KEMENTERIAN PENDIDIKAN MALAYSIA

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2015
PERCUBAAN SIJIL PEPERIKSAAN MALAYSIA

MATHEMATICS

Kertas 1

$1\frac{1}{4}$ **Jam**

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*

2. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu*

MAKLUMAT UNTUK CALON

1. *Kertas ini menagandungi* **40** *soalan.*

2. *Jawab semua soalan.*

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

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

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

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

7. *Satu senarai rumus ada disediakan..*

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

Kertas soalan ini mengandungi **28** halaman bercetak.

MATHEMATICAL FORMULAE
RUMUS MATEMATIK

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

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

RELATIONS
PERKAITAN

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SHAPE AND SPACE
BENTUK DAN RUANG

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

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

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

3. Area of circle $= \pi r^2$
   Luas bulatan $= \pi j^2$

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

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

6. Volume of right prism = cross sectional area $\times$ length
   Isipadu prisma tegak = *luas keratan rentas* $\times$ *panjang*

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

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

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

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

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

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

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

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

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

$\dfrac{\textit{panjang lengkok}}{\textit{lili}\ \text{tan}\ \textit{bula}\ \text{tan}} = \dfrac{\textit{sudut pusat}}{360^0}$

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

$\dfrac{\textit{luas sektor}}{\textit{luas bula}\ \text{tan}} = \dfrac{\textit{sudut pusat}}{360^0}$

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

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

15. Area of image $= k^2 \times$ area of object

Luas imej $= k^2 \times$ *luas objek*

1 Round off 0.05273 correct to three significant figures.
Bundarkan 0.05273 *betul kepada tiga angka bererti.*

A 0.05

B 0.053

C 0.0527

D 0.0528

2 $\dfrac{0.0048}{\left(2\times10^{-2}\right)^2} =$

A 1.2×10^{-7}

B 1.2×10

C 2.4×10^{-7}

D 2.4×10

3 Diagram 3 shows an empty conical tank.

Rajah 3 *menunjukkan sebuah tangki kosong berbentuk kon.*

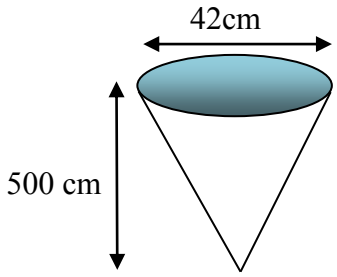


Diagram 3
Rajah 3

Shukri fill the water into the tank until full. Calculate the volume , in cm^3, of water in the tank . (Use $\pi = \frac{22}{7}$)

Shukri mengisi air ke dalam tangki itu sehingga penuh. Hitung isipadu, dalam cm^3*, air di dalam tangki itu.* (*Guna* $\pi = \frac{22}{7}$)

A 2.31×10^4

B 2.31×10^5

C 3.51×10^7

D 3.51×10^9

4 $110011_2 - 1001_2 =$

A 1010_2

B 10101_2

C 101010_2

D 1010101_2

5 Given $105_8 = 2 \times 5^2 + 3 \times 5 + p$. Find the value of p.

Diberi bahawa $105_8 = 2 \times 5^2 + 3 \times 5 + p$. *Carikan nilai bagi* p.

A 0

B 1

C 4

D 5

6 $1100_2 + 142_5 + 15_8 =$

A 110

B 110_8

C 110_5

D 110_2

7 Diagram 7 shows a polygon *PQRSTUV*. *PUV* is a straight line.

Rajah 7 *menunjukkan sebuah poligon PQRSTUV*. *PUV* ialah *garis lurus*.

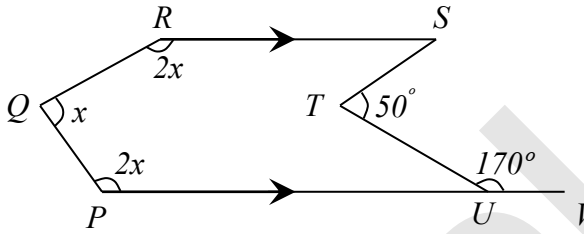


Diagram 7
Rajah 7

Find the value of *x*.

Cari nilai x.

A 28°

B 70°

C 72°

D 90°

8 In the Diagram 8, *GHJKL* is a regular pentagon. *JKMN* is a rhombus and *HJN* is a straight line.

Dalam Rajah 8*, GHJKL ialah sebuah pentagon sekata. JKMN ialah sebuah rombus dan HJN ialah garis lurus.*

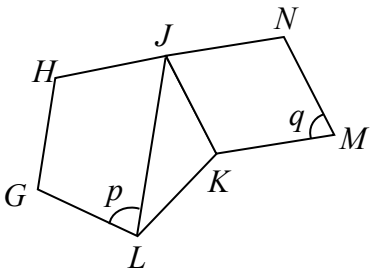


Diagram 8
Rajah 8

Find the value of $p + q$.

Cari nilai $p + q$.

A 108º

B 144º

C 152º

D 180º

9 Diagram 9 shows two circles with centre *H* and *K* respectively. *LMN* is a common tangent and HMJK is a straight line. The radius of *HL* and *KN* is 14 cm and 7 cm respectively. Given the length of *LM* = 20 cm.

Rajah 9 *menunjukkan dua bulatan pada pusat di H dan K masing-masing. LMN ialah tangen sepunya. HMJK ialah garis lurus. Jejari HL dan KN ialah* 14 cm *dan* 7 cm *masing- masing. Diberi panjang LM* = 20 cm.

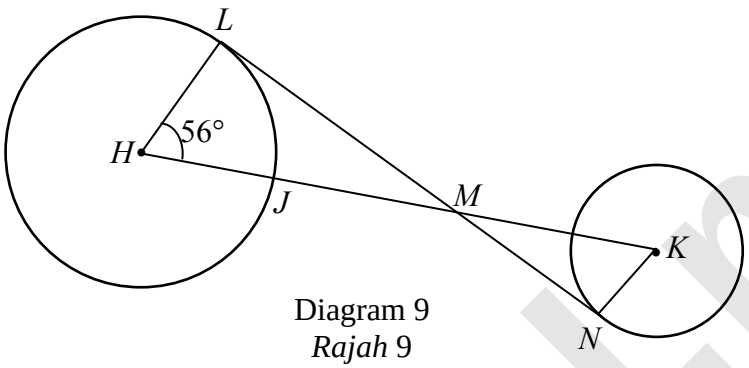


Diagram 9
Rajah 9

Calculate the length of *LN*.

Hitungkan panjang LN.

A 23.9

B 24.7

C 25.8

D 30.4

10 Diagram 10 shows five points plotted on a Cartesian plane.

Rajah 10 *menunjukkan lima titik yang diplot pada satah Cartesan.*

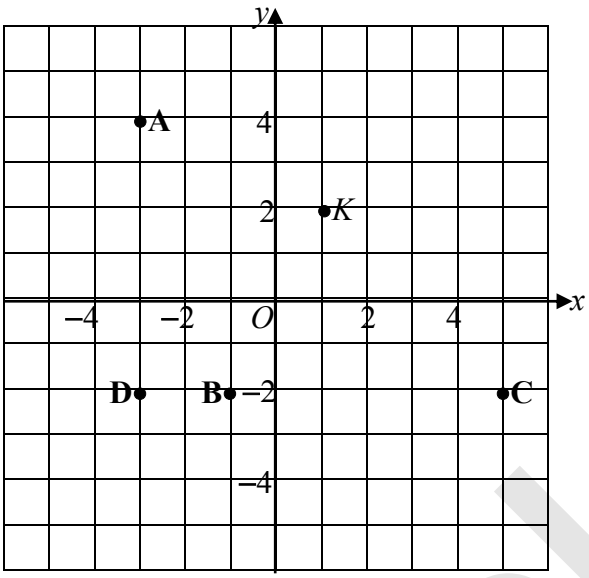


Diagram 10
Rajah 10

Which of the points, **A, B, C** or **D**, is the image of point *K* under an anticlockwise rotation of 90° about the centre (−2, 1) ?

Antara titik-titik **A, B, C** *atau* **D***, manakah imej titik K di bawah putaran* 90° *arah lawan jam di pusat* (−2, 1)?

11 Diagram 11 shows two hexagons, *PQRSTU* and *HJKLMN*, drawn on square grids.

Rajah 11 *menunjukkan dua heksagon , PQRSTU dan HJKLMN, dilukis pada grid segiempat sama.*

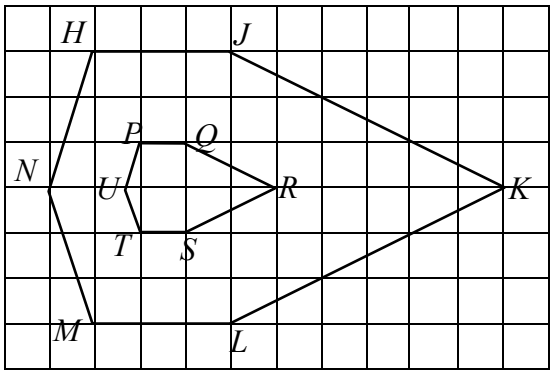


Diagram 11
Rajah 11

PQRSTU is the image of *HJKLMN* under an enlargement.
Find the scale factor of the enlargement.

PQRSTU adalah imej bagi HJKLMN di bawah pembesaran.
Cari faktor skala bagi pembesaran.

A $\frac{1}{3}$

B $-\frac{1}{3}$

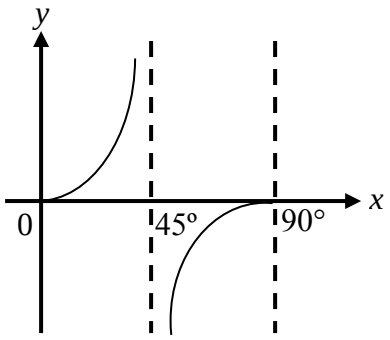
C 3

D –3

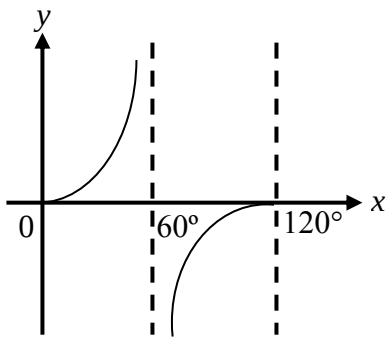
12 Which graf represents part of the graph $y = \tan x$?

Graf manakah yang mewakili sebahagian daripada graf $y = \tan x$?

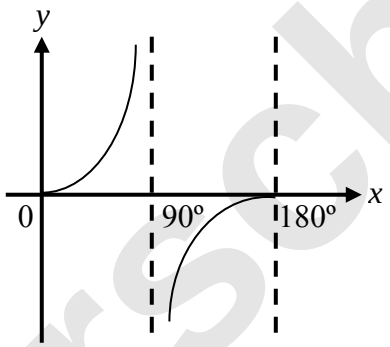
A



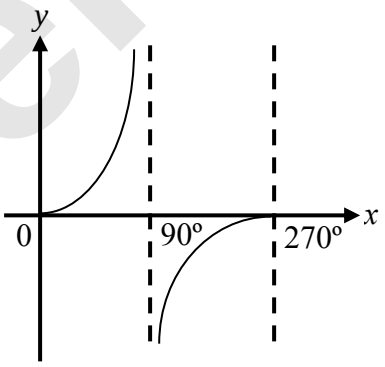
B



C



D



13 In Diagram 13, *USR* and *VQTS* are straight lines.

Dalam Rajah 13, *USR dan VQTS ialah garis lurus*.

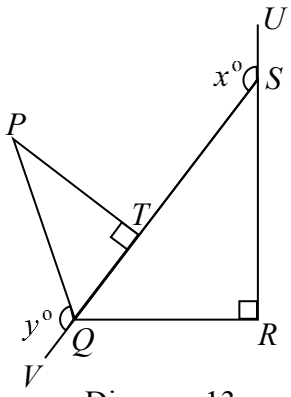


Diagram 13
Rajah 13

It is given that $TS = 29$ cm, $PQ = 13$ cm, $QR = 16$ cm and $\sin x^\circ = \frac{8}{17}$.

Find the value of $\cos y^\circ$.

Diberi bahawa $TS = 29$ cm, $PQ = 13$ cm, $QR = 16$ cm *dan* $\sin x^\circ = \frac{8}{17}$.

Cari nilai kos y°.

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

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

C $\frac{5}{13}$

D $\frac{13}{5}$

14 Diagram 14 shows a right prism with a horizontal rectangular base *JKLM*. Trapezium *JKQP* is the uniform cross-section of the prism. The rectangular surface *QRLK* is inclined and *N* is the midpoint of *PJ*.

Rajah 14 *menunjukkan sebuah prisma tegak dengan tapak mengufuk JKLM. Trapezium JKQP adalah keratan rentas seragam prisma itu. Permukaan segi empat QRLK adalah condong dan N ialah titik tengah bagi PJ.*

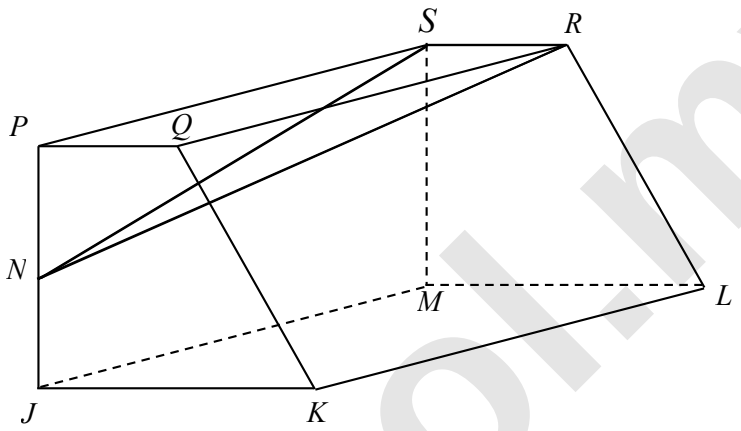


Diagram 14
Rajah 14

Name the angle between the plane *RSN* and the vertical plane *RSML*.

