PROGRAM PENINGKATAN PRESTASI AKADEMIK SPM

TAHUN 2013

MATEMATIK 1449/1

Kertas 1

1 ¼ jam Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam bahasa Melayu mendahului soalan yang sepadan dalam bahasa Inggeris.*
3. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Kertas soalan ini mengandungi 32 halaman bercetak.

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

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

6 Titik tengah / *Midpoint*, $(x, y) = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

7 Purata laju = $\frac{\text{Jarak yang dilalui}}{\text{Masa yang diambil}}$ / *Average speed* = $\frac{\textit{Distance travelled}}{\textit{Time taken}}$

8 Min = $\frac{\text{Hasil tambah nilai data}}{\text{Bilangan data}}$ / *Mean* = $\frac{\textit{Sum of data}}{\textit{Number of data}}$

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

Mean = $\frac{\textit{Sum of (class mark} \times \textit{frequency)}}{\textit{Sum of frequency}}$

10 $m = \frac{y_2-y_1}{x_2-x_1}$

11 $m = -\frac{\text{pintasan-}y}{\text{pintasan-}x}$ / $m = -\frac{y\text{-intercept}}{x\text{-intercept}}$

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 lines* × *Height*

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

3 Luas bulatan = πj^2
Areae 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 silinder = $\pi j^2 t$
Volume of cylinder = $\pi r^2 h$

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

8 Isipadu Sfera = $\frac{4}{3}\pi j^3$

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

9 Isipadu Kon = $\frac{1}{3}\pi j^3 t$

Volume of Cone = $\frac{1}{3}\pi r^3 h$

10 Isipadu Piramid Tegak = $\frac{1}{3}$ × Luas tapak × Tinggi

Volume of Right Pyramid = $\frac{1}{3}$ × *Area of base* × *Height*

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

12 $\frac{\text{Panjang lengkok}}{\text{Lilitan bulatan}} = \frac{\text{Sudut di pusat}}{360°}$

$\frac{\textit{Length of arc}}{\textit{Circumference of circle}} = \frac{\textit{Angle subtended at centre}}{360°}$

13 $\frac{\text{Luas sektor}}{\text{Luas bulatan}} = \frac{\text{Sudut di pusat}}{360°}$

$\frac{\textit{Area of sector}}{\textit{Area of circle}} = \frac{\textit{Angle subtended at centre}}{360°}$

14 Faktor skala / *Scale factor*, $k = \frac{PA'}{PA}$

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

1 Nombor yang manakah dibundarkan betul kepada tiga angka bererti?

Which number is rounded off correctly to three significant figures?

	Nombor / ***Number***	**Dibundarkan betul kepada tiga angka bererti** / ***Rounded off correctly to three significant figures***
A	34 540	34 600
B	34 560	34 600
C	0·005233	0·00524
D	0·005234	0·00524

2 Diberi bahawa $65\ 000 = m \times 10^n$, di mana $m \times 10^n$ adalah nombor dalam bentuk piawai.

Nyatakan nilai *m* dan nilai *n*.

Given that $65\ 000 = m \times 10^n$, *where* $m \times 10^n$ *is a number in standard form.*

State the value of m and of n.

A $m = 65, \quad n = 3$

B $m = 6·5, \quad n = -3$

C $m = 6·5, \quad n = 4$

D $m = 6·5, \quad n = -4$

3 $\dfrac{4 \times 5}{320\ 000} =$

A $1·41 \times 10^{-5}$

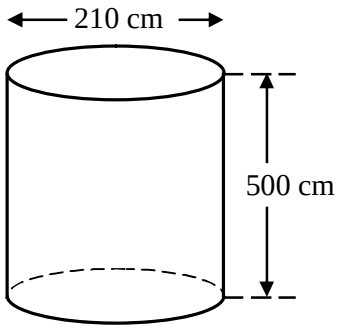
B $1·40 \times 10^{-5}$

C $1·41 \times 10^{-3}$

D $1·40 \times 10^{-3}$

4 Rajah 4 menunjukkan sebuah silinder yang kosong dengan ketinggian 500 cm dan diameter 210 cm. Seorang pekerja memasukkan air ke dalam silinder itu sehingga penuh.

Diagram 4 *shows an empty cylinder with the height is* 500 cm *and the diameter is* 210 cm. *A worker fills up the cylinder full with water.*



Rajah 4
Diagram 4

Hitungkan isipadu, dalam cm^3, air yang perlu dimasukkan ke dalam tiga bekas silinder yang sama saiz.

Calculate the volume, in cm^3, *of water needed to fill up three cylinders of the same size.*
(Use $\pi = \frac{22}{7}$)

A 1.73×10^7

B 5.20×10^7

C 1.73×10^8

D 5.20×10^8

5 Apakah nilai bagi digit 4, dalam asas lima, bagi nombor $60\,462_{10}$?

What is the value of the digit 4, *in base five, of the number* $60\,462_{10}$

A 1300_5

B 3000_5

C 3010_5

D 3100_5

6 1101101_2 ï 10101_2 =

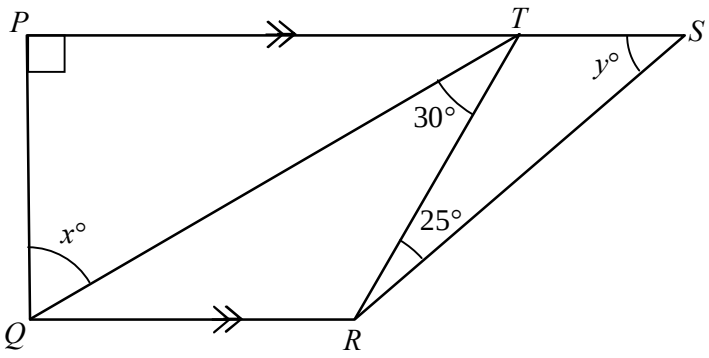
A 1001000_2

B 1010100_2

C 1011000_2

D 1101000_2

7 Dalam Rajah 7, *PQRS* ialah trapezium. Titik *T* berada di atas garis lurus *PS*.
In Diagram 7, *PQRS is a trapezium. Point T lies on the straight line PS.*



Rajah 7
Diagram 7

Diberi *QR* = *RT*, cari nilai $x + y$.
Given QR = RT, find the value of $x + y$.

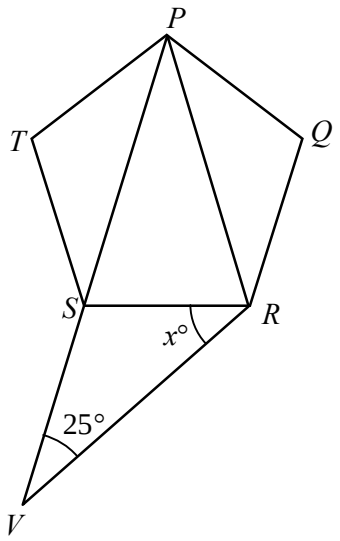
A 35°

B 60°

C 85°

D 95°

8 Rajah 8 menunjukkan sebuah pentagon sekata *PQRST* dan *PSV* adalah garis lurus.
Diagram 8 *shows a regular pentagon PQRST and PSV is a straight line.*



Rajah 8
Diagram 8

Cari nilai *x*.
Find the value of x.

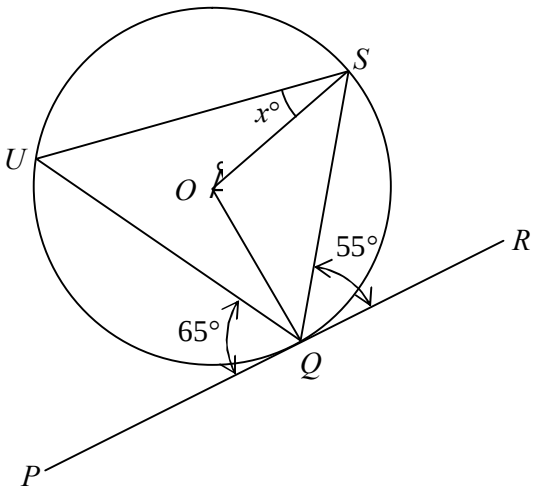
A 72

B 65

C 47

D 36

9. Dalam Rajah 9, *PQR* ialah tangen kepada bulatan berpusat *O*, di *Q*.
In Diagram 9, *PQR is a tangent to the circle centre O, at Q.*



Rajah 9
Diagram 9

Cari nilai *x*.
Find the value of x.

