{PQ} = \frac{4}{5}$	P1	
	$4 = \frac{4^*}{5}(-5) + c$ <u>or</u> $\frac{y-4}{x-(-5)} = \frac{4^*}{5}$	K1	**5**
	$y = \frac{4}{5}x + 8$	N1	
	y-intercept = 8	N1	
8 (*a*)	12	P1	1
(*b*)	$\frac{12-0}{10-0}$ *or equivalent*	K1	
	$\frac{6}{5}$ *or* $1 \cdot 2$	N1	2
	Note: Accept answer without working for K1N1		
(*c*)	$\frac{1}{2}(18+28)(12) + \frac{1}{2}((t-28)(12+20) = 468$ <u>or</u> equivalent method <u>Note:</u> $\frac{1}{2}(18+28)(12)$ *or* $\frac{1}{2}((t-28)(12+20)$ equivalent, award K1	K2	
	40	N1	3
			6

Question	Solution and Mark Scheme	Marks	
9(a)	$\dfrac{120}{360} \times 2 \times \dfrac{22}{7} \times 14$ *or* $\dfrac{180}{360} \times 2 \times \dfrac{22}{7} \times 7$	K1	
	$14 + 14 + 14 + \dfrac{120}{360} \times 2 \times \dfrac{22}{7} \times 14 + \dfrac{180}{360} \times 2 \times \dfrac{22}{7} \times 7$	K1	
	$\dfrac{280}{3}$ *or* $93\dfrac{1}{3}$ *or* 93.33	N1	
(b)	$\dfrac{120}{360} \times \dfrac{22}{7} \times 14^2$ *or* $\dfrac{180}{360} \times \dfrac{22}{7} \times 7^2$	K1	
	$\dfrac{120}{360} \times \dfrac{22}{7} \times 14^2 - \dfrac{180}{360} \times \dfrac{22}{7} \times 7^2$	K1	
	$\dfrac{385}{3}$ *or* $128\dfrac{1}{3}$ *or* 128.33	N1	6
	<u>Note</u> : 1. Accept for K mark. 2. Correct answer from incomplete working, award Kk2.		
10 (a)	{(P, M), (P, 4), (P, 5), (P, N), (Q, M), (Q, 4), (Q, 5), (Q, N), (3, M), (3, 4), (3, 5), (3, N), (R, M), (R, 4), (R, 5), (R, N)} <u>Note</u> : 1. Accept 8 correct listing from not more than 16 outcomes for P1	P2	
(b)(i)	{(3, 4), (3, 5)}	K1	
	$\dfrac{2}{16}$ *or* $\dfrac{1}{8}$	N1	
(ii)	{(P, 4), (P, 5), (Q, 4), (Q, 5), (3, M), (3, N), (R, 4), (R, 5)}	K1	
	$\dfrac{8}{16}$ *or* $\dfrac{1}{2}$	N1	
	<u>NOTE</u> : 1. Accept other method for K mark. 2. Accept answer without working from correct listing, correct tree diagram or correct grid for K1N1.		