Namakan sudut antara satah RSN dan satah menegak RSML.

A $\angle NSM$

B $\angle NSL$

C $\angle NRM$

D $\angle NRL$

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

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

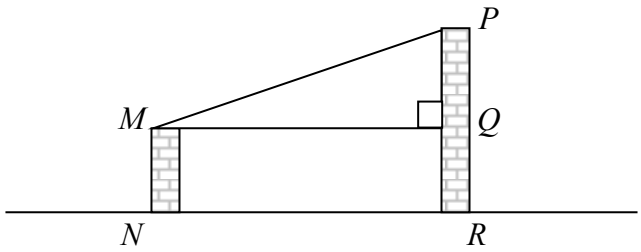


Diagram 15
Rajah 15

The angle of elevation of point *P* from point *M* is

Sudut dongakan titik P dari titik M ialah

A $\angle PNR$

B $\angle QMR$

C $\angle QPM$

D $\angle PMQ$

16 In Diagram 16, *AD* and *BC* are two vertical poles on a horizontal plane.

Dalam Rajah 16, *AD dan BC ialah dua tiang yang tegak pada suatu satah mengufuk.*

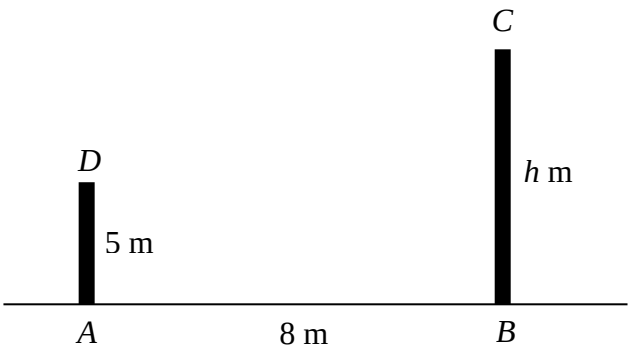


Diagram 16
Rajah 16

The angle of depression *D* from *C* is 25°.
Calculate the value of *h*.

Sudut tunduk D dari C ialah 25°.
Hitung nilai h.

A 3.7 m

B 8.7 m

C 17.2 m

D 22.2 m

17 Aida's house is located due north-east of Zul's house. Remy's house is located at bearing of 172° from Aida's house and at bearing of 097° from Zul's house. Find the bearing of Zul's house from Remy's house.

Rumah Aida terletak pada arah Timur Laut rumah Zul. Rumah Remy terletak pada bearing 172° *dari rumah Aida dan pada bearing* 097° *dari rumah Zul. Cari bearing rumah Zul dari rumah Remy.*

A 277°

B 172°

C 123°

D 044°

18 *J* and *K* are two points on the Equator. *K* lies due west of *J* . The longitude of *J* is 20° E and the different of longitude *J* and *K* is 140°. The longitude of *K* is

J dan K ialah dua titik di atas garisan Khatulistiwa. K berada di barat J. Longitud bagi J ialah 20° *T dan beza longitud J dan K ilah* 140°. *Longitud bagi K ialah*

A 120° E/*T*

B 120° W/*B*

C 160° E/*T*

D 160° W/*B*

19 $4g\,(\,3g - 2h\,) - (2g - 3h\,)^2 =$

A $8g^2 - 20gh + 9h^2$

B $8g^2 - 4gh + 9h^2$

C $8g^2 + 20gh - 9h^2$

D $8g^2 + 4gh - 9h^2$

20 Express $\frac{k-1}{km}-\frac{k-2m}{2km^2}$ as a single fraction in its simplest form.

Ungkapkan $\frac{k-1}{km}-\frac{k-2m}{2km^2}$ *sebagai pecahan tunggal dalam bentuk termudah.*

A $\frac{m-1}{m^2}$

B $\frac{m-k}{m^2}$

C $\frac{2m-1}{2m^2}$

D $\frac{2m-1}{2m}$

21 Given that $\frac{p}{4}=\frac{3}{2}\sqrt{\frac{qr^2}{p}}$, express q in terms of p and r.

Diberi bahawa $\frac{p}{4}=\frac{3}{2}\sqrt{\frac{qr^2}{p}}$ *ungkapkan q dalam sebutan p dan r.*

A $q=\frac{4p^3}{9r^2}$

B $q=\frac{16p^3}{9r^2}$

C $q=\frac{p^3}{36r^2}$

D $q=\frac{p^2}{18r^2}$

22 Given that $3k-4=5(2-k)$, then $k=$

Diberi $3k-4=5(2-k)$, *maka* $k=$

A -7

B -3

C $\frac{7}{2}$

D $\frac{7}{4}$

23 Simplify:

Ringkaskan:

$$\frac{m^6\times(9e^2)^{\frac{1}{2}}}{(m^3e^6)^{\frac{1}{3}}}$$

A $\frac{9m^2}{e}$

B $\frac{9m^3}{e}$

C $\frac{3m^5}{e}$

D $\frac{3m^5}{e^4}$

24 $7^{14}\div 7^2=$

A 7^{28}

B 7^{16}

C 7^{12}

D 7^7

25 The solution for the inequalities $10-3k \le 2+k$ is

Penyelesaian bagi $10-3k \le 2+k$ *ialah*

A $k \ge 2$

B $k \le 2$

C $k \ge -2$

D $k \le -2$

26 List all the integers *x* that satisfy the inequalities $x-\frac{2}{3} > 4$ and $x-2 \le 5$.

Senaraikan semua integer x yang memuaskan kedua-dua ketaksamaan, $x-\frac{2}{3} > 4$ *dan* $x-2 \le 5$.

A 6, 7

B 5, 6

C 4, 5, 6

D 5, 6, 7

27 In Diagram 27, the histogram shows the time spent by a group of students watching television on a certain day.

Dalam Rajah 27*, histogram menunjukkan masa yang digunakan oleh sekumpulan murid bagi menonton televisyen dalam suatu hari.*

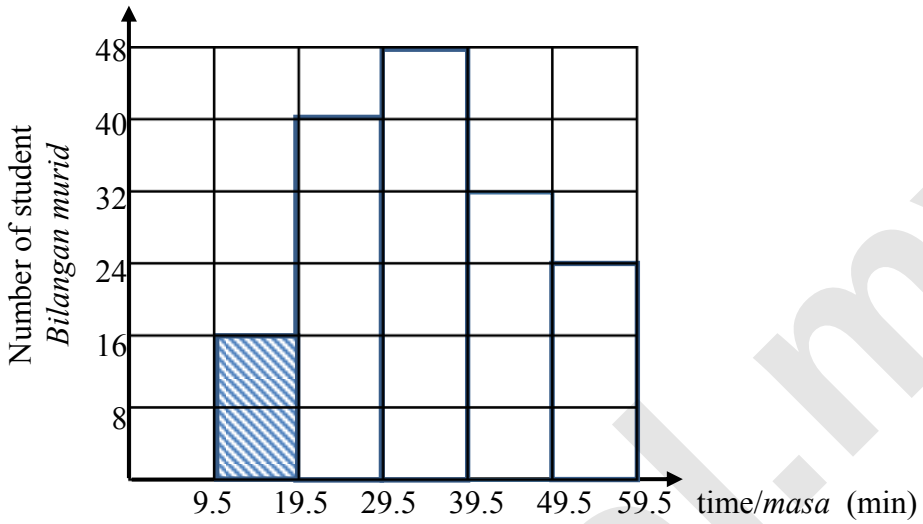


Diagram 27
Rajah 27

Calculate the mean, in minutes, of the time spent by the students watching television.

Hitungkan min, dalam minit, masa digunakan oleh sekumpulan murid bagi menonton televisyen.

A 30

B 35

C 40

D 45

28 The pie chart in Diagram 28, shows the number of shirts with sizes *XL*, *XXL*, and *XXXL* produced by Bestari Factory in a week.

Carta pai dalam Rajah 28 menunjukkan bilangan kemeja bersaiz XL, XXL dan XXXL yang dikeluarkan oleh Bestari Factory dalam seminggu.

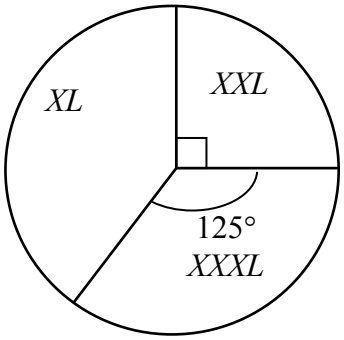


Diagram 28
Rajah 28

The number of shirts with the size of *XXXL* is 2,100 .
Calculate the number of shirts with the size of *XL*.

Bilangan kemeja bersaiz XXXL ialah 2,100 helai.
Hitung bilangan kemeja bersaiz XL.

A 2,436

B 2,268

C 2,100

D 2,000

29 Table 29 shows the distribution of the scores of a group of students in an archery competition.

Jadual 29 *menunjukkan taburan skor bagi sekumpulan murid dalam suatu pertandingan memanah.*

Score *Skor*	Frequency *Kekerapan*
4	4
5	6
6	3
7	8
8	9

Table 29
Jadual 29

What is the different between the median score and the mode?

Apakah perbezaan di antara skor median dan mod?

A 0.5

B 1.0

C 1.5

D 2.0

30 Diagram 30 shows the shaded region which satisfy the three inequalities.

Rajah 30 *menunjukkan kawasan berlorek yang memuaskan ketiga-tiga ketaksamaan*.

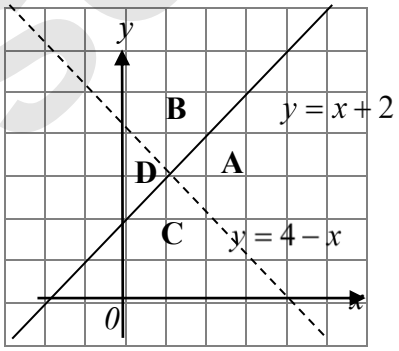


Diagram 30
Rajah 30

Which region **A**, **B**, **C** or **D** satisfy these three inequalities $y < 4 - x$, $y \geq x + 2$ and $x \geq 0$?

Kawasan manakah **A**, **B**, **C** *atau* **D** *yang memuaskan ketiga-tiga ketaksamaan* $y < 4 - x$, $y \geq x + 2$ dan $x \geq 0$?

31 Diagram 31 is a Venn diagram which shows $\xi = P \cup Q \cup R$.

Rajah 31 *ialah gambar rajah Venn yang menunjukkan* $\xi = P \cup Q \cup R$.

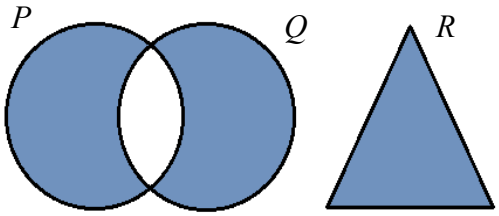


Diagram 31
Rajah 31

The shaded region in the Venn diagram represents the set

Kawasan yang berlorek dalam gambar rajah Venn itu mewakili

A $P' \cap R$

B $Q' \cap R$

C $(P \cup Q)'$

D $(P \cap Q)'$

32 Diagram 32 is a Venn diagram that shows the number of elements in set *M*, set *N* and set *S*.

Rajah 32 *ialah gambar rajah Venn yang menunjukkan bilangan unsur dalam set M, set N dan set S.*

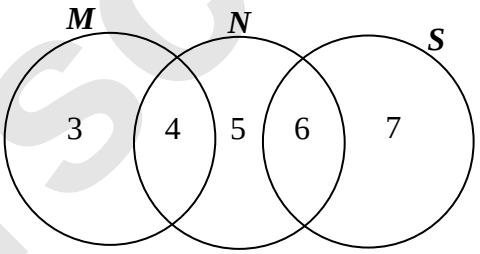


Diagram 32
Rajah 32

Find $n(M' \cup S)$.

Cari $n(M' \cup S)$.

A 13

B 18

C 22

D 31

33 Diagram 33 shows a straight line of *RS* drawn on a Cartesian plane.

Rajah 33 *menunjukkan garis lurus RS dilukis pada satu satah Cartesan.*

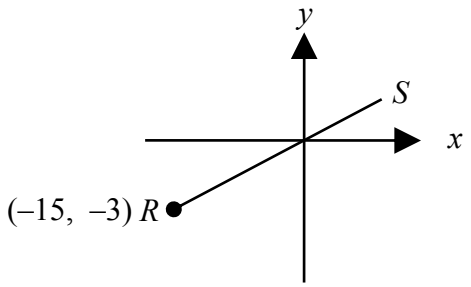


Diagram 33
Rajah 33

The gradient of a straight line *RS* is

Kecerunan bagi garis lurus RS ialah

A $-\frac{1}{5}$

B -5

C $\frac{1}{5}$

D 5

34 Determine the *y*-intercept of the straight line $6x + 2y = -8$.

Tentukan pintasan-y bagi garis lurus $6x + 2y = -8$.

A -4

B -8

C 4

D 8

35 Given that set $P = \{ 29 < x \leq 59, x \text{ and } y \text{ are integers}\}$. A number is selected at random from the set.
Find the probability of getting prime number.