A 25

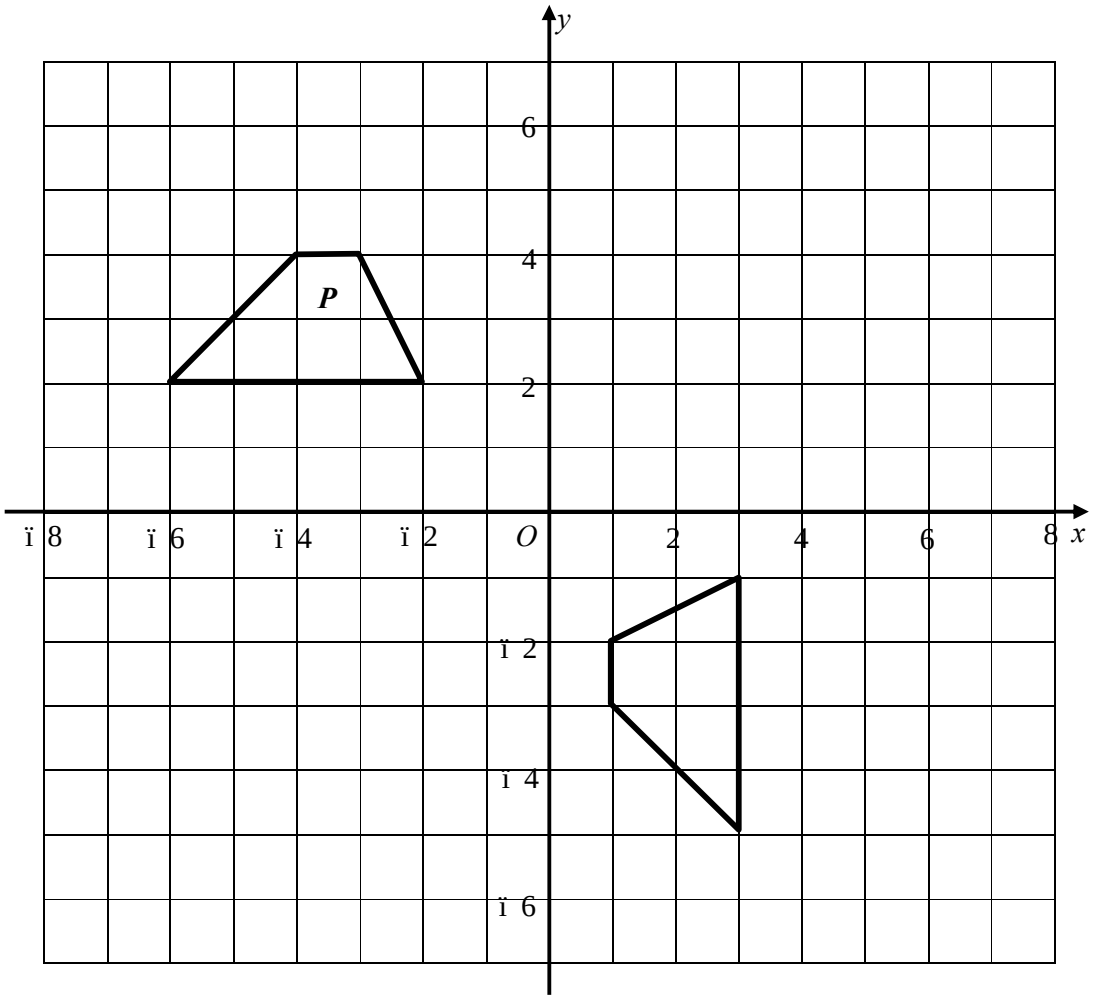
B 30

C 35

D 55

10 Dalam Rajah 10, sisi empat *P* ialah imej bagi sisi empat *Q* di bawah suatu putaran 90° ikut arah jam.

In Diagram 10*, quadrilateral P is the image of quadrilateral Q under a clockwise rotation of* 90°.



Rajah 10
Diagram 10

Nyatakan pusat putaran itu.

State the centre of rotation.

A (1, 0)

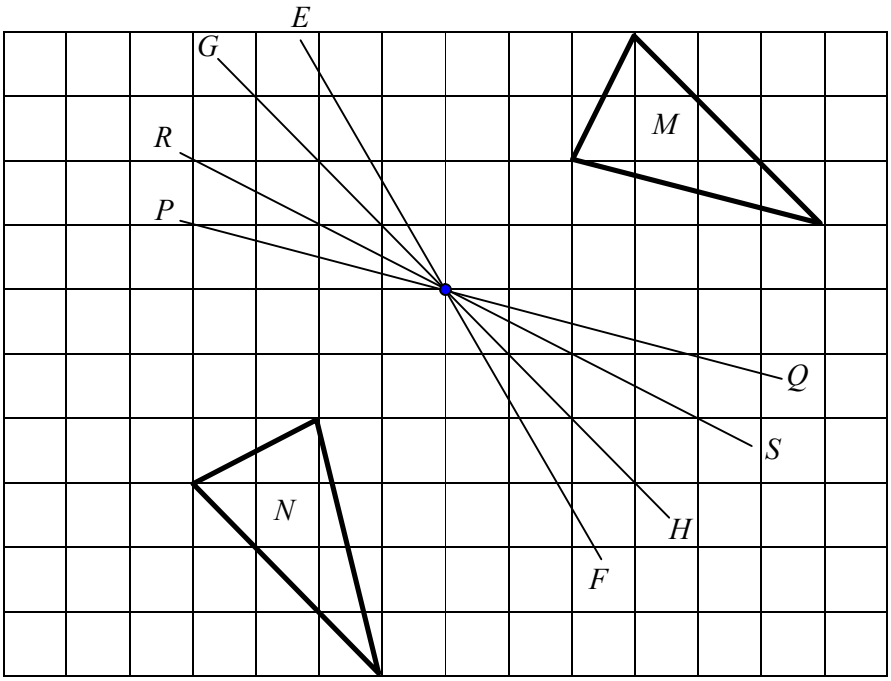
B (1, 2)

C (2, 2)

D (2, 3)

11 Rajah 11 menunjukkan dua segi tiga, *M* dan *N*, dan empat garis lurus, *EF, GH, PQ* dan *RS*, dilukis pada grid segi empat sama. Segi tiga *N* adalah imej bagi segi tiga *M* di bawah suatu pantulan.

Diagram 11 *shows two triangles, M and N, and four straight lines, EF, GH, PQ and RS, drawn on square grids. Triangle N is the image of triangle M under a reflection.*



Rajah 11
Diagram 11

Paksi pantulan itu ialah garis lurus

The axis of the reflection is the straight line

A *RS*

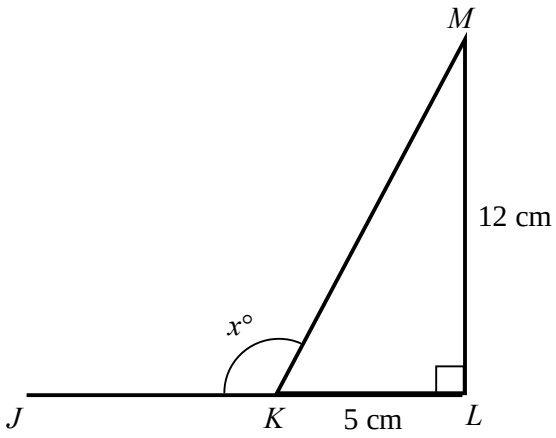
B *PQ*

C *GH*

D *EF*

12 Dalam Rajah 12, *JKL* ialah garis lurus.

In Diagram 12, *JKL is a straight line.*



Rajah 12
Diagram 12

Apakah nilai bagi kos $x°$?

What is the value of cos $x°$?

A $\frac{5}{13}$

B $\frac{12}{13}$

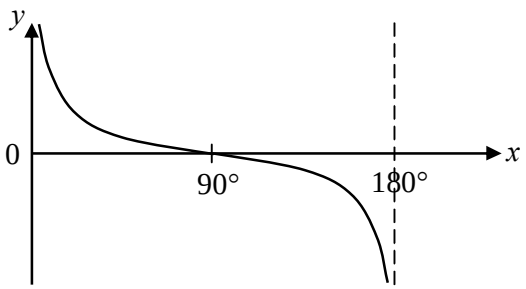
C $-\frac{12}{13}$

D $-\frac{5}{13}$

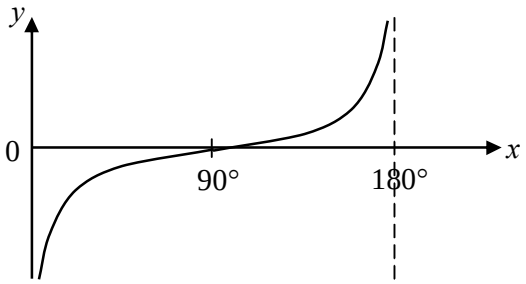
13. Graf manakah di antara yang berikut mewakili $y = \tan x$?

Which of the following graphs represents $y = \tan x$?

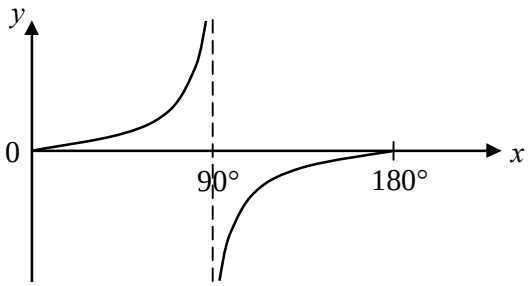
A



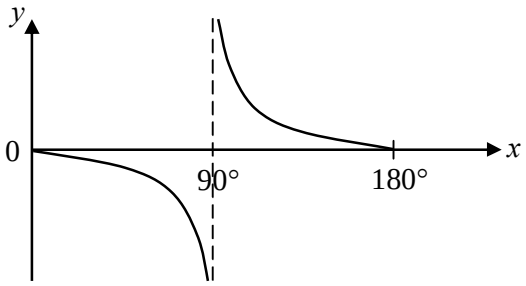
B



C

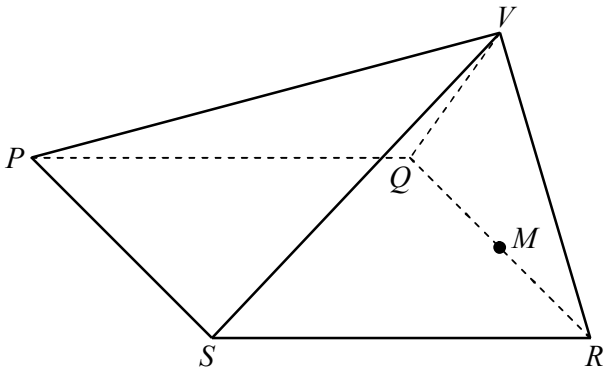


D



14 Rajah 14 menunjukkan sebuah piramid dengan tapak mengufuk *PQRS*. *M* ialah titik yang berada di atas garis *QR*.

Diagram 14 *shows a pyramid with a horizontal base PQRS. M is a point on the line QR.*



Rajah 14
Diagram 14

Puncak *V* berada tegak di atas *M*.
Namakan sudut di antara garis *SV* dengan satah *PQRS*.

Vertex *V* is vertically above *M*.
Name the angle between the line SV and the plane PQRS.

A $\angle VSQ$

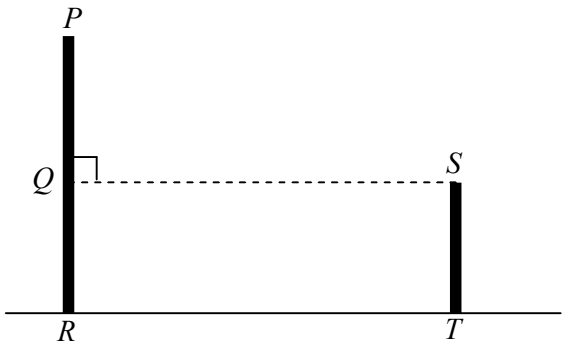
B $\angle VSM$

C $\angle SVQ$

D $\angle SVM$

15 Dalam Rajah 15, *PQR* dan *ST* ialah dua batang tiang tegak yang terletak pada satah mengufuk.

In Diagram 15, *PQR and ST are two vertical poles on a horizontal plane.*



Rajah 15
Diagram 15

Namakan sudut tunduk *T* dari *Q*.

Name the angle of depression of T from Q.