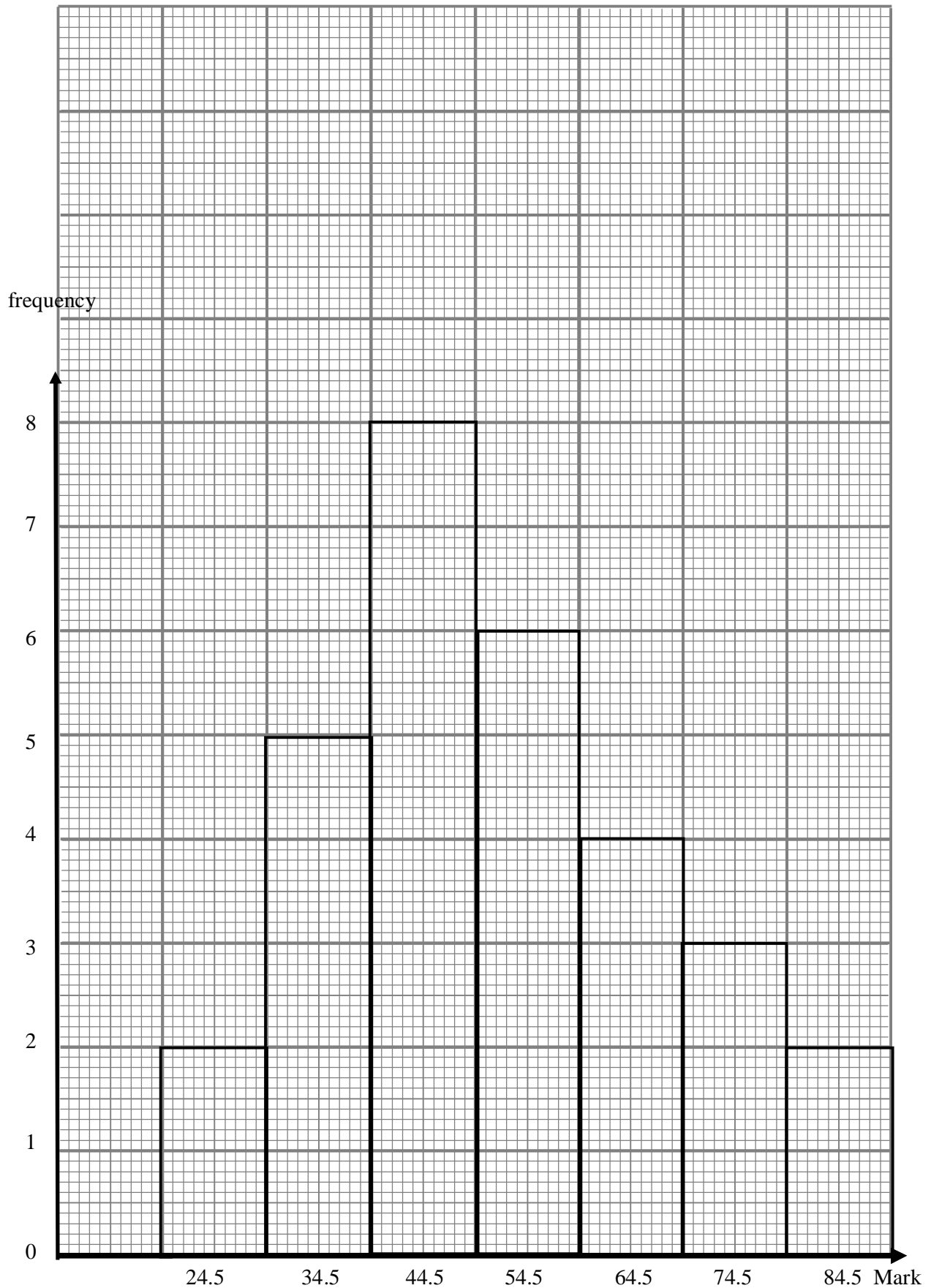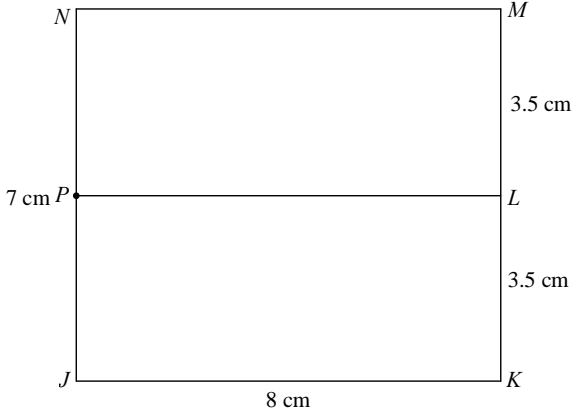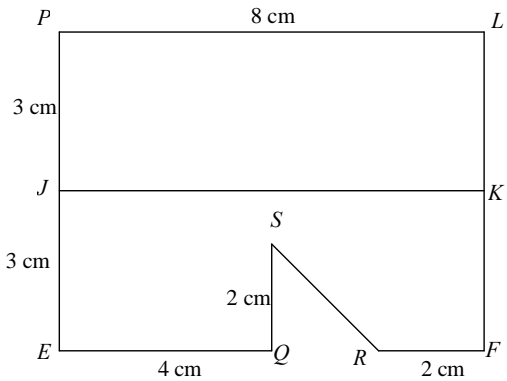| Question	Solution and Mark Scheme	Marks	
11 (*a*)	$\dfrac{1}{(3\times-1)-(2\times6)}\begin{pmatrix}-1 & -2 \\ -6 & 3\end{pmatrix}$ $\begin{pmatrix}\dfrac{1}{15} & \dfrac{2}{15} \\ \dfrac{6}{15} & -\dfrac{1}{5}\end{pmatrix}$	P2	2
(*b*)	$\begin{pmatrix}3 & 2 \\ 6 & -1\end{pmatrix}\begin{pmatrix}x \\ y\end{pmatrix}=\begin{pmatrix}9 \\ -7\end{pmatrix}$	P1	
	$\begin{pmatrix}x \\ y\end{pmatrix}=\dfrac{1}{(3)(-1)-(2)(6)}\begin{pmatrix}-1 & -2 \\ -6 & 3\end{pmatrix}\begin{pmatrix}9 \\ -7\end{pmatrix}$ <u>or</u> $\begin{pmatrix}x \\ y\end{pmatrix}=\overset{*}{\begin{pmatrix}Inverse \\ matrix\end{pmatrix}}\begin{pmatrix}9 \\ -7\end{pmatrix}$	K1	
	$x=-\dfrac{1}{3}$	N1	
	$y=5$	N1	4
			6
	<u>Note</u>: 1. $\begin{pmatrix}x \\ y\end{pmatrix}=\begin{pmatrix}-\dfrac{1}{3} \\ 5\end{pmatrix}$ as final answer, award N1 2. Do not accept any solution solved no using matrix method. 3. Do not accept $\overset{*}{\begin{pmatrix}inverse \\ matrix\end{pmatrix}}=\begin{pmatrix}3 & 2 \\ 6 & -1\end{pmatrix}$ <u>or</u> $\overset{*}{\begin{pmatrix}inverse \\ matrix\end{pmatrix}}=\begin{pmatrix}1 & 0 \\ 0 & 1\end{pmatrix}$		
12	(*a*) **$x=-4$, $y=3$** **$x=-1.5$, $y=8$**	K1 K1	**12**
	(*b*) <u>Graph</u> Axes drawn in correct direction, uniform scales in $-6\leq x\leq-0.75$ and $0\leq y\leq16$.	P1	
	All 6 points and *2 points correctly plotted <u>or</u> curve passes through these points $-6\leq x\leq-0.75$ and $0\leq y\leq16$.	K2	
	A smooth and continuous curve without any straight line and passes through all 9 correct points using the given scale for $-6\leq x\leq-0.75$ and $0\leq y\leq16$.	N1	
	<u>Note</u> : 1. 6 or 7 points correctly plotted, award K1. 2. Ignore curve out of range.		