Diberi bahawa set P= { 29 < x ≤ 59, x dan y ialah integer}. Satu nombor dipilih secara rawak daripada set tersebut.
Cari kebarangkalian memilih nombor perdana.

A $\frac{7}{30}$
B $\frac{8}{30}$
C $\frac{7}{31}$
D $\frac{8}{31}$

36 A bag contains 52 marbles. A marble is chosen at random from the bag. The probability of getting a red marble is $\frac{1}{4}$. Find the number of red marbles that needed to be added to the bag so that the probability that a red marble is piscked is $\frac{3}{4}$.

Sebuah beg mengandungi 52 biji guli. Sebiji guli dipilih secara rawak daripada beg itu. Kebarangkalian memperolehi sebiji guli merah ialah $\frac{1}{4}$. Cari bilangan guli merah yang perlu ditambah ke dalam beg supaya kebarangkalian memilih guli merah ialah $\frac{3}{4}$.

A 13
B 39
C 104
D 117

37 It is given that *s* varies directly as the cube of *t* and inversely as the square root of *r*. The relationship between variables *r*, *s* and *t* is

Diberi bahawa s berubah secara langsung dengan kuasa tiga t dan secara songsang dengan punca kuasa dua r. Hubungan antara pembolehubah r, s dan t ialah

A $s \propto \frac{\sqrt{r}}{t^3}$

B $s \propto \frac{t^3}{r^2}$

C $s \propto \frac{\sqrt[3]{t}}{r^2}$

D $s \propto \frac{t^3}{\sqrt{r}}$

38 Table 38 shows some values of the variables *x* and *y*.

Jadual 38 *menunjukkan beberapa nilai pembolehubah x dan y.*

x	1	*p*
y	4	108

Table 38
Jadual 38

It is given that *y* varies inversely as the cube of *x*. Calculate the value of *p*.

Diberi bahawa y berubah secara songsang dengan kuasa tiga x. Hitung nilai p.

A 27

B $\frac{1}{27}$

C 3

D $\frac{1}{3}$

39 Given the matrix equation $3\begin{pmatrix} s & -2 \\ 0 & 1 \end{pmatrix} - \begin{pmatrix} 1 & -4 \\ 0 & t \end{pmatrix} = \begin{pmatrix} 5 & -2 \\ 0 & 4 \end{pmatrix}$, find the value of s and of t.

Diberi persamaan matriks $3\begin{pmatrix} s & -2 \\ 0 & 1 \end{pmatrix} - \begin{pmatrix} 1 & -4 \\ 0 & t \end{pmatrix} = \begin{pmatrix} 5 & -2 \\ 0 & 4 \end{pmatrix}$, *cari nilai s dan nilai t.*

A $s = 2, t = -1$

B $s = 2, t = -3$

C $s = 6, t = -3$

D $s = 4, t = 1$

40 $\begin{pmatrix} 3 & 1 \\ 4 & -2 \end{pmatrix}\begin{pmatrix} 5 \\ -1 \end{pmatrix} =$

A $\begin{pmatrix} 16 \\ 18 \end{pmatrix}$

B $\begin{pmatrix} 14 \\ 22 \end{pmatrix}$

C $\begin{pmatrix} 15 & 5 \\ -4 & 2 \end{pmatrix}$

D $\begin{pmatrix} 15 & -1 \\ 20 & 2 \end{pmatrix}$

KERTAS SOALAN TAMAT

NAMA :

TINGKATAN :

KEMENTERIAN PENDIDIKAN MALAYSIA

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2015
PERCUBAAN SIJIL PELAJARAN MALAYSIA

MATHEMATICS

Kertas 2

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

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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

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

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

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

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

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

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

MATHEMATICAL FORMULAE
RUMUS MATEMATIK

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

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

RELATIONS
PERKAITAN

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SHAPE AND SPACE
BENTUK DAN RUANG

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

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

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

3. Area of circle $= \pi r^2$
   Luas bulatan $= \pi j^2$

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

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

6. Volume of right prism = cross sectional area $\times$ length
   Isipadu prisma tegak = luas keratan rentas $\times$ *panjang*

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

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

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

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

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

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

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

11. Sum of interior angles of a polygon
    Hasil tambah sudut pedalaman poligon

    $= (n - 2) \times 180°$

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

$\dfrac{\textit{panjang lengkok}}{\textit{lili}\ \text{tan}\ \textit{bula}\ \text{tan}} = \dfrac{\textit{sudut pusat}}{360^0}$

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

$\dfrac{\textit{luas sektor}}{\textit{luas bula}\ \text{tan}} = \dfrac{\textit{sudut pusat}}{360^0}$

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

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

15. Area of image $= k^2 \times$ area of object

Luas imej $= k^2 \times$ *luas objek*

For Examiner's Use

Section A
[52 *marks*]

Answer **all** *questions in this section.*

1 (a) Given universal set $\xi = P \cup Q \cup R$, $P \cap Q = \varnothing$ and $R \subset Q$.
In the answer space ,draw the Venn diagram to represent the relationships.

Diberi set universal, $\xi = P \cup Q \cup R$, $P \cap Q = \varnothing$ *dan* $R \subset Q$.
Pada ruang jawapan, lukis gambarajah Venn untuk mewakili hubungan tersebut.

(b) State the inequalities that represent the shaded region in Diagram 1.

Nyatakan semua ketaksamaan yang mewakili kawasan berlorek dalam Rajah 1

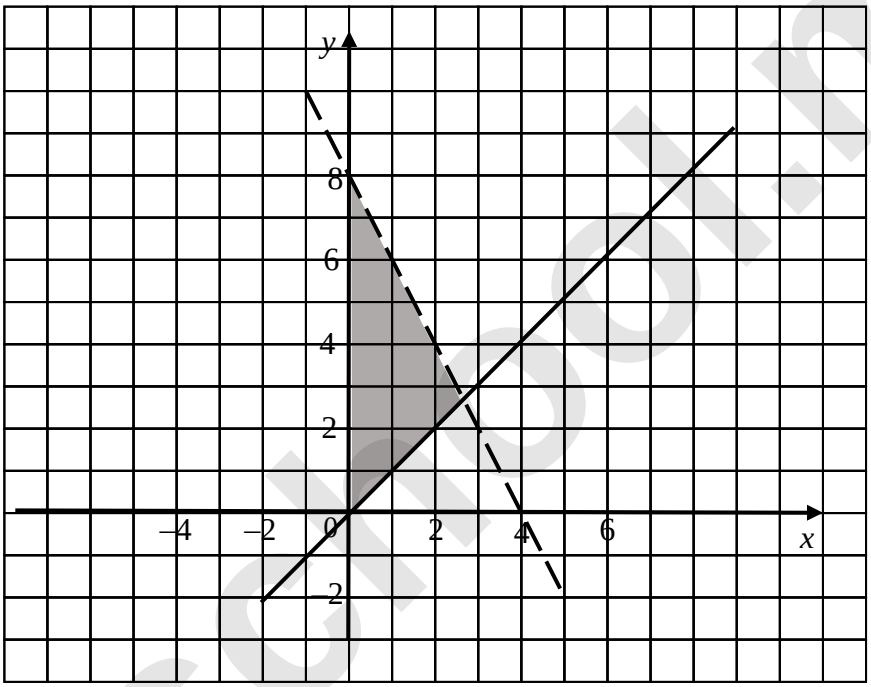


Diagram / *Rajah* 1

[4 marks]
[4 *markah*]

Answer/ *Jawapan*:

(a)

(b)

For Examiner's Use

2 Mr. Zulkifli is an architect. He is required to prepare a plan for the construction of a swimming pool which is rectangular in shape. Given that the length of the pool is 6 m more than its width and a lane with 1 m width is built around the pool. If the area of the pool, including the adjacent lane is 72 m^2, find the length of the pool to be built**.**

En Zulkifli merupakan seorang arkitek. Dia dikehendaki menyediakan satu pelan untuk pembinaan sebuah kolam renang yang berbentuk segi empat tepat. Diberi bahawa panjang kolam itu adalah 6 m *lebih daripada lebarnya dan satu lorong dengan lebar* 1 m *dibina di sekeliling kolam renang itu. Jika luas kolam renang itu termasuk lorong disekelilingnya ialah* 72 m^2*, cari panjang kolam renang yang akan dibina itu.*

[4 marks]
[4 *markah*]

Answer / *Jawapan*:

For Examiner's Use

3 Mr. Low sells both white and blue paint in large and small tin. Large tin selling price for each color is RM *x* and a small tin for each color is RM *y*. Number of tin for every type of paint sold per day given in Table 3.

Encik Low menjual kedua-dua cat berwarna putih dan biru dalam tin besar dan kecil. Harga jualan tin besar bagi setiap warna ialah RM x dan tin kecil bagi setiap warna ialah RM y. Bilangan tin bagi setiap jenis cat yang dijual dalam sehari diberi dalam Jadual 3.

Colour *Warna*	Large (1 kg) *Besar (*1 kg*)*	Small (½kg) *Kecil* (½kg*)*
White *Putih*	4	3
Blue *Biru*	1	2

Table / *Jadual* 3

The total income from sale of white paint is RM68 and blue paint is RM 32.

Jumlah pendapatan hasil jualan cat putih ialah RM68 *dan cat biru ialah* RM 32.

(a) Write two equations that relates the data above.
Tuliskan dua persamaan yang menghubungkan data di atas.

(b) Hence, calculate the value of *x* and of *y*.
Seterusnya, hitung nilai x dan nilai y.

[4 marks]
[4 *markah*]

Answer / *Jawapan*:

(a)

(b)

For Examiner's Use

4 Diagram 4 in the answer space shows a right prism with a uniform cross-section in the shape of a right-angled triangle *RST*. *M* is the midpoint of *RS*.

Rajah 4 *di ruang jawapan menunjukkan sebuah prisma tegak dengan keratan rentas seragam dalam bentuk segi tiga bersudut tegak RST. M ialah titik tengah RS.*

(a) On Diagram 4 in the answer space, mark the angle between line *KM* and the plane *JKST* and label as θ.

Pada Rajah 4 *di ruang jawapan, tandakan sudut di antara garis KM dengan satah JKST dan label sebagai* θ.

(b) Hence, calculate the angle between the line *KM* and plane *JKST*.
Seterusnya, hitung sudut di antara garis KM dengan satah JKST tersebut.

[3 marks]
[3 *markah*]

Answer / *Jawapan*:

(a)

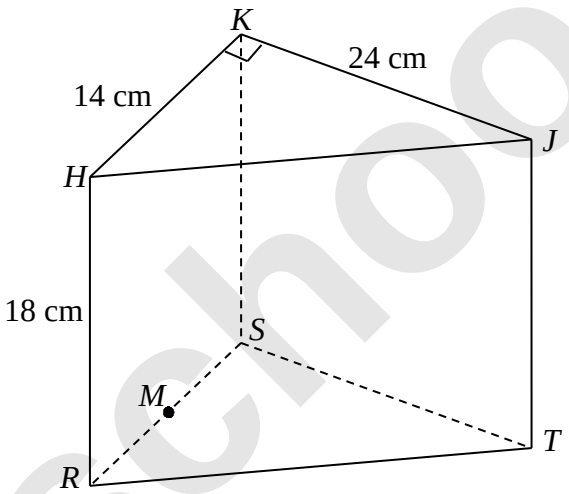


Diagram / *Rajah* 4

(b)

For Examiner's Use

5 Diagram 5.1 shows a cubical container filled with water. Water is then poured into a cylindrical container as shown in Diagram 5.2. Given the height of the cylinder is twice of its radius.
Find the height, in cm, of the cylinder.

Rajah 5.1 *menunjukkan sebuah bekas air berbentuk kiub penuh berisi air. Air tersebut dicurahkan ke dalam bekas berbentuk silinder seperti yang ditunjukkan dalam Rajah* 5.2. *Diberi bahawa tinggi silinder tersebut adalah dua kali ganda jejarinya. Carikan tinggi , dalam* cm, *silinder itu.*

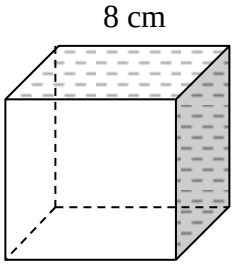


Diagram / *Rajah* 5.1

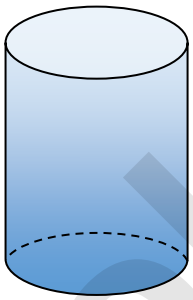


Diagram / *Rajah* 5.2

[4 marks]
[4 *markah*]

Answer/ *Jawapan*:

For Examiner's Use

6 (a) Determine whether the following statement is true or false:
Tentukan sama ada pernyataan berikut benar atau palsu:

(i) $a^2 + b^2 = (a+b)^2$ *or* $\frac{1}{\sqrt{x}} = x^{-\frac{1}{2}}$

$a^2 + b^2 = (a+b)^2$ *atau* $\frac{1}{\sqrt{x}} = x^{-\frac{1}{2}}$

(ii) sin 220° = – sin 40° and 220° is an obtuse angle.
sin 220° = – sin 40° *dan* 220° *ialah sudut cakah*.

(b) Write down Premise 1 to complete the following argument:
Tulis Premis 1 *untuk melengkapkan hujah berikut:*

Premise 1/ *Premis* 1 : .....

Premise 2 : The scale factor of an enlargement is not a proper fraction.

Premis 2 : *Faktor skala bagi pembesaran bukan nombor pecahan wajar.*

Conclusion : The image is bigger than the object.