A $\angle TQS$

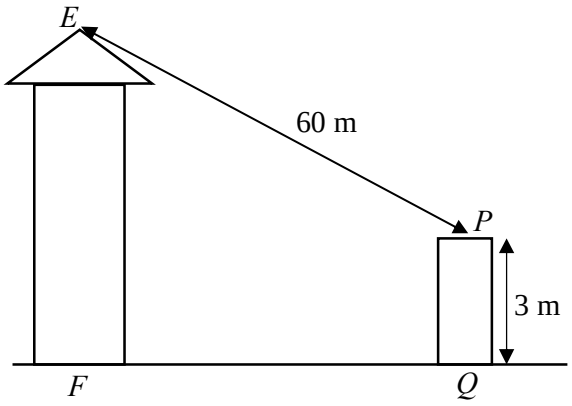
B $\angle TQR$

C $\angle QTS$

D $\angle QTR$

16 Rajah 16 menunjukkan sebatang tiang tegak, *PQ* dan sebuah menara tegak *EF*, yang terletak di atas satah mengufuk. Sudut dongakan *E* dari *P* ialah 50°.

Diagram 16 *shows a vertical pole, PQ and a vertical tower EF on a horizontal plane. The angle of elevation of E from P is* 50°.



Rajah 16
Diagram 16

Hitung tinggi, dalam m, menara itu dari satah mengufuk.

Calculate the height, in m*, of the vertical tower from the horizontal plane.*

A 38·57

B 41·57

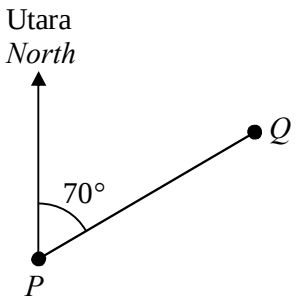
C 45·96

D 48·96

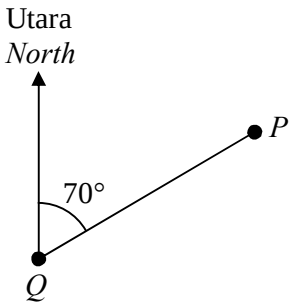
17 Titik *P* dan titik *Q* terletak pada suatu satah mengufuk. Bearing *Q* dari *P* ialah 070°.
Rajah manakah yang menunjukkan kedudukan bagi *P* dan *Q* ?

Point P and point Q lie on a horizontal plane. The bearing of Q from P is 070°.
Which diagram shows the positions of P and Q ?

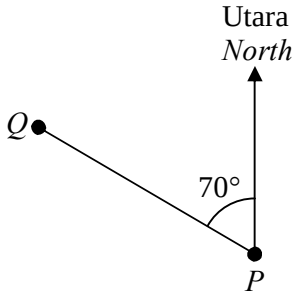
A



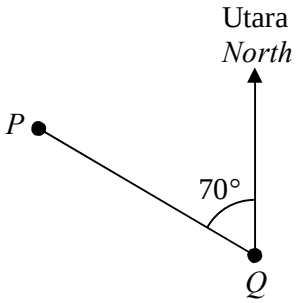
B



C

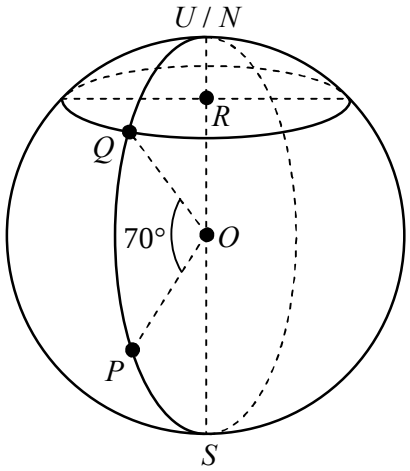


D



18 Dalam Rajah 18, *U* ialah Kutub Utara, *S* ialah Kutub Selatan dan *O* ialah pusat bumi. *R* ialah pusat bulatan bagi latitud 30°*U*. Longitud *Q* ialah 50°*T*.

In Diagram 18, *N is the North Pole, S is the South Pole and O is the centre of the earth. R is the centre of the circle of latitude* 30°*N. The longitude of Q is* 50°*E*.



Rajah 18
Diagram 18

Cari kedudukan titik *P*.

Find the position of point P.

A (30° *S*, 50° *T*)
(30° *S*, 50° *E*)

B (40° *S*, 50° *T*)
(40° *S*, 50° *E*)

C (50° *S*, 50° *T*)
(50° *S*, 50° *E*)

D (70° *S*, 50° *T*)
(70° *S*, 50° *E*)

19 $(p - 2q)^2 - (p + q)(p - q) =$

A $q^2 - 4pq$

B $3q^2 - 4pq$

C $5q^2 - pq$

D $5q^2 - 4pq$

20 Ungkapkan $\frac{p+2}{9p+3pq} \times \frac{9-q^2}{2pq+4q}$ sebagai satu pecahan tunggal dalam bentuk termudah.

Express $\frac{p+2}{9p+3pq} \times \frac{9-q^2}{2pq+4q}$ *as a single fraction in its simplest form.*

A $\frac{3-q}{6pq}$

B $\frac{3+q}{6pq}$

C $\frac{6pq}{3-q}$

D $\frac{6pq}{3+q}$

21 Diberi $t - (m + 2) = 3m$, ungkapkan m dalam sebutan t.

Given $t - (m + 2) = 3m$, *express* m *in terms of* t.

A $m = \frac{t+2}{4}$

B $m = \frac{t-2}{4}$

C $m = \frac{t+2}{2}$

D $m = \frac{t-2}{2}$

22 Diberi bahawa $\frac{1}{x-2} = \frac{5}{3x+2}$, hitung nilai x.

Given that $\frac{1}{x-2} = \frac{5}{3x+2}$, *calculate the value of* x.

A 6

B 2

C -6

D -2

23 $3^{-\frac{2}{3}} =$

A $\sqrt[3]{3^2}$

B $\sqrt{3^3}$

C $\frac{1}{\sqrt[3]{3^2}}$

D $\frac{1}{\sqrt{3^3}}$

24 Ringkaskan:
Simplify:

$$\left(s^{\frac{1}{3}} t^3 \div \right)^3 \div s^{-1} t^{14}$$

A $s^2 t^5$

B $s^2 t^{-5}$

C $s^2 t^{23}$

D $s^2 t^{-23}$

25 Senaraikan semua integer x yang memuaskan ketaksamaan linear $1-2x \geq 5$.

List all the integers x that satisfy the linear inequalities $1-2x \geq 5$.

A é , ï 4, ï 3, ï 2

B ï 2, ï 1, 0, ...

C é 0, 1, 2

D 2, 3, 4, ...

26 Cari penyelesaian bagi $11 - 5x \leq 3(x + 1)$.

Find the solution for $11 - 5x \leq 3(x + 1)$.

A $x \leq 1$

B x Ó1

C $x \leq -1$

D x Ó–1

27 Rajah 27 ialah sebuah piktogram yang menunjukkan bilangan basikal yang dijual oleh sebuah syarikat dalam tempoh empat bulan. Bilangan basikal yang dijual pada bulan Julai tidak ditunjukkan.

Diagram 27 *is a pictogram showing the number of bicycles sold by a company in the duration of four months. The number of bicycles sold in July is not shown*.

Mei *May*	
Jun *June*	
Julai *July*	
Ogos *August*	

 mewakili 20 buah basikal
represents 20 bicycles

Rajah 27
Diagram 27

Nisbah bilangan basikal yang dijual pada bulan Jun kepada bilangan basikal yang dijual pada bulan Julai ialah 5 : 6.

Hitung bilangan basikal yang dijual pada bulan Julai.

The ratio of the number of the bicycles sold in June to the number of the bicycles sold in July is 5 : 6.

Calculate the number of bicycles sold in July.

A 35

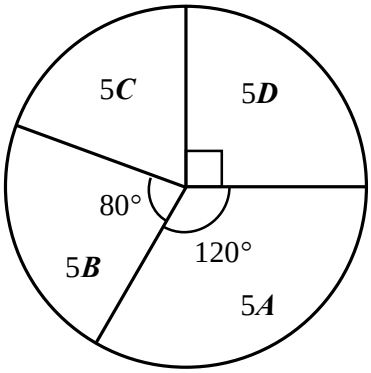
B 60

C 96

D 120

28 Rajah 28 ialah sebuah carta pai yang menunjukkan bilangan murid yang memperoleh keputusan cemerlang dalam suatu ujian Matematik di sebuah sekolah.

Diagram 28 *is a pie chart showing the number of pupils who have achieved excellent result during a Mathematics test in a school.*



Rajah 28
Diagram 28

Diberi bilangan murid kelas 5***B*** yang memperoleh keputusan cemerlang ialah 32 orang.

Hitung bilangan murid dari kelas 5***C*** yang memperoleh keputusan cemerlang dalam ujian itu.

Given the number of pupils who achieve excellent result in 5***B*** *is* 32.

Calculate the number of pupils in 5***C*** *who have achieved excellent result.*

A 20

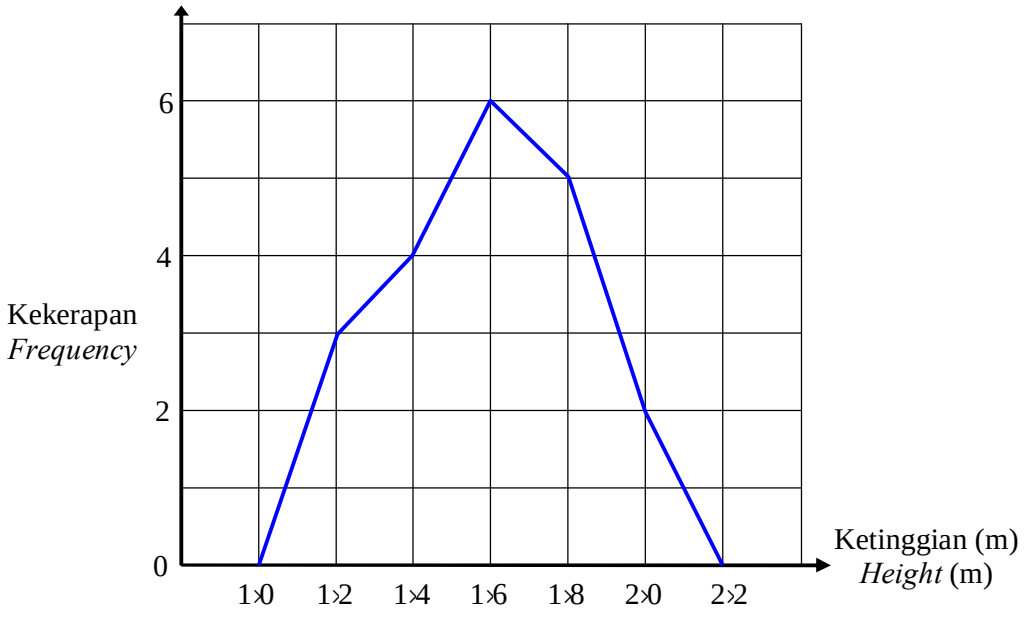
B 24

C 28

D 36

29 Rajah 29 ialah sebuah poligon kekerapan yang menunjukkan taburan ketinggian bagi sekumpulan murid.

Diagram 29 *is a frequency polygon showing the distribution of heights for a group of pupils*.