Graf untuk Soalan12
Graph for Question **12**

www.tutormansor.com

	(*c*) (i) $4.6 \leq y \leq 5.0$	P1
	(ii) $-1.0 \leq x \leq = -0.8$	P1
	(*d*) $y = 2x + 12$ <u>*or*</u> *garis lurus* $y = 2x + 12$ *dilukis*	K1 K1
	$-4.8 \leq x \leq -4.65$, $-1.35 \leq x \leq -1.20$	N1 N1
13(*a*)(i)	(2 , 6)	P2
	<u>Note</u>: (4, 5) or (4, 5) marked , award P1	
(ii)	(7, 8)	P2
	<u>Note</u>: (9 , 7) or (9 , 7) marked, award P1	
(*b*)(i)(*a*)	**W**: Rotation, 90° clockwise at (10 , 10)	P3
	<u>Note</u> : 1. P2 : Rotation 90° clockwise or Rotation, at (10 , 10) / Putaran 90° ikut arah jam atau Putaran pada (10,10) 2. P1: Rotation// Putaran	
(*b*)	**V**: Enlargement at centre (13 , 10), with scale factor $\frac{1}{3}$ Note: P2: Enlargement at centre (13 , 10), or Enlargement with scale factor $\frac{1}{3}$ // Pembesaran pada (13 , 10) atau pembesaran dengan faktor skala $\frac{1}{3}$ P1: Enlargement// Pembesaran	P3
(ii)	$= \left(\frac{1}{3}\right)^2 \times 180$	K1
	20	N1
		12

Question	Solution and Mark Scheme	Marks	
14(*a*)(i)			

Marks *Markah*	Mid-point *Titik tengah*	Frequency *Kekerapan*	
20 ó 29	24.5	2	I
30 ó 39	34.5	5	II
40 ó 49	44.5	8	III
50 ó 59	54.5	6	IV
60 ó 69	64.5	4	V
70 ó 79	74.5	3	VI
80 ó 89	84.5	2	VII