Kesimpulan : *Imej lebih besar daripada objek.*

(c) The number of subsets of a set can be found by using 2^n, where *n* is the number of elements. It is given set A = {3, 5, 7}. Make one conclusion by deduction for the number of subset of set A.

Bilangan subset bagi suatu set boleh diperolehi dengan menggunakan , di mana n ialah bilangan unsur. Diberi set A = {3, 5, 7}. *Buat satu kesimpulan secara deduksi untuk bilangan subset bagi set A.*

[5 marks]
[5 *markah*]

Answer / *Jawapan*:

(a) (i) .....

(ii) .....

(b) Premise 1/ *Premis 1* :

.....

.....

(c)

.....

For Examiner's Use

7 Diagram 7 shows two parallel lines *MN* and *PQ* drawn on a Cartesian plane. Given that the equation of straight line *PQ* is $y - 4x = 3$.

Rajah 7 menunjukkan dua garis selari MN dan PQ dilukis pada suatu satah Cartesan. Diberi bahawa persamaan garis lurus PQ ialah $y - 4x = 3$.

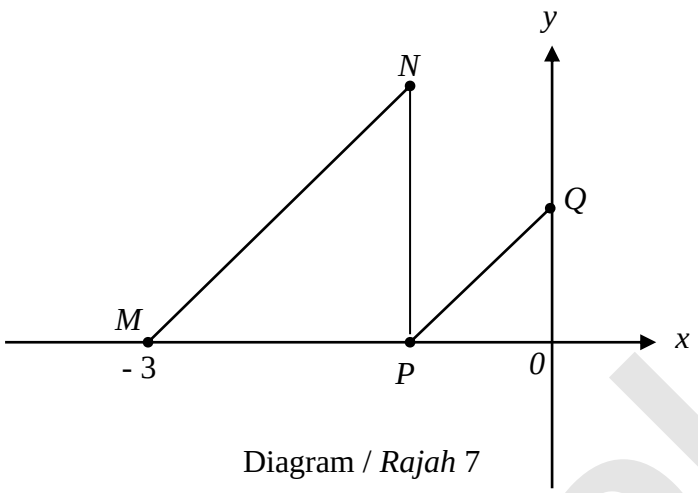


Diagram / *Rajah 7*

(a) State the equation of *NP*.

Nyatakan persamaan NP.

(b) Find the equation of *MN*, hence state its *y*-intercept.

Cari persamaan garis lurus MN, seterusnya nyatakan pintasan-y.

[5 marks]
[5 *markah*]

Answer / *Jawapan*:

(a)

(b)

For Examiner's Use

8 Diagram 8.1 shows three cards labelled with letters.

Rajah 8.1 *menunjukkan tiga keping kad yang berlabel dengan huruf.*

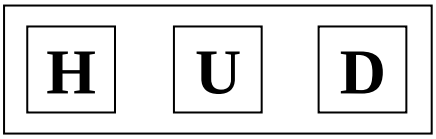


Diagram / *Rajah* 8.1

All these cards are put into a box. Two cards are picked at random, one after another, without replacement.

Kesemua kad ini dimasukkan ke dalam sebuah kotak. Dua kad dipilih secara rawak satu persatu, tanpa dikembalikan.

(a) Diagram 8.2 in the answer space shows the incomplete possible outcomes of the event. Complete the possible outcomes in Diagram 8.2.

Rajah 8.2 *di ruang jawapan menunjukkan kesudahan peristiwa yang mungkin, yang tidak lengkap.*
Lengkapkan kesudahan peristiwa yang mungkin di Rajah 8.2.

(b) By listing down the possible outcomes of the event, find the probability that

Dengan menyenaraikan kesudahan yang mungkin bagi peristiwa itu, cari kebarangkalian.

(i) both consonant cards are picked,
kedua-dua kad konsonan dipilih,

(ii) a vowel card and a consonant card are picked.
Sekeping kad vokal dan sekeping kad konsonan di pilih.

[5 marks]
[5 *markah*]

For Examiner's Use

Answer / *Jawapan*:

(b) (i)

(ii)

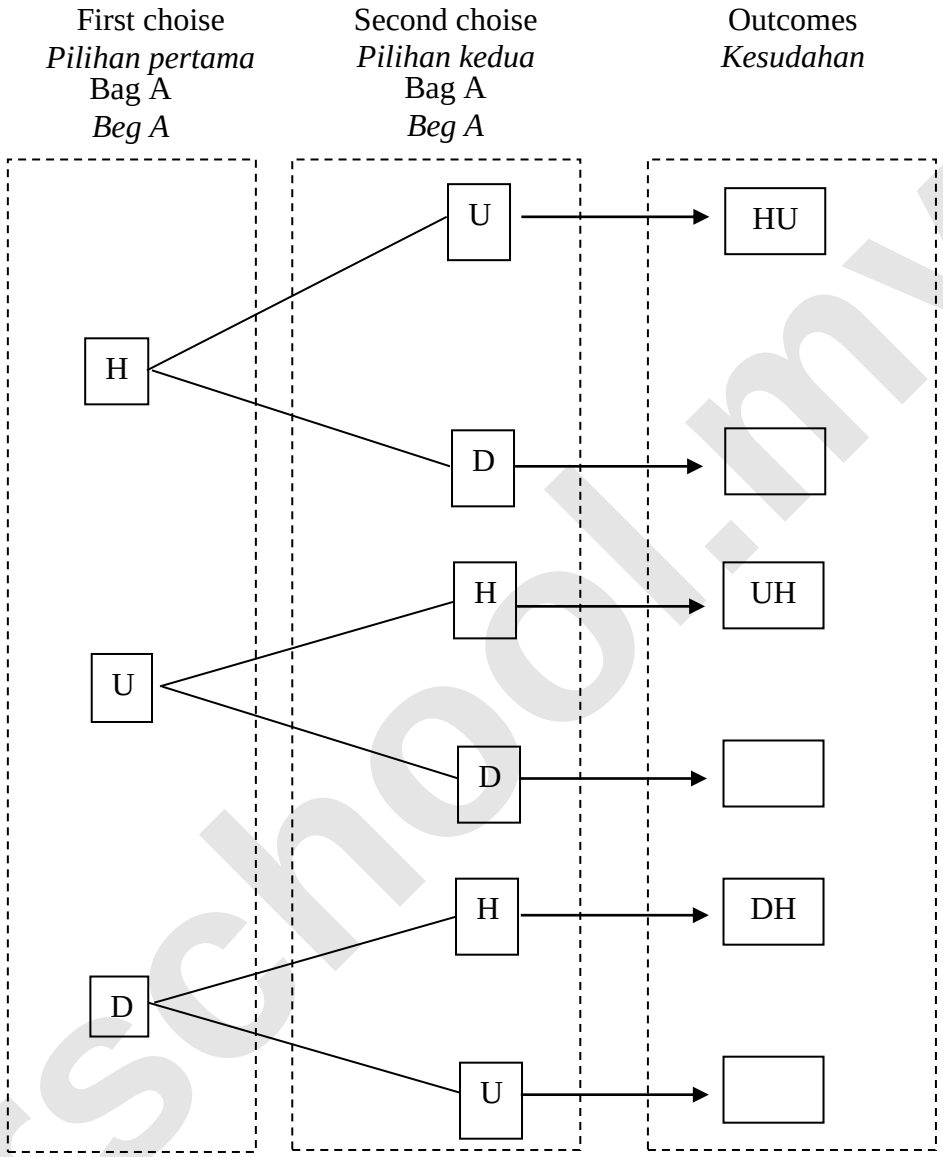


Diagram / *Rajah* 8.2

(b) (i)

(ii)

For Examiner's Use

9 In Diagram 9, *OKL* is a quadrant of a circle and *OPQRS* is a semicircle with common centre *O*.
Dalam Rajah 9, *OKL ialah sukuan bulatan dan OPQRS ialah semibulatan dengan pusat sepunya O.*

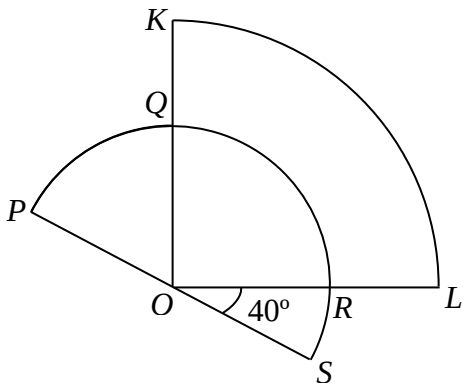


Diagram / *Rajah* 9

It is given that $\angle ROS = 40°$, OK = 21 cm and $OR : RL = 2 : 1$.
Using $\pi = \frac{22}{7}$, calculate
Diberi bahawa $\angle ROS = 40°$, OK = 21 cm *dan* $OR : RL = 2 : 1$.
Guna $\pi = \frac{22}{7}$, *hitung*

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

(b) the area, in cm², of the shaded region.
luas, dalam cm², *kawasan yang berlorek.*

[6 marks]
[6 *markah*]

For Examiner's Use

Answer / *Jawapan*:

(a)

(b)

For Examiner's Use

10 Diagram 10 shows the distance-time graph of the journey of a bus and a taxi for a period of 172 minutes. The graph *EFGH* represents the journey of the bus from town *N* to town *M*. The graph of *KLM* represents the journey of the taxi from town *M* to town *N*.
The bus leaves town *M* and the taxi leaves town *N* at the same time and they travel along the same road.

Rajah 10 *menunjukkan graf jarak-masa perjalanan bagi sebuah bas dan sebuah teksi dalam tempoh* 172 *minit. Graf EFGH mewakili perjalanan bas dari Bandar N ke Bandar M. Graf KLM mewakili perjalanan teksi dari Bandar M ke Bandar N.*
Pada masa yang sama bas bertolak dari bandar N dan teksi bertolak dari bandar M di sepanjang jalan yang sama.

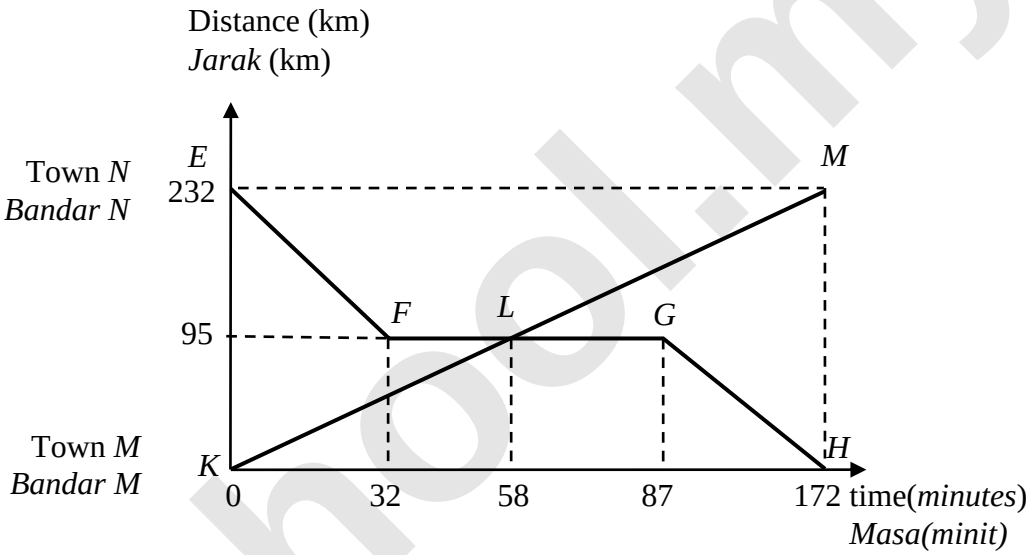


Diagram / *Rajah* 10

(a) If the journey starts at 9.10 *am*, at what time do the vehicles meet?
Jika perjalanan bermula pada jam 9.10 *pagi, pada masa bilakah kedua-duanya bertemu?*

[1 marks]
[1 *markah*]

(b) Find the distance, in *km*, from town *N* when the vehicles meet.

Cari jarak, dalam km, dari bandar N bila kedua-dua kenderaan itu bertemu.

[2 marks]
[2 *markah*]

(c) Calculate the average speed, in km h^{-1}, of the bus for the whole journey.

Hitungkan purata laju, dalam km j^{-1}, *bagi bas sepanjang perjalanan itu.*

[2 marks]
[2 *markah*]

Answer / *Jawapan*:

For Examiner's Use

(a)

(b)

(c)

For Examiner's Use

11 (a) Given matrix $P = \begin{pmatrix} x & -4 \\ 1 & x-4 \end{pmatrix}$, find the value of x if matrix P has no inverse.

Diberi matriks $P = \begin{pmatrix} x & -4 \\ 1 & x-4 \end{pmatrix}$ *, cari nilai bagi x jika matriks P tiada songsangan.*

[2 marks]
[2 *markah*]

(b) Write the following simultaneous linear equations as matrix form:

Tulis persamaan linear serentak berikut dalam bentuk matriks:

$$7q - 1 = 4p$$

$$2p = 3$$

Hence, by using matrix method, calculate the value of p and of q.

Seterusnya, dengan menggunakan kaedah matriks, hitung nilai p dan nilai q.

[5 marks]
[5 *markah*]

Answer / *Jawapan*:

(a)

(b)

For Examiner's Use

Section B
[48 *marks*]

Answer ***four*** *questions in this section.*

12 (a) Complete Table 12 in the answer space for the equation $y = x^3 - 4x - 2$ by writing down the values of y when $x = -2.5$ and $x = 2$.

[2 marks]

Lengkapkan Jadual 12 di ruang jawapan bagi persamaan $y = x^3 - 4x - 2$ *dengan menulis nilai-nilai y apabila* $x = -2.5$ *dan* $x = 2$.