Rajah 29
Diagram 29

Hitung min ketinggian bagi murid-murid itu.

Calculate the mean height of the pupils.

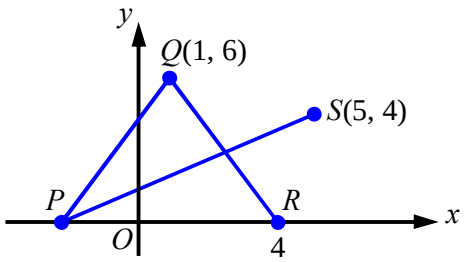
A 1·51

B 1·53

C 1·55

D 1·59

30 Rajah 30 ialah satah Cartesan. *P* dan *R* terletak pada paksi-*x*.
Diagram 30 *is a Cartesian plane. P and R are on x-axis.*



Rajah 30
Diagram 30

Diberi $PQ = QR$, hitungkan kecerunan garis lurus *PS*.
Given $PQ = QR$, *calculate the gradient of the straight line PS.*

A $\frac{2}{5}$

B $\frac{2}{3}$

C $\frac{3}{4}$

D $\frac{4}{7}$

31 Garis lurus $y = -3x + 10$ dan $y = -px + 6$ bersilang pada titik $(2, q)$.
Straight lines $y = -3x + 10$ *and* $y = -px + 6$ *are intersect at point* $(2, q)$

Cari nilai *p*.
Find the value of p.

A -1

B 1

C 2

D 3

32 Antara garis lurus berikut, yang manakah **TIDAK** mempunyai pintasan-y yang sama dengan 4 ?

*Among the following straight lines, which y-intercept of the straight line does **NOT** equal to* 4 ?

A $2y + 3x = 8$

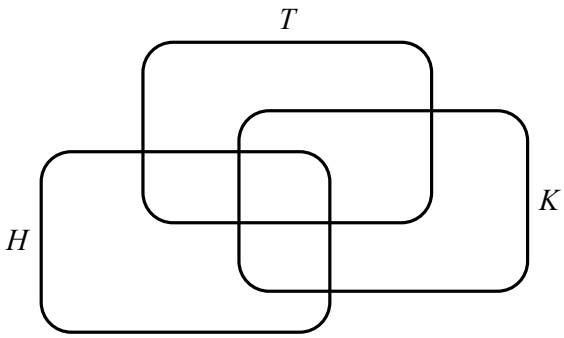
B $y - 4 = 2x$

C $4y = 2x - 16$

D $-2x + 12 = 3y$

33 Rajah 33 ialah gambar rajah Venn menunjukkan hubungan antara set H, set K dan set T.

Diagram 33 *is the Venn diagram showing the relation between set H, set K and set T.*



Rajah 33
Diagram 33

Diberi bahawa set semesta, $\xi = H \cup K \cup T$, $n(H) = 27$, $n(K) = 25$, $n(H \cap K) = 13$ dan $n(\xi) = 50$. Cari $n(H \cup K)'$.

Given that the universal set, $\xi = H \cup K \cup T$, $n(H) = 27$, $n(K) = 25$, $n(H \cap K) = 13$ *and* $n(\xi) = 50$. *Find* $n(H \cup K)'$.

A 11

B 12

C 13

D 14

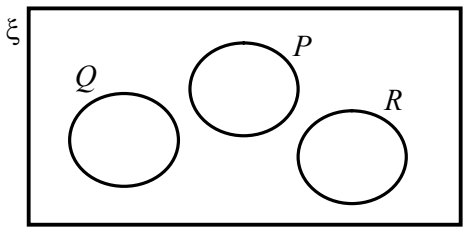
34 Diberi bahawa
set semesta, $\xi = \{x: 2 \le x \le 20, x \text{ ialah integer}\}$,
set $P = \{x: x \text{ ialah nombor perdana}\}$,
set $Q = \{x: x \text{ ialah nombor kuasa dua sempurna}\}$ dan
set $R = \{x: x \text{ ialah gandaan } 4\}$.

Gambar rajah Venn manakah yang mewakili hubungan ini?

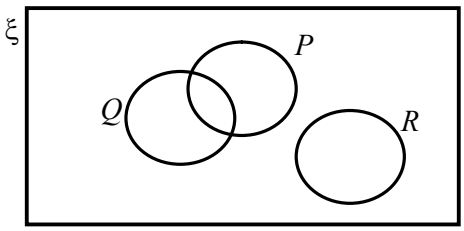
It is given that
the universal set, $\xi = \{x: 2 \le x \le 20, x \text{ are integers}\}$,
set $P = \{x: x \text{ is prime number}\}$,
set $Q = \{x: x \text{ is perfect square}\}$ *and*
set $R = \{x: x \text{ is multiples of } 4\}$.

Which of the following Venn diagram represents these relationships?

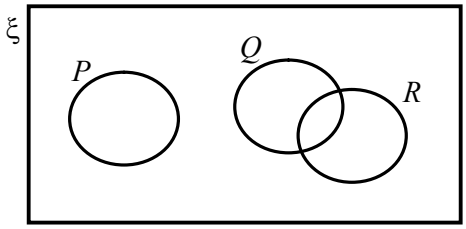
A



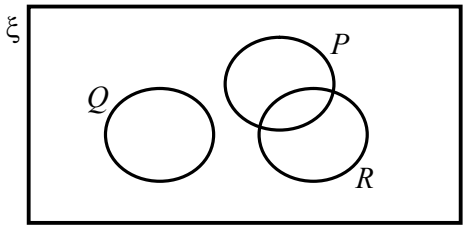
B



C



D



35 Jadual 35 menunjukkan bilangan ahli bagi pelbagai persatuan di sebuah sekolah.
Table 35 *showing the number of members of different societies in a school.*

Persatuan ***Society***	**Bilangan** ***Nu er***
Sains *Science*	40
Matematik *Mathematics*	60
Sejarah *History*	x
Bahasa Melayu *Malay Languague*	50

Jadual 35
Table 35

Seorang murid dipilih secara rawak daripada sekolah tersebut, kebarangkalian bahawa murid itu adalah ahli Persatuan Sejarah ialah $\frac{2}{5}$. Hitungkan nilai x.

A pupil is chosen at random from the school, the probability that the pupil is a member of History Society is $\frac{2}{5}$. *Calculate the value of* x.

A 50

B 80

C 100

D 120

36 Rajah 36 menunjukkan dua belas kad yang berlabel dengan huruf *X, Y* dan .

Diagram 36 *showing twelve cards labelled with letters X, Y and* .

Rajah 36
Diagram 36

Sekeping kad dipilih secara rawak. Hitung kebarangkalian bahawa kad yang dipilih itu **TIDAK** berlabel dengan huruf .

A card is chosen at random. Calculate the probability that the card chosen is ***NOT*** *labelled with the letter* .

A $\frac{1}{4}$

B $\frac{1}{3}$

C $\frac{2}{3}$

D $\frac{3}{4}$

37 Jadual 37 menunjukkan nilai-nilai bagi pembolehubah, *S*, *P* dan *M*.

Table 37 *shows the values for variables, S, P and M.*

S	3	4
P	9	27
M	16	*w*

Jadual 37
Table 37

Jika *S* berubah secara langsung dengan *P* dan secara songsang dengan punca kuasa dua *M*, hitung nilai *w*.

If S varies directly as P and varies inversely as square roots of M, calculate the value of w.

A 3

B 9

C 27

D 81

38 Diberi bahawa *m* berubah secara langsung dengan n^2 dan $m = 64$ apabila $n = 4$.

Nyatakan *m* dalam sebutan *n*.

It is given that m is directly proportional to n^2 *and* $m = 64$ *when* $n = 4$.

Express m in terms of n.

A $m = n^2$

B $m = 4n^2$

C $m = 8n^2$

D $m = 16n^2$

39 Diberi:

Given:

$$\begin{pmatrix} h & 4 \end{pmatrix}\begin{pmatrix} 2 & 0 \\ -h & 1 \end{pmatrix}=\begin{pmatrix} 12 & 4 \end{pmatrix}.$$

Cari nilai h.

Find the value of h.

A –6

B –2

C 2

D 6

40 Diberi bahawa $3 \quad +\begin{pmatrix} 1 & 4 \\ 0 & -3 \end{pmatrix}=\begin{pmatrix} 16 & 10 \\ -6 & 9 \end{pmatrix}$.

Cari matriks .

It is given that $3 \quad +\begin{pmatrix} 1 & 4 \\ 0 & -3 \end{pmatrix}=\begin{pmatrix} 16 & 10 \\ -6 & 9 \end{pmatrix}$.

Find matrix .

A $\begin{pmatrix} 5 & 2 \\ -2 & 4 \end{pmatrix}$

B $\begin{pmatrix} 5 & 2 \\ 2 & 2 \end{pmatrix}$

C $\begin{pmatrix} 17 & 14 \\ -6 & 6 \end{pmatrix}$

D $\begin{pmatrix} 15 & 6 \\ -6 & 12 \end{pmatrix}$

END O UESTION PAPER
ERTAS SOALAN TAMAT

IN ORMATION OR CANDIDATES
MA LUMAT UNTU CALON

1. Kertas soalan ini mengandungi **40** soalan.

   This question paper consists of **40** *questions*.

2. Jawab **semua** soalan.

   Answer ***a*** *questions*.

3. Jawab setiap soalan dengan menghitamkan ruangan yang betul pada kertas jawapan objektif.

   Answer each question by blackening the correct space on the objective answer sheet.

4. Hitamkan **satu** ruangan sahaja bagi setiap soalan.

   Blacken only ***one*** *space for each question.*

5. Sekiranya anda hendak menukarkan jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.

   If you wish to change your answer, erase the blackened mark that you have made. Then blacked the space for the new answer.

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

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

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

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

8. Sebuah buku sifir empat angka disediakan.

   A booklet of four-figure mathematical tables is provided.

9. Anda dibenarkan menggunakan kalkulator saintifik.

   You may use a scientific calculator.

NAMA : é ..

ANGKA GILIRAN : é é é é é é é é é TINGKATAN 5 : é ....

