NAMA : .....

TINGKATAN : .....

MODUL PENINGKATAN PRESTASI TINGKATAN LIMA

PEPERIKSAAN PERCUBAAN SPM

2019

MATEMATIK

1449/2

KERTAS 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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

2 *Kertas soalan ini adalah dalam dwibahasa.*

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

4 *Jawab soalan pada ruang jawapan yang disediakan.*

Untuk Kegunaan Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah diperoleh
A	1	3	
	2	4	
	3	4	
	4	4	
	5	5	
	6	4	
	7	5	
	8	6	
	9	6	
	10	6	
	11	5	
B	12	12	
	13	12	
	14	12	
	15	12	
JUMLAH MARKAH		100	

Rumus-rumus berikut boleh membantu anda untuk menjawab soalan. Simbol-simbol yang diberiadalah yang biasadigunakan.

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 $\left(a^m\right)^n = a^{m \times n}$

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

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

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

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

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

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

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

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

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

12 TeoremPithagoras / *Pythagoras Theorem*
$c^2 = a^2 + b^2$

13 $P(A) = \frac{n(A)}{n(S)}$

14 $P(A) = 1 - P(A')$

BENTUK DAN RUANG

SHAPES AND SPACE

1 Luas Trapezium $= \frac{1}{2} \times$ Hasil tambah dua sisi selari $\times$ Tinggi

Area of Trapezium $= \frac{1}{2} \times$ *Sum of parallel lines* $\times$ *Height*

2 Lilitanbulatan$=\pi d = 2\pi j$
Circumference of circle $=\pi d = 2\pi r$

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

4 Luas permukaanmelengkungsilinder$= 2\pi jt$
Curved surface area of cylinder $= 2\pi rh$

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

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

7 Isipaduprismategak=luaskeratanrentas×panjang
Volume of right prism =cross sectional area ×length

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

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

9 Isi padu Kon $= \frac{1}{3}\pi j^2 t$

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

10 Isi padu Piramid Tegak $= \frac{1}{3} \times$ Luas tapak $\times$ Tinggi

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

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

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

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

Bahagian A
[52 *marks*]
[*52 markah*]

Answer **all** *questions in thissection.*
*Jawab***semua***soalandalambahagianini.*

1 TheVenndiagrambelowshowssetsP, Q,and$R$.Giventhattheuniversalset $\xi = P \cup Q \cup R$.
Shade the region representing
Gambarajah Venn di bawahmenunjukkan set P, Q dan R. Di beri set semesta $\xi = P \cup Q \cup R$.
Lorekkankawasan yang mewakili

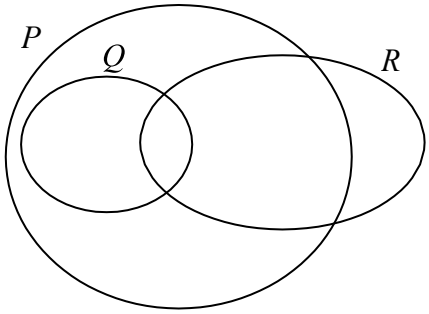
(i) $Q \cap R$

(ii) $(Q \cup R) \cap P$

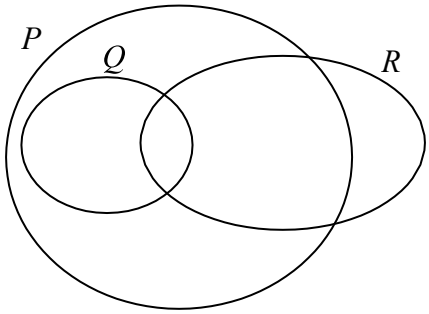
[3*marks*]
[3markah]

Answer/ *Jawapan:*

(i)



(ii)



For Examiner's Use

2 A stone is thrown vertically upward from a platform. The distance, h m, of the stone from the ground is given by $h = 6 + 11t - 2t^2$ where *t* is the time in seconds after throw. When does the stone hit the ground?
Seketulbatudibalingsecarategakdarisebuahpelantar.Jarak h m, batuitudaritanahdiberiolehh $= 6 + 11t - 2t^2$ *dengan t ialah masa dalam saatselepasdibaling.Bilakahbatuitutiba di permukaantanah?*

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

Answer/Jawapan:

---

3 Puan Amina bought one kilogram of prawn and one kilogram of fish with a total payment of RM40. Puan Siva paid RM64 to buy one kilogram of such prawn and three kilograms of such fish. Calculate the total amount of money, in RM, that Puan Sandy needs to pay if she buys two kilograms of prawn and two kilograms of fish.