[2 *markah*]

(b) *For this part of question, use the graph paper provided on page* 31.
You may use a flexible curve ruler.

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 $y = x^3 - 4x - 2$ for $-2{\cdot}5 \le x \le 4$.

Untuk ceraian soalan ini, gunakan kertas graf yang disediakan pada halaman 31. *Anda boleh menggunakan pembaris fleksibel.*
Dengan menggunakan skala 2 cm *kepada* 1 *unit pada paksi-x dan* 2 cm *kepada* 5 *unit pada paksi-y, lukis graf* $y = x^3 - 4x - 2$ *untuk* $-2{\cdot}5 \le x \le 4$.

[4 marks]
[4 *markah*]

(c) From the graph 12(b), find
Dari graf di 12(b), *cari*

(i) the value of x when $y = 5$,
nilai x apabila $y = 5$,

(ii) the value of y when $x = 3.3$.
nilai y apabila $x = 3.3$.

[2 marks]
[2 *markah*]

(d) Draw a suitable straight line on your graph to find the positive values of x which satisfy the equation $x^3 - 8x + 3 = 0$ for $-2{\cdot}5 \le x \le 4$.
State the values of x.

Lukiskan satu garis lurus yang sesuai pada graf anda untuk mencari nilai-nilai positif x yang memuaskan persamaan $x^3 - 8x + 3 = 0$ *bagi* $-2{\cdot}5 \le x \le 4$.

Nyatakan nilai-nilai x.

[4 marks]
[4 *markah*]

For Examiner's Use

Answer / *Jawapan*:

(a)

x	–2.5	–2	–1	1	2	3	3.5	4
y		– 2	1	–5		13	26.9	46

Table / *Jadual* 12

(b) Refer graph on page 31
Rujuk graf di halaman 31

(c) (i) $x =$ ……

(ii) $y =$ ……

(d)

$x =$ …… , ……

For Examiner's Use

13 (a) Transformation **T** is the translation $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$.

Penjelmaan **T** *ialah translasi.* $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$

Transformation **R** is a reflection in the line $y = 0$.

Penjelmaan **R** *ialah pantulan pada garis* $y = 0$.

(i) Draw the image of quadrilateral *JKLM* in Diagram 13.1 under combined transformation **RT**.

Lukiskan imej bagi sisiempat JKLM dalam Rajah 13.1 *di bawah gabungan penjelmaan* **RT.**

(ii) State the coordinate of the image of point *K* under combined transformation
TR.

Nyatakan koordinat imej bagi titik K di bawah gabunagan penjelmaan **TR.**

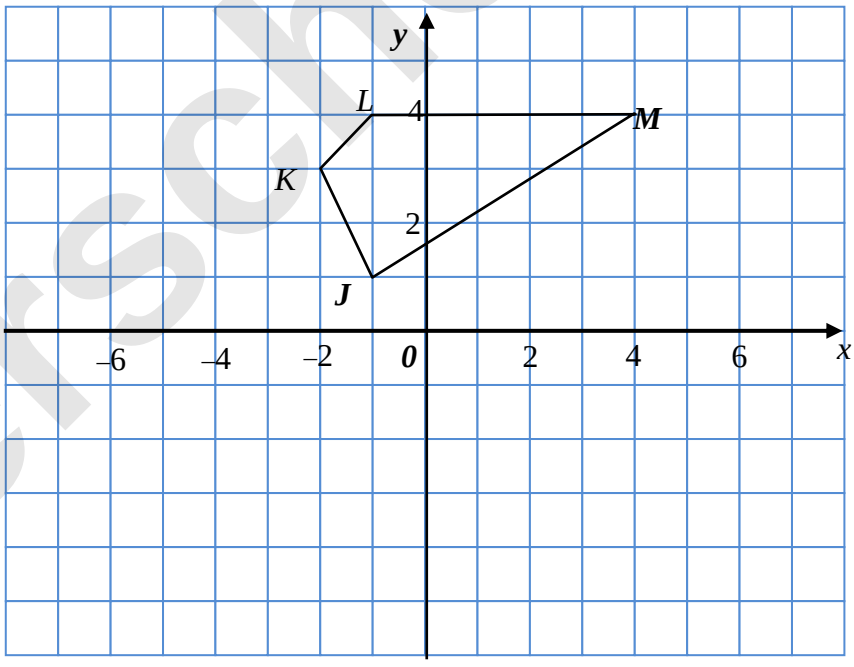


Diagram / Rajah 13.1

For Examiner's Use

(b) Diagram 13. 2 shows three pentagon *ABCDE*, *PQRST* and *JKLM*N, draw on a Cartesan plane.

Rajah 13.2 *menunjukkan tiga pentagon ABCDE, PQRST dan JKLMN, dilukis pada suatu satah Cartesan.*

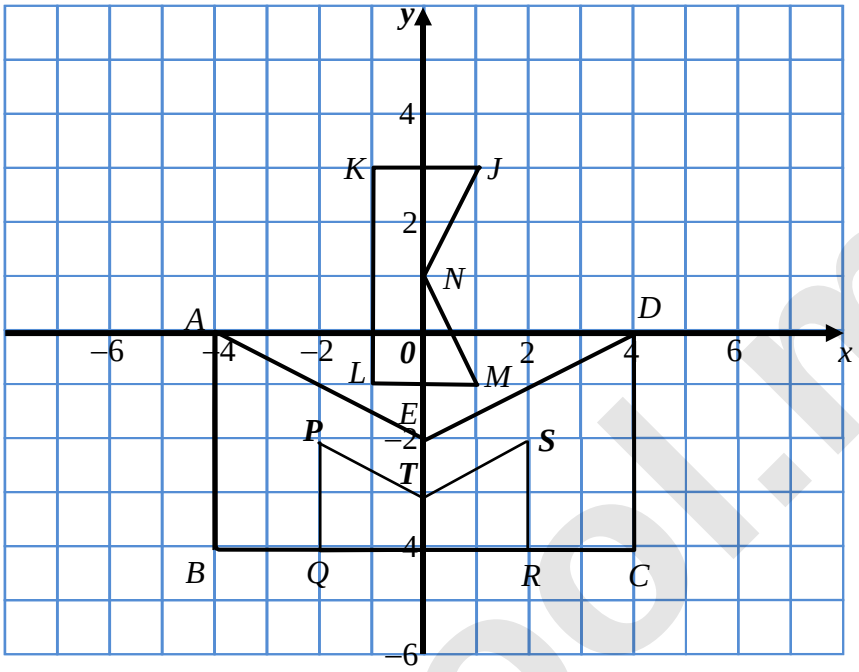


Diagram / Rajah 13.2

Pentagon *JKLMN* is the image of pentagon *ABCDE* under a transformation **VW**.
Pentagon *JKLMN ialah imej bagi pentagon ABCDE di bawah penjelmaan* **VW.**

(i) Describe in full the transformation:

Huraikan selengkapnya penjelmaan:

(a) **W**
(b) **V**

(ii) It is given that the area of shaded region is 180 cm^2.
Calculate the area of the pentagon *JKLMN* , in cm^2.

Diberi bahawa luas bahagian berlorek ialah 180 cm^2.
Hitungkan luas pentagon JKLMN, dalam cm^2.

14 The frequency polygon in the Diagram 14 shows the marks for Mathematics test of 100 students of Sekolah Menengah Kebangsaan Kampung Limau Manis.

For Examiner's Use

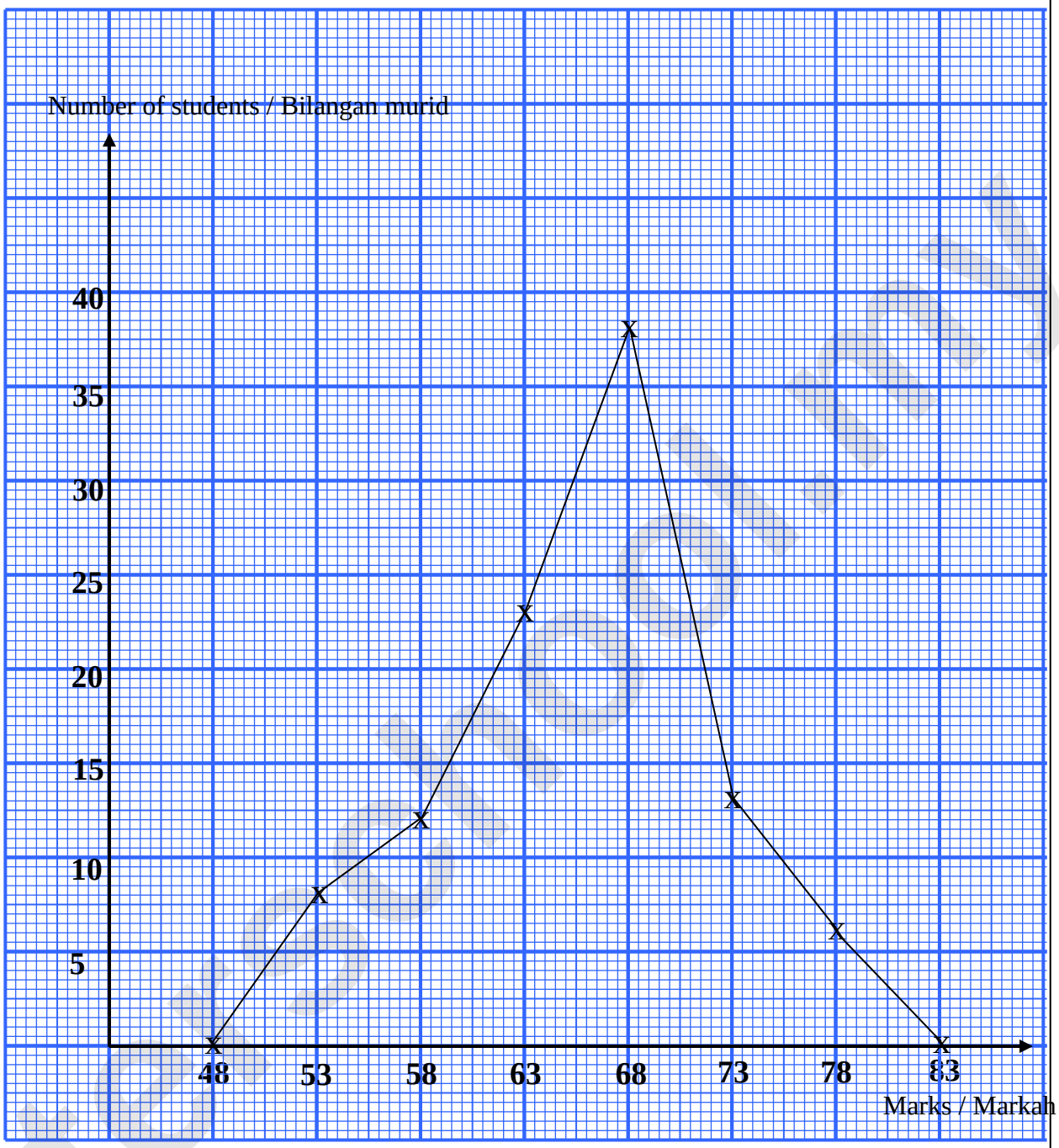


Diagram / *Rajah* 14

(a) Based on the data, complete Table 14 in the answer space.
Berdasarkan data yang diberi, lengkapkan Jadual 14 *di ruangan jawapan.*

[4 marks]
[4 *markah*]

(b) From the Table 14 in (a), calculate the estimated mean of the students marks.

Berdasarkan Jadual 14 *di (a), hitung min anggaran bagi markah murid-murid* tersebut.

[3 marks
[3 *markah*]

For Examiner's Use

(c) For this part of the question, use the graph paper provided on page 32
Untuk ceraian soalan ini, gunakan kertas graf yang disediakan di ha.laman 32.

By using scale of 2 cm to 5 marks on the horizontal axis and 2 cm to 10 students on the vertical axis, draw an ogive for the data.

Dengan menggunakan skala 2 cm *kepada* 5 *markah pada paksi mengufuk dan* 2 cm *kepada* 10 *orang murid pada paksi mencancang, lukiskan satu ogif bagi data tersebut.*

[4 marks]
[4 *markah*]

(d) Based on the ogive in (c) , find the percentage of students who get more than 67 marks.
Berdasarkan ogif di (c), *cari peratus murid yang perolehi markah lebih daripada* 67 *markah*.

[1 marks]
[1 *markah*]

Answer / *Jawapan*:

(a)

Marks / *Markah*	Frequency	Cumulative Frequency / *Kekerapan longgokan*	Upper Boundary / *Sempadan Atas*	Midpoint/ *Titik tengah*
46 – 50				
51 - 55				
56 – 60				
61 – 65				
66 – 70				
71 – 75				
76 – 80				

Table / *Jadual* 14

For Examiner's Use

(b)

(c) Refer graph on page 32
Rujuk graf di halaman 32

(d)

For Examiner's Use

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

*Anda **tidak** dibenarkan menggunakan kertas graf untuk menjawab soalan ini.*

Diagram 15.1 shows a stationary holder with combination of a right prism and a half of cylinder *GHF*. *ABCDEV* is uniform cross-section of the right prism. *ABKJ* is a rectangle on a horizontal plane. The rectangle *DCLM* is an inclined plane.