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

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.*

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			

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

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

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

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

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

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

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

Mean = $\frac{\textit{sum of data}}{\textit{number of data}}$

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

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

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

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

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

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 = $\frac{1}{3} \times j^2 t$

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

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

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

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

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

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

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

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*

Untuk Kegunaan Pemeriksa *For Examiner's Use*

Bahagian A
***Section* A**

[52 marks / *markah*]

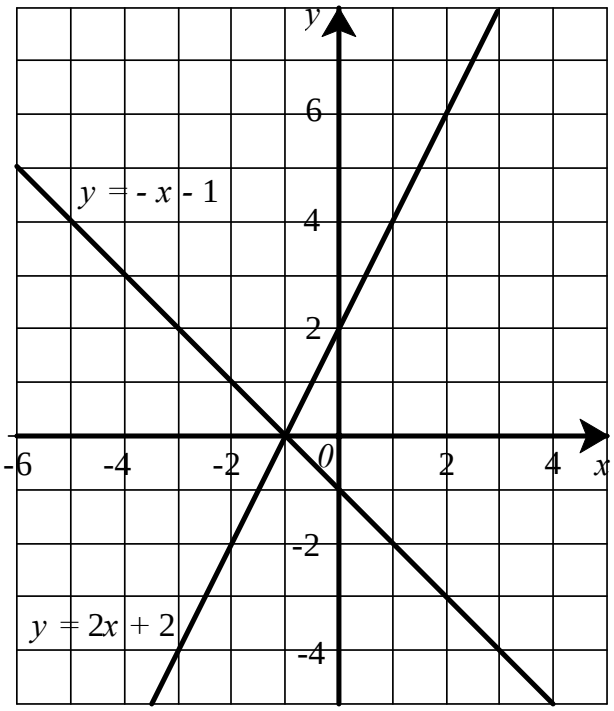
Answer **all** questions in this section.
Jawab **semua** *soalan dalam bahagian ini*.

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

On the graph in the answer space, shade the region which satisfies the three inequalities $y \leq 2x + 2$, $y \geq$ ï x ï 1 *dan* $x < 1$.

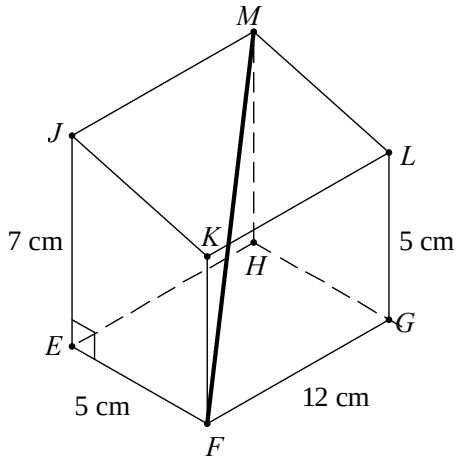
[3 markah/ *marks*]

Jawapan / *Answer*:



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*)

Untuk Kegunaan Pemeriksa
For Examiner's Use

Untuk Kegunaan Pemeriksa *For Examiner's Use*

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*:

$$x + 3y = 11$$

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

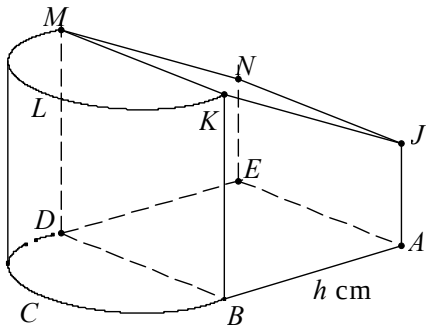
[4 markah/ *marks*]

Jawapan / *Answer* :

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.*

Untuk Kegunaan Pemeriksa
For Examiner's Use



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

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

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

Untuk Kegunaan Pemeriksa *For Examiner's Use*

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

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

Determine whether the statement is true or false.

$3^{-2} = \frac{1}{9}$ *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*) é

(*b*) é

é é

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

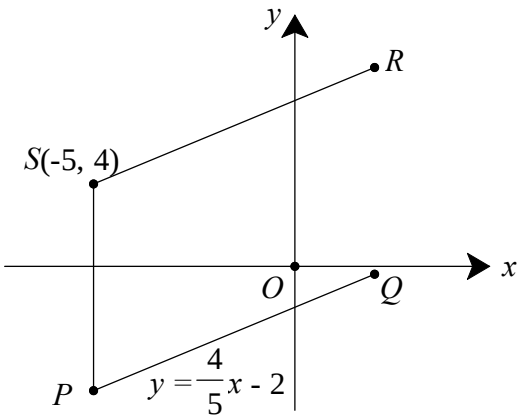
é é

(*d*) é

Untuk Kegunaan Pemeriksa *For Examiner's Use*

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* :

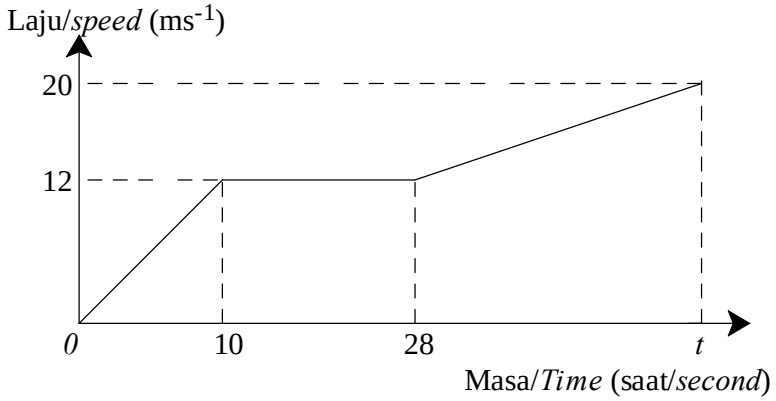
(*a*)

(*b*)

Untuk Kegunaan Pemeriksa *For Examiner's Use*

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*)

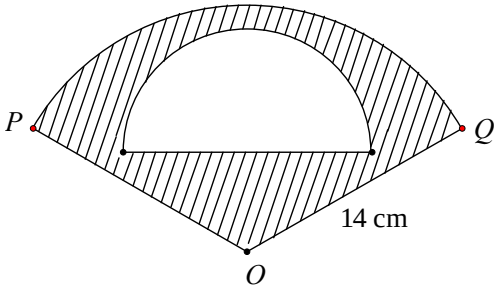
(*b*)

(*c*)

Untuk Kegunaan Pemeriksa
For Examiner's Use

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

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



Rajah 9
Diagram 9

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

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

(*a*) perimeter, dalam cm, kawasan yang berlorek,
the perimeter, in cm, *of the shaded region.*

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

[6 markah/ *marks*]

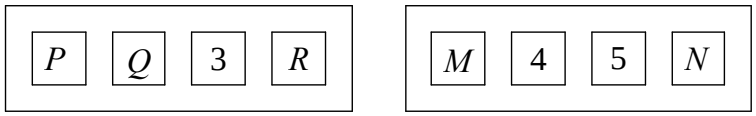
Jawapan/ *Answer*:

(*a*)

(*b*)

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.*



Kotak *A* *Box A*

Kotak *B* *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)

`

Untuk Kegunaan Pemeriksa
For Examiner's Use

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*)

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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 $y = -\frac{12}{x}$ dengan menulis nilai-nilai y apabila $x = \text{ï } 4$ dan $x = \text{ï } 1.5$.

Complete Table 12 *in the answer space on page* 16 *for the equation* $y = -\frac{12}{x}$ *by writing down the values of* y *when* $x = \text{ï } 4$ *and* $x = \text{ï } 1.5$.

[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 $y = -\frac{12}{x}$ untuk $\text{ï } 6 \le x \le \text{ï } 0.75$ dan $0 \le y \le 16$.

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* $y = -\frac{12}{x}$ *for* $\text{ï } 6 \le x \le \text{ï } 0.75$ *and* $0 \le y \le 16$.

[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*]

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

Jadual 12
Table 12

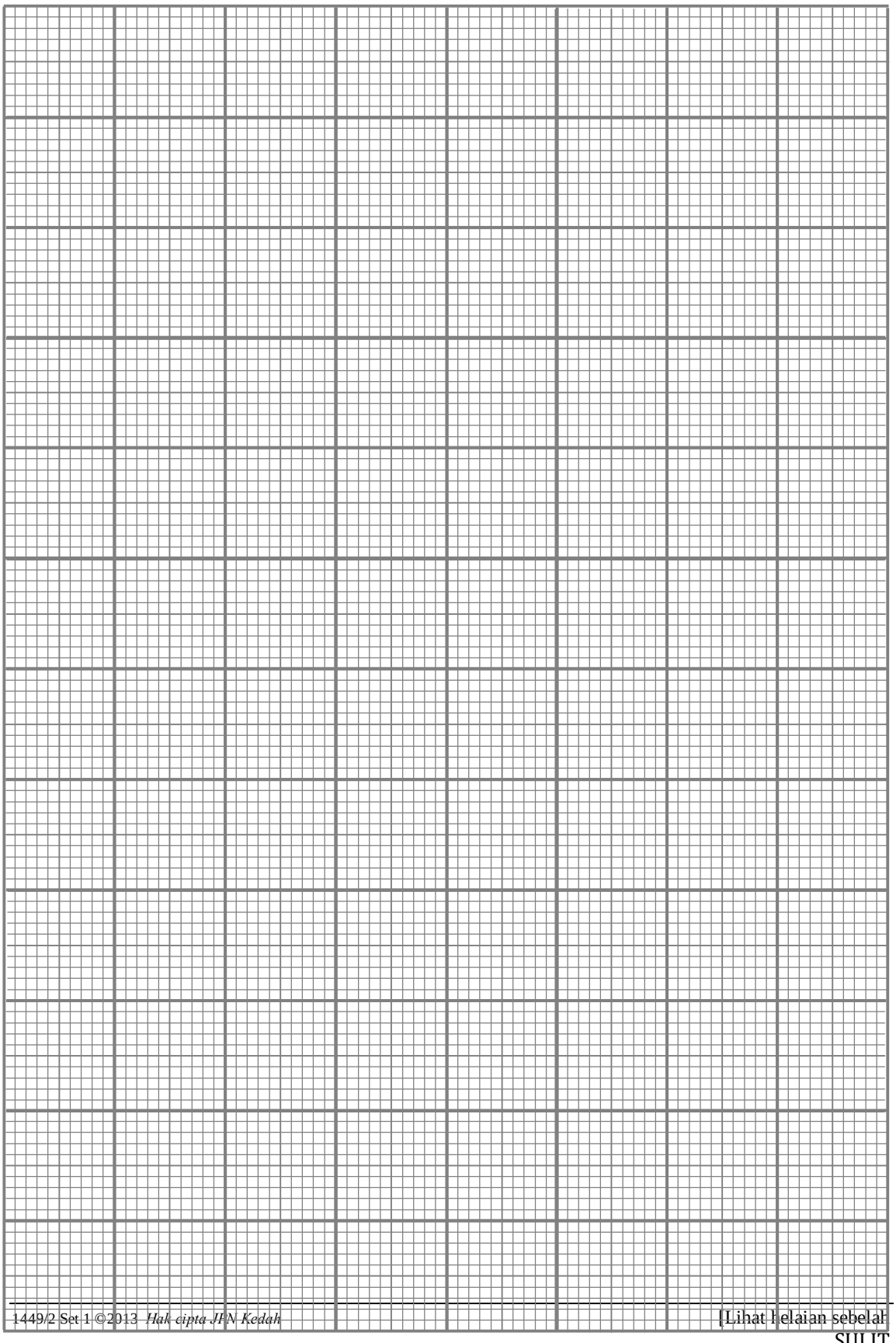
(*b*) Rujuk graf di halaman 17.
Refer graph on page 17.