Puan Amina membelisekilogramudangdansekilogramikandenganjumlah bayaransebanyak RM40. Puan Siva membayar RM64 untukmembelisekilogramudangdantiga kilogramikan yang sama. Hitungjumlahwang, dalam RM, yang perludibayarolehPuan Sandyjikabeliaumembelidua kilogram udangdandua kilogram ikan.

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

Answer/ *Jawapan*:

4 Diagram 4 shows a cuboid with *TUVW* as the horizontal base .*L, M* and *N* are the midpoints of *PS, QR* and *UV*respectively.
Rajah 4 *menunjukkansebuahkuboiddengantapakmengufuk TUVW.L, M dan N adalahtitiktengahbagi PS, QR dan UV masing-masing.*

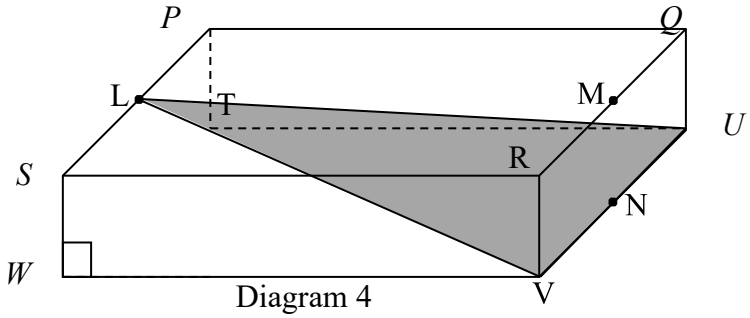


Diagram 4
Rajah 4

Given WT = 8 cm, WV= 12 cm and QU = 4 cm.
DiberiWT = 8 cm, WV= 12 cm dan QU = 4cm.

(a) Identify the angle between the plane *LVU* and the plane*QRVU*.
Kenalpastisudut di antarasatah LVU dengansatahQRVU.

(b) Calculate the angle between theplane *LVU* and the plane *QRVU*.
Hitungkansudut di antarasatah LVU dengansatahQRVU.

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

Answer :

(*a*)

(*b*)

5 (*a*) Write two implications base on the sentencebelow.
Tulisduaimplikasiberdasarkanpernyataanberikut.

" $P \subset Q$ if and only if $P \cap Q = \varnothing$ "
" $P \subset Q$ *jikadanhanyajika* $P \cap Q = \varnothing$ "

(b) Complete the followingargument:
Lengkapkanhujahberikut:

Premise1 : If $n = 2$, then $x^n + x$ is a quadraticexpression.
Premis1 : *Jika* $n = 2$, *then* $x^n + x$ *ialahsuatuungkapankuadratik.*

Premise2 : $x^n + x$ is not a quadraticexpression.
Premis2 : $x^n + x$ *bukansuatuungkapankuadratik.*

Conclusion : _____

Kesimpulan : _____

(c) Makeageneralconclusionbyinductionforthenumbersequence7,22,47,82, … . which follows the following pattern.
*Buatsatukesimpulanumumsecaraaruhanbagiurutannombor*7, 22, 47, 82,*...yang mengikutpolaberikut.*

$7 = 5(1) + 2$
$22 = 5(4) + 2$
$47 = 5(9) + 2$
$82 = 5(16) + 2$
.....