Question	Solution and Mark Scheme	Marks	
	Marks : (II to VII)	P1	
	Mid point : (II to VII)	P1	
	Frequency : (I to VII)	P2	**4**
	Note : Allow two mistake in frequency for P1.		
(*b*)(i)	40 ó 49	P1	
(ii)	$$\frac{(2^{*}\times24.5)+(5^{*}\times34.5)+(8^{*}\times44.4)+(6^{*}\times54.5)+(4^{*}\times64.5)+(3^{*}\times74.5)+(2^{*}\times84.5)}{2^{*}+5^{*}+8^{*}+6^{*}+4^{*}+3^{*}+2^{*}}$$ *or* $\frac{1555}{30}$ Note: 1. Allow *midpoint for K1 $\frac{311}{6}$ *or* $51\frac{5}{6}$ *or* 51.83 Note: Correct answer from incomplete working, award Kk2	K2 N1	4
(*c*)	Axes drawn in correct direction and uniform scale for $24.5 \le x \le 84.5$ and $0 \le y \le 8$. *7 points correctly plotted Note : *5 or *6 points correctly plotted *or* bar passes through using at least 6 correct mid-point, award K1. Correct bar passes all 7 correct points for using given scales $24.5 \le x \le 84.5$	P1 K2 N1	4

www.tutormansor.com

Graf untuk Soalan14
Graph for Question **14**

www.tutormansor.com

Question	Solution and Mark Scheme	Marks	
15	Note :		

15 Note :

(1) Accept drawing only (not sketch).

(2) Accept diagrams with wrong labels and ignore wrong labels.

(3) Accept correct rotation of diagrams.

(4) Lateral inversions are not accepted.

(5) If more than 3 diagrams are drawn, award mark to the correct ones only.

(6) For extra lines (dotted or solid) except construction lines, no mark is awarded.

(7) If other scales are used with accuracy of ± 0.2 cm one way, deduct 1 mark from the N mark obtained, for each part attempted.

(8) Accept small gaps extensions at the corners.
For each part attempted :

   (i) If ≤ 0.4 cm, deduct 1 mark from the N mark obtained.

   (ii) If > 0.4 cm, no N mark is awarded.

(9) If the construction lines cannot be differentiated from the actual lines:

     (i) Dotted line :
       If outside the diagram, award the N mark.
       If inside the diagram, award N0.

     (ii) Solid line :
       If outside the diagram, award N0.
       If inside the diagram, no mark is awarded.

(10) For double lines or non-collinear or bold lines, deduct 1 mark from the N mark obtained, for each part attempted.

Question	Solution and Mark Scheme	Marks	
15(*a*)	 Correct shape with rectangles *JKMN* , *JKLP* and *PLMN* All solid lines. *JK > KM > KL=LM* Measurement correct to $\pm\,0 \cdot 2$ cm (one way) and all angles at vertices of rectangles = $90° \pm 1°$	K1 K1 dep K1 N1 dep K1K1	3

15(*b*)(i)	
	
	Correct shape with rectangle *PLKJ*, *SQ* perpendicular to EQ
	  All solid lines
	
	PL > LF > EQ > LK = KF > RF = QR = QS
	
	Measurement correct to $\pm\,0 \cdot 2$ cm (one way) and all angles at the
	  vertices of rectangles = $90° \pm 1°$
		K1
		
		K1
		dep K1
		
		N2
		dep
		K1K1
			4

Question	Solution and Mark Scheme	Marks
		5
15(*b*)(ii)	Correct shape All solid lines Note : Ignore *SV* *S* and *V* joined with dashed line to form rectangles *SVFG* *FG* > *LM* > *MG* Measurement correct to ± 0·2 cm (one way) and all angles at the vertices of rectangles = 90° ± 1°	K1 K1 dep K1 K1 dep K1K1 N2 dep K1K1K1
		5
		12
16(*a*)	$105°\,E$ // $105°\,T$) <u>Note :</u> $105°$ <u>*or*</u> $°\,E$ // $°\,T$, award P1	P2
(*b*)(i)	$\dfrac{3900}{60}$ $35°\,N$ // U	K1 N1N1
(ii)	$\theta \times 60 \times \cos 35° = 4669$ 20	K2 N1
(c)	$\dfrac{(75+105) \times 60 \times \cos 30}{600}$ 15.59 Note : $*\cos 45 \; + \; *(75 + 105)$, award K1	K2K1 N1
		12