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

(ii) x = ...

(*d*) x =

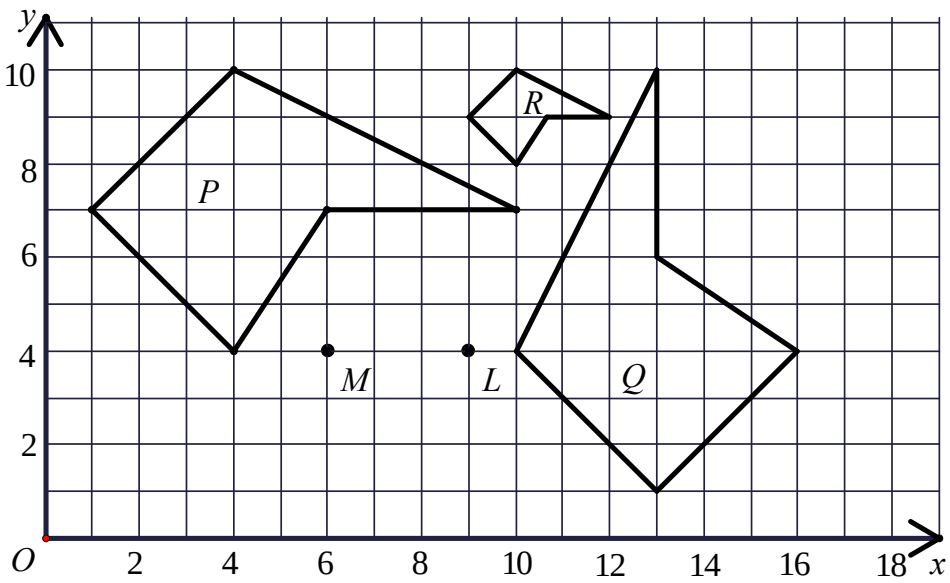
Graf untuk Soalan12
Graph for Question 12



Untuk Kegunaan Pemeriksa
For Examiner's Use

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) $\mathbf{T}^2$,

(ii) **TU.**

[4 markah/ *marks*]

Jawapan / *Answer* :

(*a*) (i)

(ii)

(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 cm^2, hitung luas, dalam cm^2, kawasan yang diwakili oleh *R.*

Given Q represents a region of area 180 cm^2*, calculate the area, in* cm^2*, of the region represented by R.*

[8 markah/ *marks*]

Untuk Kegunaan Pemeriksa

For Examinerôs Use

Jawapan / *Answer* :

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

(*b*)

(ii)

Untuk Kegunaan Pemeriksa
For Examiner's Use

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*]

Answer / *Jawapan*:

Untuk Kegunaan Pemeriksa

For Examiner's Use

(*a*) (i)

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

Table 14
Jadual 14

(*b*) (i)

(ii)

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

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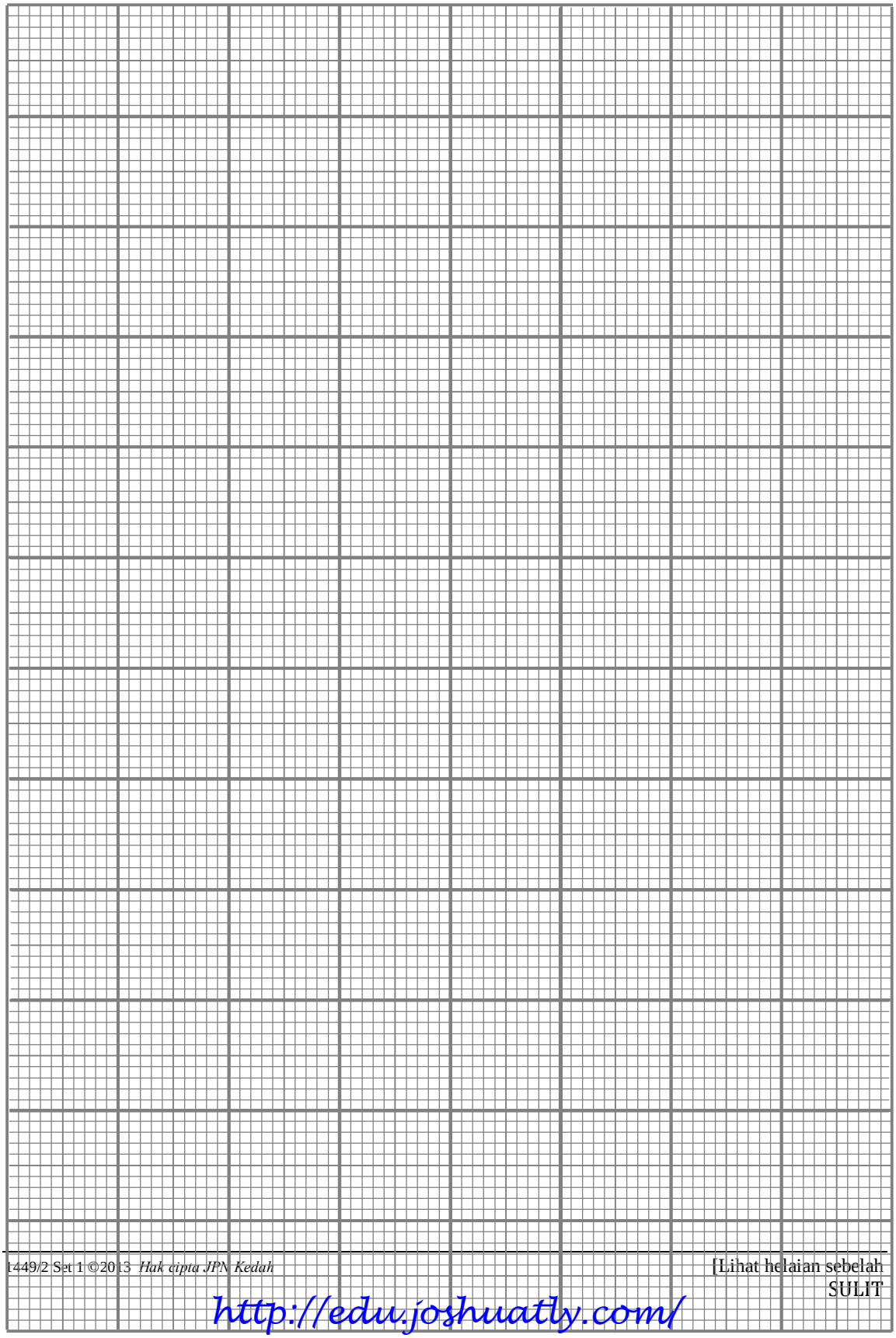
Graf untuk Soalan14
Graph for Question 14

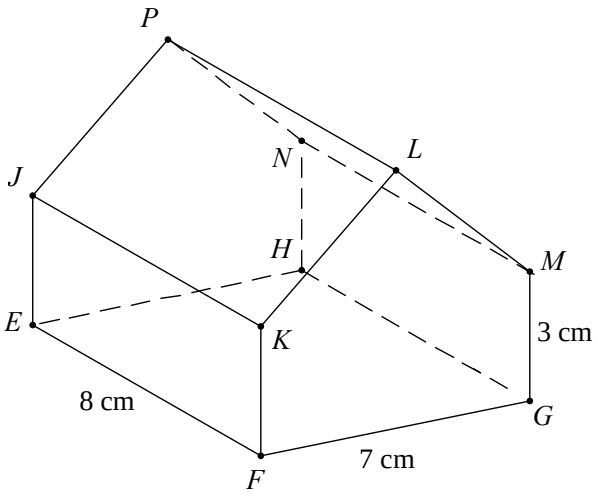


Untuk Kegunaan Pemeriksa *For Examiner's Use*

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*]

Jawapan / *Answer* :

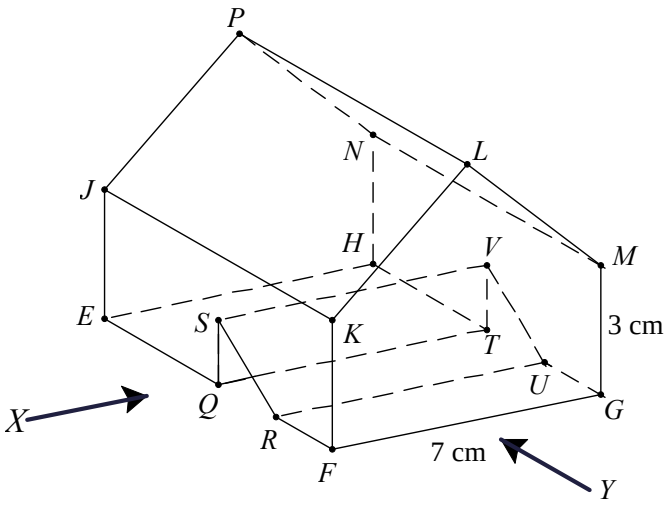
(*a*)

Untuk Kegunaan Pemeriksa *For Examiner's Use*

Untuk Kegunaan Pemeriksa *For Examiner's Use*

(*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*]

Jawapan / *Answer* :

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

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Untuk Kegunaan Pemeriksa *For Examiner's Use*

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	$30^{o}S$ $30^{o}S$	$75^{o}B$ $75^{o}W$
Q	$x^{o}U$ $x^{o}N$	$75^{o}B$ $75^{o}W$
R	$x^{o}U$ $x^{o}N$	$y^{o}T$ $y^{o}E$

(*a*) *P* ialah titik di permukaan bumi dengan keadaan *JP* ialah diameter selarian latitud $30^{o}S$.
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 $30^{o}S$.
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 latitude 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 n*autical 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*]

Jawapan / *Answer* :

(*a*)

(*b*) (i)

(ii)

(*c*)

Untuk Kegunaan Pemeriksa *For Examiner's Use*

KERTAS SOALAN TAMAT

END OF QUESTION PAPER

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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.