Rajah 15.1 *menunjukkan sebuah bekas alatulis dengan gabungan sebuah prisma tegak dan separuh silinder GHF. ABCDEV ialah keratan rentas seragam bagi prisma tegak dan ABKJ ialah segi empat tepat terletak di atas satah mengufuk. Segi empat tepat DCLM ialah satah condong.*

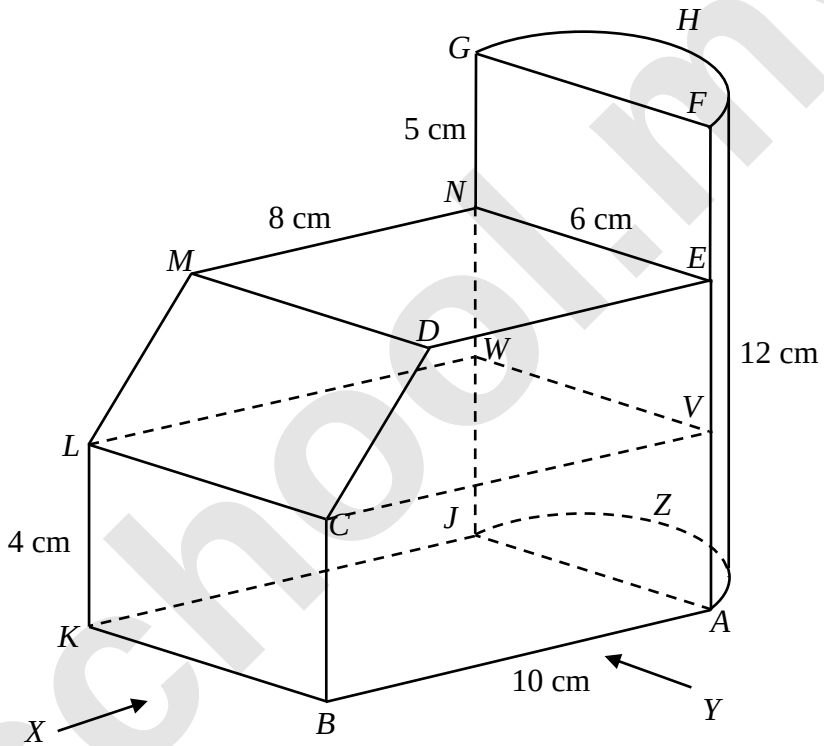


Diagram /*Rajah* 15.1

(a) Draw to full scale,

Lukis dengan skala penuh,

i) the elevation of the stationary holder on a vertical plane paralled to *KB* as viewed from *X*.

dongakan bekas alatulis itu pada satah mencancang yang selari dengan KB sebagaimana dilihat dari X

[3 *marks*]
[3 *markah*]

ii) the elevation of the stationary holder on a vertical plane paralled to *BA* as viewed from *Y*

dongakan bekas alatulis itu pada satah mencancang yang selari dengan BA sebagaimana dilihat dari Y

[4 *marks*]
[4 *markah*]

For Examiner's Use

Answer / *Jawapan*:

a) (i)

(ii)

For Examiner's Use

(b) Diagram 15.2 shows the rectangular drawer *KBCL* is pull out half from the stationary holder.

Rajah 15.2 *menunjukkan laci segi empat tepat KBCL itu ditarik keluar separuh daripada bekas alat tulis.*

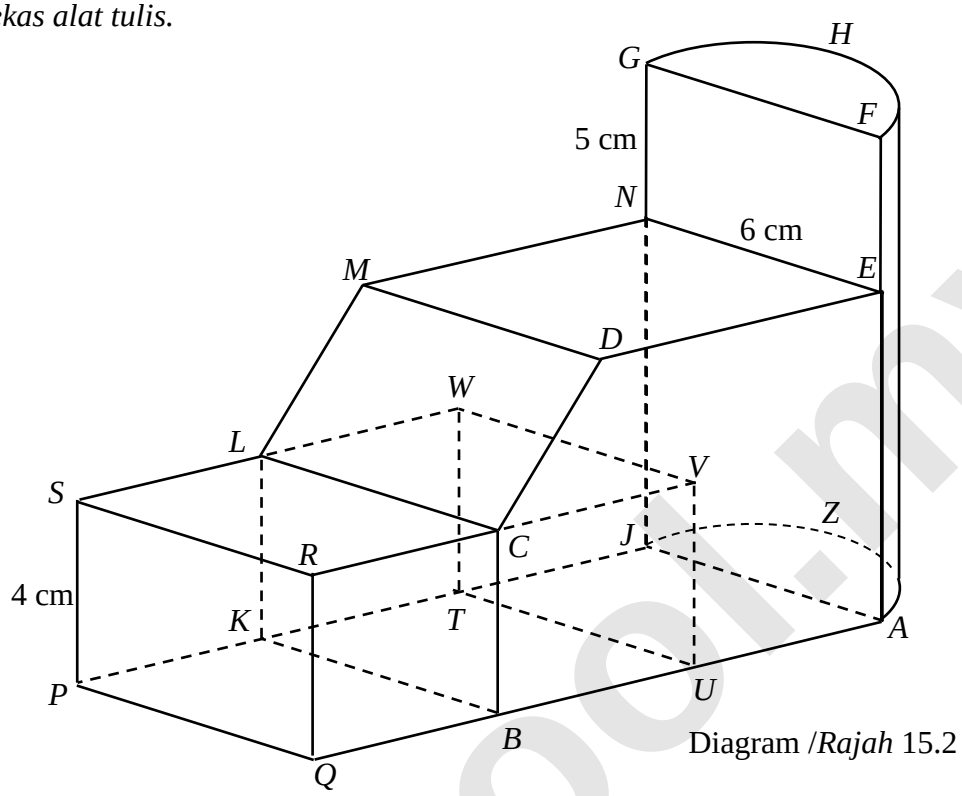


Diagram /*Rajah* 15.2

Draw to full scale, the plan of the stationary holder.
Lukis dengan skala penuh plan bekas alat tulis itu,

[5 *marks*]
[5 *markah*]

Answer/ *Jawapan:*

For Examiner's Use

16 $P(60°N, 70°W)$, Q, R and V are four points on the surface of the earth. PQ is the diameter of the common parallel of latitude and QR is the diameter of the earth.

$P(60°U, 70°B)$, Q, R dan V ialah empat titik di atas permukaan bumi. PQ ialah diameter selarian latitud sepunya dan QR ialah diameter bumi.

(a) The position of P is marked on Diagram 16 in the answer space. Mark the position of Q on Diagram 16 in the answer space, hence state the latitude of R.

[3 marks]

Kedudukan P ditandakan pada rajah 16 *di ruang jawapan. Tandakan kedudukan Q pada Rajah* 16 *di ruang jawapan, seterusnya nyatakan latitud bagi R.*

[3 *markah*]

(b) V is 4200 nautical miles due east of R measured along the common parallel of latitude. Find the longitude of V.

[3 marks]

V terletak 4200 *batu nautika ke timur R diukur sepanjang selarian latitud sepunya. Cari longitud V.*

[3 *markah*]

(c) Calculate the distance, in nautical mile, from P to Q measured along the common parallel of latitude.

[3 *marks*]

Hitung jarak , dalam batu nautika, dari P ke Q diukur sepanjang latitud sepunya.

[3 *markah*]

(d) An aeroplane took off from Q and flew due west to P, and then due south to R. Upon reaching R, the aeroplane then flew due east to V. The average speed of the aeroplane is 560 knots. Calculate the minimum time can be taken , in hours, for the whole journey.

[3 marks]

Sebuah kapal terbang berlepas dari Q dan terbang ke arah barat ke P, dan kemudian ke selatan ke R. Apabila tiba di R, kapal terbang itu kemudiannya terbang ke timur ke V. Purata laju bagi kapal terbang itu ialah 560 knot. *Hitungkan masa minimum yang boleh diambil, dalam jam, keseluruhan penerbangan itu.*

[3 *markah*]

For Examiner's Use

Answer / *Jawapan*:

(a)

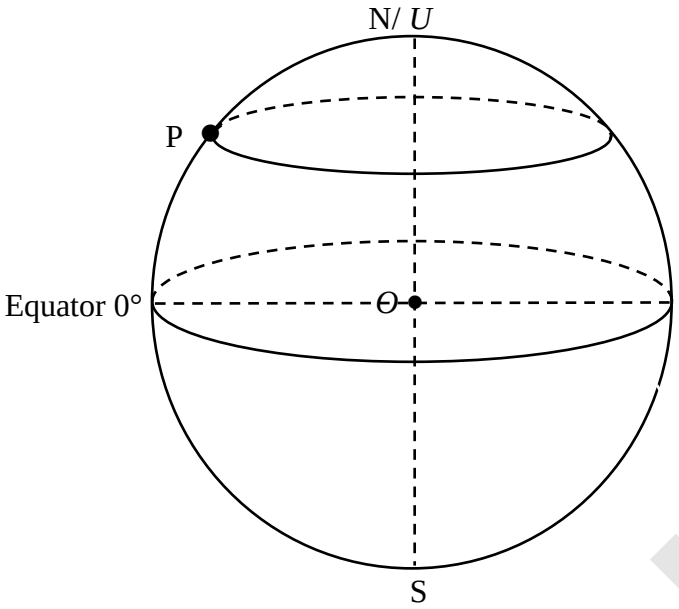


Diagram / *Rajah* 16

Latitude of / Latitud *R*: ……

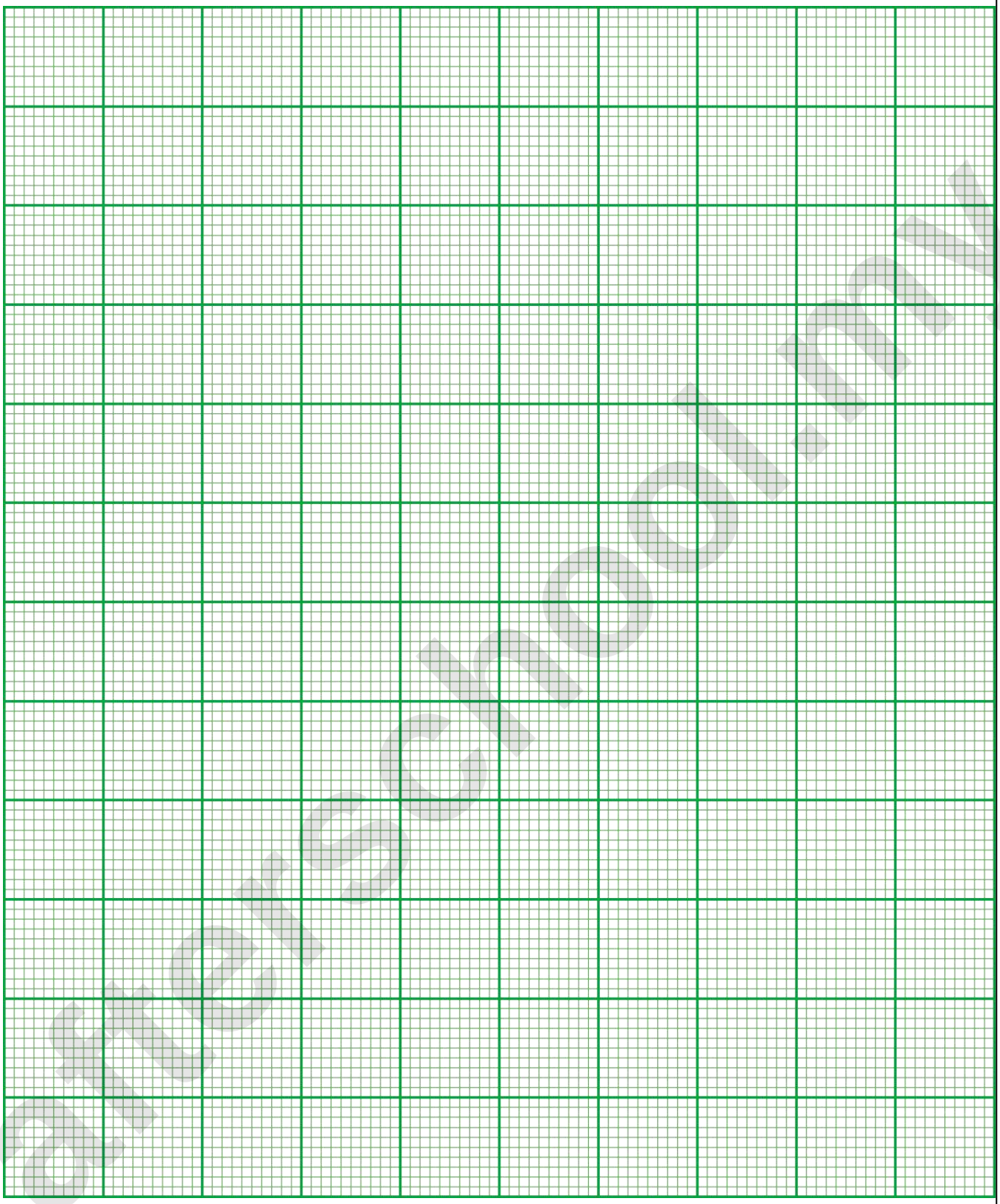
(b)

(c)

(d)