PROGRAM PENINGKATAN AKADEMIK SPM 2013

ANJURAN

MAJLIS PENGETUA SEKOLAH MALAYSIA (KEDAH)

MODUL A

MATEMATIK SPM

KERTAS 1

PERATURAN PERMARKAHAN

PROGRAM PENINGKATAN PRESTASI AKADEMIK SPM TAHUN 2013
MATEMATIK 1449
Kertas 1 / Set 1

Jawapan / Answer:

1 B	11 C	21 B	31 B
2 C	12 D	22 A	32 C
3 A	13 C	23 C	33 A
4 B	14 B	24 B	34 C
5 D	15 A	25 A	35 C
6 C	16 D	26 B	36 D
7 D	17 A	27 C	37 D
8 C	18 B	28 C	38 B
9 B	19 D	29 D	39 A
10 D	20 A	30 D	40 A

Analisis Jawapan / Answer Analysis:

Qs	1 ï 10		11 ï 20		21 ï 30		31 ï 40		JUMLAH
A	1	+	3	+	2	+	3	=	9
B	3	+	2	+	3	+	2	=	10
C	3	+	2	+	3	+	3	=	11
D	3	+	3	+	2	+	2	=	10
JUMLAH KESELURUHAN :									40

NOTA **MARKAH CALON** $\frac{(\ 1 + \ 2)}{140} \times 100$

PROGRAM PENINGKATAN PRESTASI AKADEMIK SPM 2013

ANJURAN

MAJLIS PENGETUA SEKOLAH MALA SIA KEDAH

MODUL A

MATEMATIK

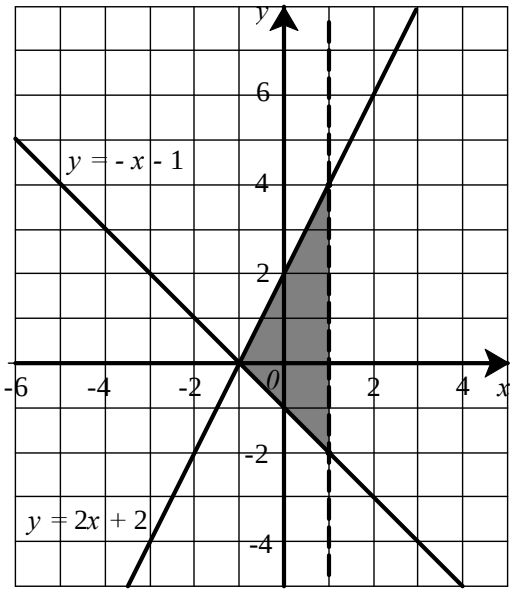
KERTAS 2

PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan pemarkahan ini mengandungi 14 halaman bercetak

Section A
[52 *marks*]

uestion	Solution and Mark Scheme	Marks	
1			
	Straight dotted line $x = 1$ correctly drawn.	K1	
	Region correctly shaded	P2	**3**
	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		
2(*a*) (*b*)	$\angle MFH$ $\tan \angle MFH = \frac{7}{13}$ *or* equivalent 28.3° *or* 28° 18′	P1 K1 N1	**3**

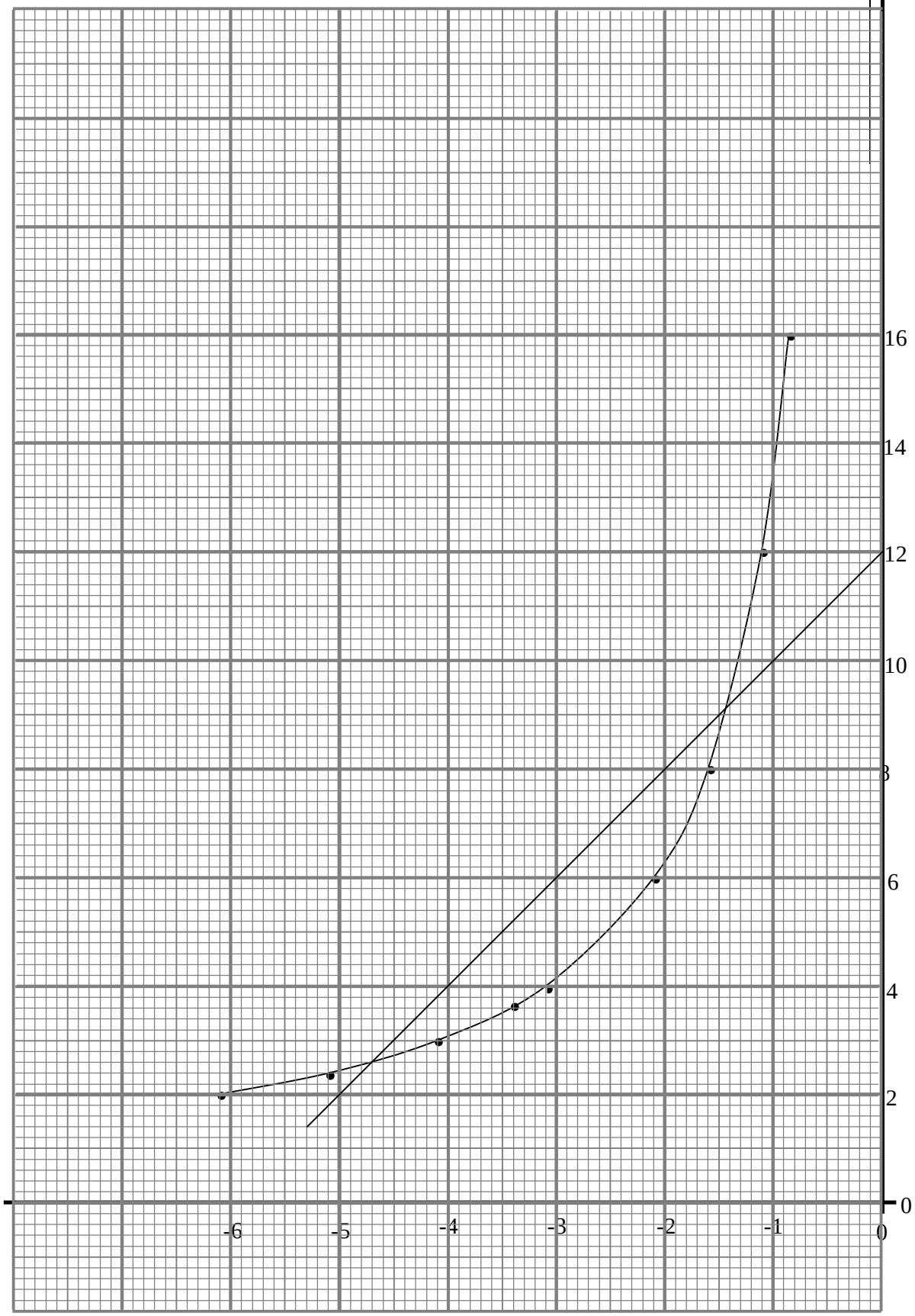
uestion	Solution and Mark Scheme	Marks	
3	$9x^2 - 4 = 0$	K1	
	$(3x-2)(3x+2) = 0$ *or* equivalent	K1	
	$x = \frac{2}{3}$ *or* 0.67	N1	
	$x = -\frac{2}{3}$ *or* ï 0.67	N1	**4**
	Note : 1. Accept without ó= 0ô 2. Accept two terms on the same side, in any order. 3. $(x-0\times67)(x+0\times67)$ with $x = 0\times67, x = -0\times67$ award Kk2		
4	$14x+3y=-2$ *or* $7x+21y=77$ *or* equivalent	K1	
	Note : Attempt to equate one of the coefficients the unknowns, award K1		
	OR $x = 11-3y$ *or* $y = \frac{11-x}{3}$ *or* $x = \frac{-1-\frac{3}{2}y}{7}$ *or* $y = \frac{2(-1-7x)}{3}$ *or* equivalent (K1)		
	Note : Attempt to make one of the unknowns as the subject award K1.		
	$-13x = 13$ *or* $\frac{39}{2}y = 78$ *or* equivalent	K1	
	OR $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{(1)\left(\frac{3}{2}\right)-(3)(7)} \begin{pmatrix} \frac{3}{2} & -3 \\ -7 & 1 \end{pmatrix} \begin{pmatrix} 11 \\ -1 \end{pmatrix}$ (K2)		
	Note : Attempt to write without equation, award (K1)		
	$x = -1$	N1	
	$y = 4$	N1	4
	Note : $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -1 \\ 4 \end{pmatrix}$ as final answer, award N1		

uestion	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	
	Note : 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	
	$4 = \frac{4^*}{5}(-5) + c$ or $\frac{y-4}{x-(-5)} = \frac{4^*}{5}$	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* 1×2	N1	2
	Note: Accept answer without working for K1N1		
(*c*)	$\frac{1}{2}(18+28)(12) + \frac{1}{2}((t-28)(12+20)$ = 468 *or* equivalent method	K2	
	Note: $\frac{1}{2}(18+28)(12)$ *or* $\frac{1}{2}((t-28)(12+20)$ equivalent, award K1		
	40	N1	3
			6

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

uestion	Solution and Mark Scheme	Marks	
11 (*a*)	$\frac{1}{(3\times-1)-(2\times6)}\begin{pmatrix}-1 & -2\\ -6 & 3\end{pmatrix}$ $\begin{pmatrix}\frac{1}{15} & \frac{2}{15}\\ \frac{6}{15} & -\frac{1}{5}\end{pmatrix}$	P2	2
(*b*)	$\begin{pmatrix}3 & 2\\ 6 & -1\end{pmatrix}\begin{pmatrix}x\\ y\end{pmatrix}=\begin{pmatrix}9\\ -7\end{pmatrix}$	P1	
	$\begin{pmatrix}x\\ y\end{pmatrix}=\frac{1}{(3)(-1)-(2)(6}\begin{pmatrix}-1 & -2\\ -6 & 3\end{pmatrix}\begin{pmatrix}9\\ -7\end{pmatrix}$ *or*		
	$\begin{pmatrix}x\\ y\end{pmatrix}=^{*}\begin{pmatrix}Inverse\\ matrix\end{pmatrix}\begin{pmatrix}9\\ -7\end{pmatrix}$	K1	
	$x=-\frac{1}{3}$	N1	
	$y=5$	N1	4
			6
	Note: 1. $\begin{pmatrix}x\\ y\end{pmatrix}=\begin{pmatrix}-\frac{1}{3}\\ 5\end{pmatrix}$ as final answer, award N1 2. Do not accept any solution solved no using matrix method. 3. Do not accept $^{*}\begin{pmatrix}inverse\\ matrix\end{pmatrix}=\begin{pmatrix}3 & 2\\ 6 & -1\end{pmatrix}$ *or* $^{*}\begin{pmatrix}inverse\\ matrix\end{pmatrix}=\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}$		
12	(*a*) **$-4 \le y \le 3$** **$-1.5 \le y \le 8$**	K1 K1	**12**
	(*b*) Graph Axes drawn in correct direction, uniform scales in $-6 \le x \le -0.75$ and $0 \le y \le 16$.	P1	
	All 6 points and *2 points correctly plotted *or* curve passes through these points $-6 \le x \le -0.75$ and $0 \le y \le 16$.	K2	
	A smooth and continuous curve without any straight line and passes through all 9 correct points using the given scale for $-6 \le x \le -0.75$ and $0 \le y \le 16$.	N1	
	Note : 1. 6 or 7 points correctly plotted, award K1. 2. Ignore curve out of range.		

Graf untuk Soalan12
***rap for uestion* 12**



	(*c*) (i) $4.6 \leq y \leq 5.0$ (ii) $-1.0 \leq x \leq -0.8$ (*d*) $y = 2x + 12$ *or* *garis lurus* $y = 2x + 12$ *dilukis* $-4.8 \leq x \leq -4.65$, $-1.35 \leq x \leq -1.20$	P1 P1 K1 K1 N1N1	
13(*a*)(i)	(2 , 6)	P2	
	Note: (4, 5) or (4, 5) marked , award P1		
(ii)	(7, 8)	P2	
	Note: (9 , 7) or (9 , 7) marked, award P1		
(*b*)(i)(*a*)	**W**: Rotation, 90° clockwise at (10 , 10)	P3	
	Note : 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*) (ii)	**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 $=\left(\frac{1}{3}\right)^2 \times 180$ 20	P3 K1 N1	12

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

Marks *Marka*	Mid-point *Titik tenga*	re uenc *ekerapan*	
20 ï 29	24.5	2	I
30 ï 39	34.5	5	II
40 ï 49	44.5	8	III
50 ï 59	54.5	6	IV
60 ï 69	64.5	4	V
70 ï 79	74.5	3	VI
80 ï 89	84.5	2	VII

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 ï 49 P1

(ii)

$$\frac{(2^{*}\times 24.5)+(5^{*}\times 34.5)+(8^{*}\times 44.4)+(6^{*}\times 54.5)+(4^{*}\times 64.5)+(3^{*}\times 74.5)+(2^{*}\times 84.5)}{2^{*}+5^{*}+8^{*}+6^{*}+4^{*}+3^{*}+2^{*}}$$

K2

or $\frac{1555}{30}$

Note: 1. Allow *midpoint for K1

$\frac{311}{6}$ *or* $51\frac{5}{6}$ *or* 51.83 N1

Note: Correct answer from incomplete working, award Kk2

4

(*c*) Axes drawn in correct direction and uniform scale for $24.5 \le x \le 84.5$ and $0 \le y \le 8$. P1

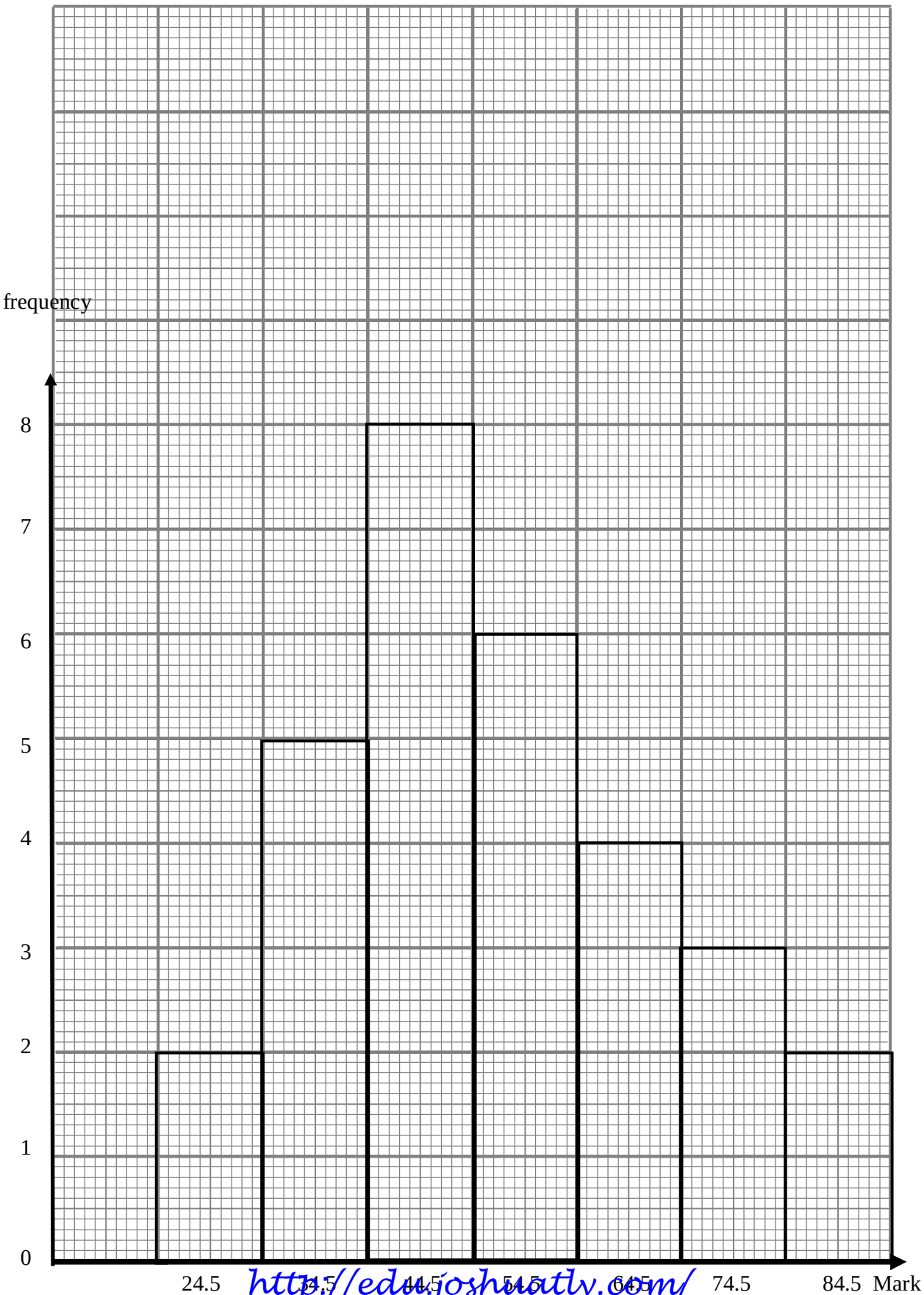
*7 points correctly plotted K2

Note :
*5 or *6 points correctly plotted *or* bar passes through using at least 6 correct mid-point, award K1.

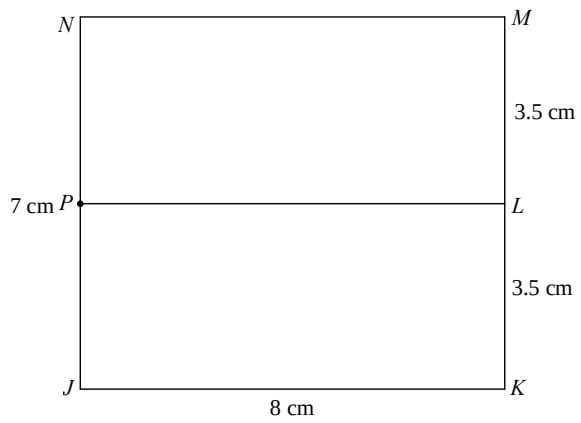
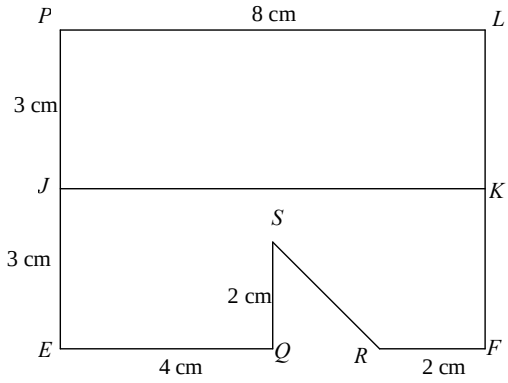
Correct bar passes all 7 correct points for using given scales $24.5 \le x \le 84.5$ N1

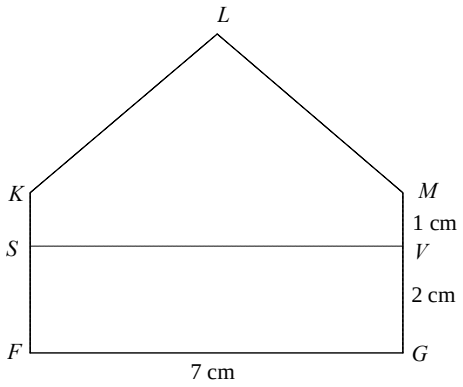
4

Graf untuk Soalan14
***rap for uestion* 14**



uestion	Solution and Mark Scheme	Marks	
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 $\leq 0 \times 4$ cm, deduct 1 mark from the N mark obtained. (ii) If $> 0 \times 4$ 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.		

uestion	Solution and Mark Scheme	Marks	
15(*a*)			
	Correct shape with rectangles *JKMN* , *JKLP* and *PLMN* All solid lines.	K1	
	JK > *KM* > *KL*=*LM*	K1 dep K1	3
	Measurement correct to ± 0×2 cm (one way) and all angles at vertices of rectangles = 90° ± 1°	N1 dep K1K1	
15(*b*)(i)			
	Correct shape with rectangle *PLKJ*, *SQ* perpendicular to EQ All solid lines	K1	
	PL > *LF* > *EQ* > *LK* = *KF* > *RF* = *QR* = *QS*	K1 dep K1	**4**
	Measurement correct to ± 0×2 cm (one way) and all angles at the vertices of rectangles = 90° ± 1°	N2 dep K1K1	

uestion	Solution and Mark Scheme	Marks	
15(*b*)(ii)			**5**
	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*)	$105^\circ E$ // $105^\circ T$) Note : 105° *or* d° *E* // d° *T*, award P1	P2	
(*b*)(i)	$\frac{3900}{60}$ $35^\circ N$ // *U*	K1 N1N1	
(ii)	$\theta \times 60 \times \cos 35^o = 4669$ 20	K2 N1	
(c)	$\frac{(75+105)\times 60\times \cos 30}{600}$ 15.59 Note : * cos 45 + * (75 + 105) , award K1	K2K1 N1	**12**