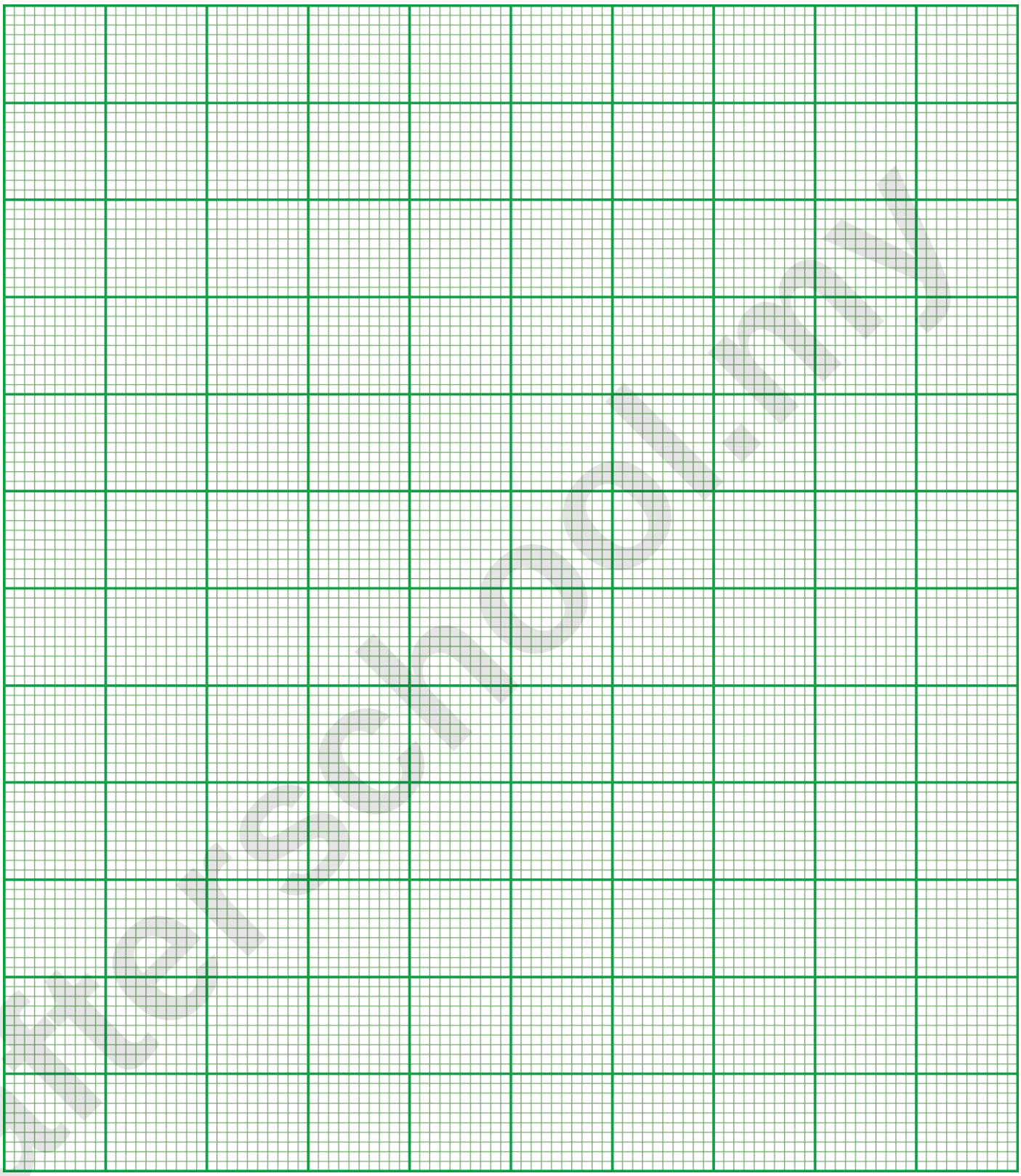
For Examiner's Use

Graph for Question / *Graf untuk Soalan* 12



For Examiner's Use

Graph for Question / *Graf untuk Soalan* 14



END OF QUESTIONS PAPER
KERTAS SOALAN TAMAT

KEMENTERIAN PENDIDIKAN MALAYSIA

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2015: PERCUBAAN SIJIL PELAJARAN MALAYSIA

MATHEMATICS

SKEMA PEMARKAHAN

KERTAS 1 DAN KERTAS 2

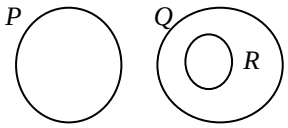
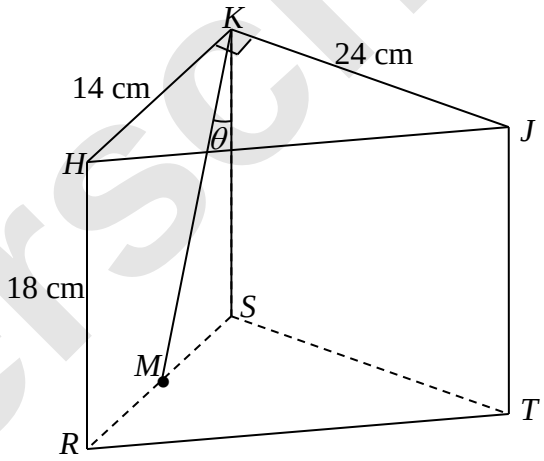
Pengiraan Markah

$$\text{Markah} = \frac{\text{Kertas1} + \text{Kertas2}}{2} \times 100$$

PAPER 1

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

PAPER 2
Section A
[52 *marks* **]**

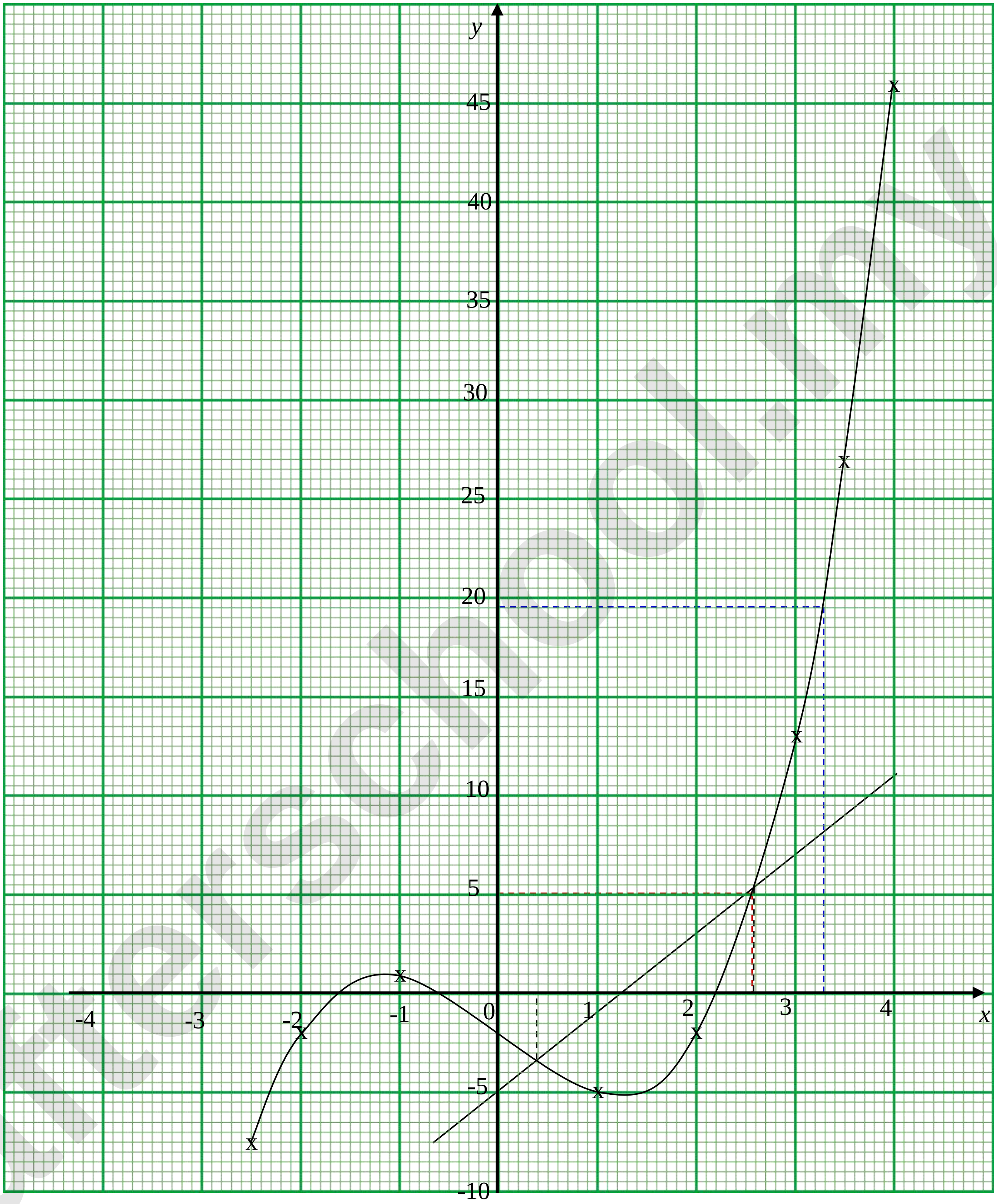
No.		Marking Scheme	Marks	Total
1	a		P1	
	b	$x \geq 0, \quad y \geq x, \quad y < -2x + 8$	P1 P1 P1	**4**
2		$(x+8)(x+2) = 72$ $x^2 + 10x - 56 = 0$ $(x-4)(x+14) = 0$ Length = 10 m	K1 K1 K1 N1	**4**
3	a b	$4x + 3y = 68$ $x + 2y = 32$ $x = 8$ $y = 12$	K1 K1 N1 N1	**4**
4	a		P1	
	b	Tan $\angle MKS = \frac{7}{18}$ $\angle MKS = 21.3^\circ$ *or* $21^\circ 15'$	K1 N1	**3**

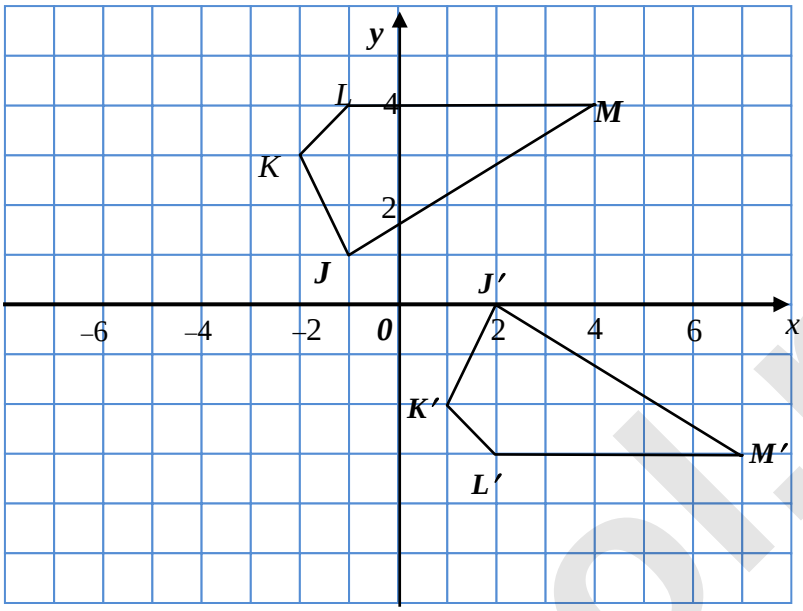
No.		Marking Scheme	Marks	Total
5		$\frac{22}{7}\times\frac{h}{2}\times\frac{h}{2}\times h = 8\times 8\times 8$ $h^3 = \frac{8\times 8\times 8\times 7\times 2\times 2}{22}$ $h = 8.67$ cm	K2 K1 N1	**4**
6	a)	i) True ii) False	P1 P1	
	b)	If the scale factor of an enlargement is not a proper fraction then the image is bigger than the object. OR If the image is not bigger than the object then the scale factor of enlargement is a proper fraction.	K2	
	c)	The number of subset of set A is 8	N1	**5**
7	(a)	$0 = 4x + 3$ $x = -\frac{3}{4}$	K1 N1	
	(b)	$0 = 4(-3) + c$ or equivalent $y = 4x + 12$	K1 N1	
		y-intercept = 12	N1	**5**
8	a	HD, UD, DU	K1	
	b	(i) X = {HD,DH} P(X) = $\frac{2}{6} = \frac{1}{3}$	K1 N1	
		(ii) Y = {HU,UH, DU,UD} P(Y) = $\frac{4}{6} = \frac{2}{3}$	K1 N1	**5**

No.		Marking Scheme	Marks	Total
9	a	$\frac{90}{360}\times 2\times\frac{22}{7}\times 21$ *or* $\frac{90}{360}\times 2\times\frac{22}{7}\times 14$	K1	
		$\left(\frac{90}{360}\times 2\times\frac{22}{7}\times 21\right)+\left(\frac{90}{360}\times 2\times\frac{22}{7}\times 14\right)+7+7+28$	K1	
		97	N1	
	b	$\frac{90}{360}\times\frac{22}{7}\times 21^2$ *or* $\frac{90}{360}\times\frac{22}{7}\times 14^2$ *or* $\frac{50}{360}\times\frac{22}{7}\times 14^2$	K1	
		$\left(\frac{90}{360}\times\frac{22}{7}\times 21^2\right)-\left(\frac{90}{360}\times\frac{22}{7}\times 14^2\right)+\left(\frac{50}{360}\times\frac{22}{7}\times 14^2\right)$	K1	
		$\frac{5005}{18}$ *or* $278\frac{1}{18}$ *or* 278.06	N1	6
10	a	10.08 a.m.	P1	
	b	232 – 95 137	K1 N1	
	c	$\frac{232}{\frac{172}{60}}$ 80.93	K1 N1	5
11	a	$x^2 - 4x + 4 = 0$ $x = 2$	P1 N1	
	b	$\begin{pmatrix}4 & -7\\ 2 & 0\end{pmatrix}\begin{pmatrix}p\\ q\end{pmatrix}=\begin{pmatrix}-1\\ 3\end{pmatrix}$ *or* $\begin{pmatrix}-4 & 7\\ 2 & 0\end{pmatrix}\begin{pmatrix}p\\ q\end{pmatrix}=\begin{pmatrix}1\\ 3\end{pmatrix}$ *or* $\begin{pmatrix}7 & -4\\ 0 & 2\end{pmatrix}\begin{pmatrix}q\\ p\end{pmatrix}=\begin{pmatrix}1\\ 3\end{pmatrix}$	P1	
		$\begin{pmatrix}p\\ q\end{pmatrix}=\frac{1}{(0)(4)-(-7)(2)}\begin{pmatrix}0 & 7\\ -2 & 4\end{pmatrix}\begin{pmatrix}-1\\ 3\end{pmatrix}$ *or* equivalent $=\frac{1}{14}\begin{pmatrix}21\\ 14\end{pmatrix}$	K1 K1	
		$p=\frac{3}{2}$, $q=1$	N1, N1	7

No.		Marking Scheme	Marks	Total
12	a	<table><tr><td>x</td><td>–2.5</td><td>2</td></tr><tr><td>y</td><td>–7.625</td><td>–2</td></tr></table>	K1 K1	
	b	Graph Axes are drawn in the correct direction, uniform scale for $-2.5 \le x \le 4$ and $-2.5 \le y \le 46$	K1	
		6 points and 2 points* plotted accurately Notes : (1) 6 or 7 points plotted correctly, award K1 (2) Other scale being used, subtract 1 mark from the KN marks obtained.	K2	
		Smooth and continuous curve without straight line(s) and passes through all the 8 correct points for $-2.5 \le x \le 4$	N1	
	c	$2.5 \le x \le 2.7$ $19 \le y \le 20$ Note : Do not accept the values of x and y obtained by calculation	N1 N1	
	d	Identify the equation $y = 4x - 5$ *or* equivalent	N1	
		The straight line $y = 4x - 5$ drawn correctly The values of x : 0.4 ± 0.1 2.6 ± 0.1 Notes : (1) Award N mark(s) if the value(s) of x shown on the graph (2) Do not accept the value(s) of x obtained by calculation	K1 N1 N1	**12**

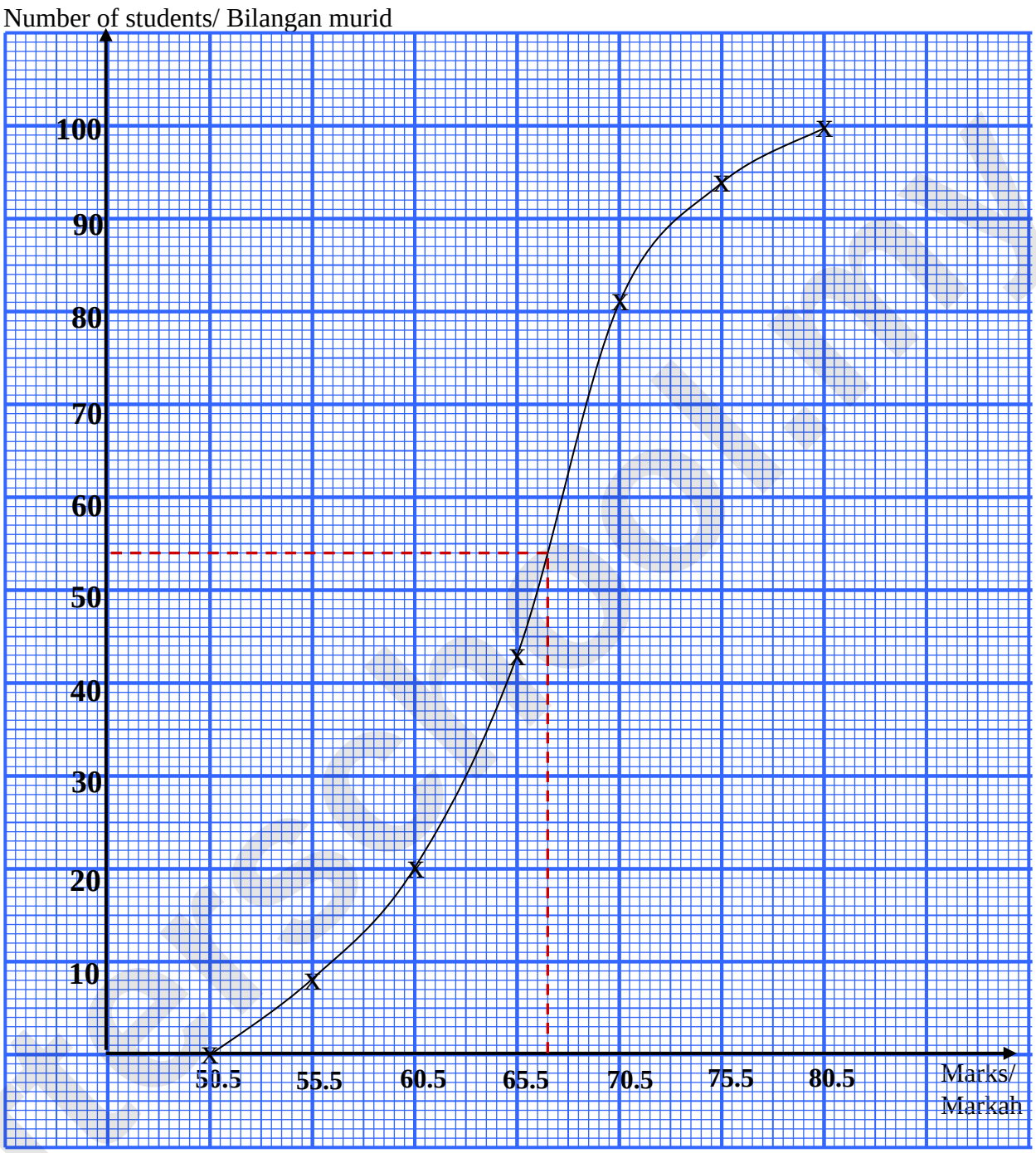
SOALAN 12

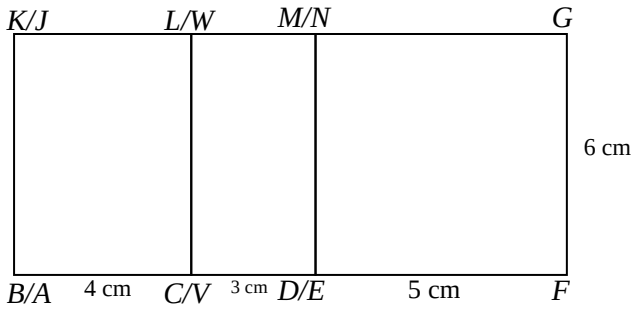
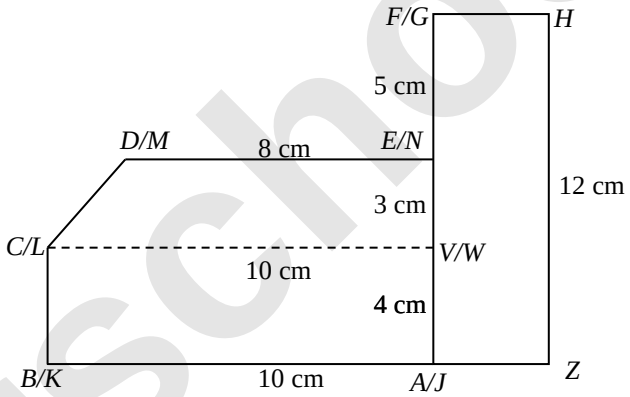


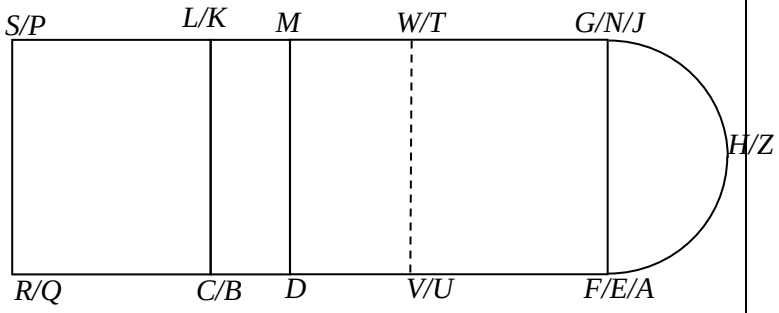
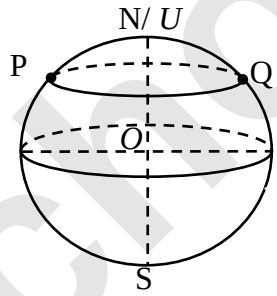
No.		Marking Scheme	Marks	Total
13	a	(i) 	P2	
		(ii)(–1, –4)	N1	
	b	(i) (a) Enlargement with scale factor $\frac{1}{2}$ at centre (0, –4)	P3	
		(b) Rotation of 90° clockwise at centre (2, –1)	P3	
		(ii) $\frac{x}{180+x} = \left(\frac{1}{2}\right)^2$ $x = 60$	K2 N1	12

<table>
<tr><th>No</th><th></th><th>Marking Scheme</th><th>Marks</th><th>Total</th></tr>
<tr><td>14</td><td>(a)</td><td>
<table>
<tr><th>Marks / Markah</th><th>Frequency</th><th>Cumulative Frequency / Kekerapan longgokan</th><th>Upper Boundary / Sempadan Atas</th><th>Midpoint/ Titik tengah</th></tr>
<tr><td>46 – 50</td><td>0</td><td>0</td><td>50.5</td><td>48</td></tr>
<tr><td>51 - 55</td><td>8</td><td>8</td><td>55.5</td><td>53</td></tr>
<tr><td>56 – 60</td><td>12</td><td>20</td><td>60.5</td><td>58</td></tr>
<tr><td>61 – 65</td><td>23</td><td>43</td><td>65.5</td><td>63</td></tr>
<tr><td>66 – 70</td><td>38</td><td>81</td><td>70.5</td><td>68</td></tr>
<tr><td>71 – 75</td><td>13</td><td>94</td><td>75.5</td><td>73</td></tr>
<tr><td>76 – 80</td><td>6</td><td>100</td><td>80.5</td><td>78</td></tr>
</table>
</td><td>P1P1P1P1</td><td>12</td></tr>
<tr><td></td><td>(b)</td><td>$\text{Mean} = \dfrac{8(53)+12(58)+23(63)+38(68)+13(73)++6(78)}{100}$
$= \dfrac{6570}{100} = 65.7$</td><td>K2
N1</td><td></td></tr>
<tr><td></td><td>(c)</td><td>Rujuk kertas graf
Axes drawn in the correct direction, uniform scale for $50.5 \le x \le 80.5$ and $0 \le y \le 100$.
7 points plotted correctly
Smooth curve passing through 7 correct points
Note :
5 or 6 points plotted correctly, award K1</td><td>P1
K2
N1</td><td></td></tr>
<tr><td></td><td>(d)</td><td>46%</td><td>P1</td><td></td></tr>
</table>

Graph for Question / *Graf untuk Soalan* 14



15	a	 Correct shape with rectangles *BCLK*, *CDML* and *DEGM* *DF* > *BC* > *CD* The measurement is correct to ± 0.2 cm (one direction) and the angles at all vertices of the rectangles are 90° ± 1°	K1 K1 N1	
	b	 Correct shape with pentagon *BCDEVA* and rectangle *AFHZ* All solid lines. *HZ* = *FA* > *BA* = *CV* > *DE*=*MN* *CV* is dotted line The measurement is correct to ± 0.2 cm (one way) and the angles at all vertices of the rectangles are 90° ± 1°	K1 K1 K1 N1	

		 Correct shape with correct rectangles *RCLS*, *CDML* and *DFGM* semicircle *FHG*. All solid lines. *DE* > *RC* > *CD* *WV* is dotted line The measurement is correct to ± 0.2 cm (one direction) and the angles at all vertices of the rectangles are 90° ± 1°	K1 K1 K1 N1	
16	(a)	 Latitude *R*= 60°S	P1 P2	
	(b)	$4200 = \theta \times 60 \times \cos 60^\circ$ 140° - 70° Longitude *V* = 70°E	K1 K1 N1	
	(c)	$PQ = 180 \times 60 \times \cos 60^\circ$ 5400	K1K1 N1	
	(d)	$\frac{60 \times 60 + 120 \times 60 + 4200}{t} = 560$ 26.79 hours	K2 N1	12

ERATA
1449 MATEMATIK

KERTAS 1 –SOALAN 30

Asal	Baru
Diagram 30 shows the shaded region which satisfy the three inequalities. *Rajah* 30 *menunjukkan kawasan berlorek yang memuaskan ketiga-tiga ketaksamaan.*	Diagram 30 shows the region which satisfy the three inequalities. *Rajah* 30 *menunjukkan kawasan yang memuaskan ketiga-tiga ketaksamaan.*

KERTAS 2 : SOALAN 15 - 15b

Asal	Baru
Diagram 15.2 shows the rectangular drawer ***KBCL*** is pull out half from the stationary holder. *Rajah* 15.2 *menunjukkan laci segi empat tepat* ***KBCL itu*** *ditarik keluar separuh daripada bekas alat tulis.*	Diagram 15.2 shows the rectangular drawer is pull out half from the stationary holder. *Rajah* 15.2 *menunjukkan laci segi empat tepat ditarik keluar separuh daripada bekas alat tulis.*

Soalan 7 – Diagram 7

Asal	Baru