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

Answer/*Jawapan :*

(*a*)……

……

(*b*) Conclusion/*Kesimpulan*: ……

(*c*) ……

……

6 Diagram 6 shows a cone with diameter 18 cm and height 21 cm. A cube of 6 cm sides is taken out of thecone.
Rajah 6 *menunjukkansebuahkondengan diameter* 18 cm *dantinggi*21 cm*.*
*Sebuahkiubdengansisi*6 cm *dikeluarkandarikontersebut.*

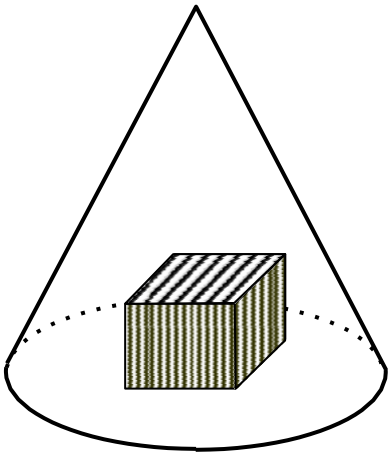


Diagram 6
Rajah 6

Using $\pi = \frac{22}{7}$, calculate the volume, in cm^3, of the remaining solid.

Denganmenggunakan $\pi = \frac{22}{7}$ *,hitungkanisipadu, dalam* cm^3*, pepejal yang tinggal*.

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

Answer/*Jawapan :*

7 In Diagram 7, O is the origin. Straight line AB is parallel to straight line CD and straight line BC is parallel to y-axis. The equation of the straight line AB is $y = 2x + 5$.

Dalam Rajah 7, O ialah asalan. Garis lurus AB adalah selari dengan garis lurus CD dan garis lurus BC adalah selari dengan paksi-y. Persamaan garis lurus AB ialah

$y = 2x + 5$.

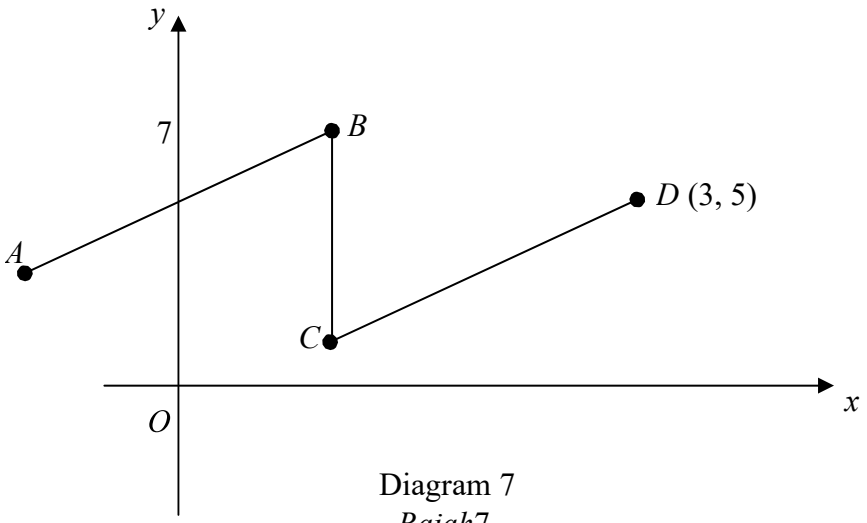


Diagram 7
Rajah 7

(a) State the equation of the straight line BC.

Nyatakan persamaan garis lurus BC.

(b) Find the equation of the straight line CD.

Cari kan persamaan garis lurus CD.

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

Answer/*Jawapan*: (*a*)

(*b*)

8 (a) Find the inverse matrix of $\begin{pmatrix} 6 & -4 \\ 3x & -3 \end{pmatrix}$
Carimatrikssongsangbagi $\begin{pmatrix} 6 & -4 \\ 3x & -3 \end{pmatrix}$

(b) PuanAzlin paid RM19 for 5 pencils and 6 pens. PuanPriya paid RM12.40 for 3 pencils and 4 pens. By using matrix method, find the price, in RM, of 1 pencil and the price, in RM, of 1 pen
PuanAzlinmembayar RM19 untuk 5 batangpenseldan 6 batang pen.PuanPriyamembayar RM12.40 untuk 3 batangpenseldan 4 batang pen.Denganmenggunakankaedagmatriks, cariharga, dalam RM sebatang pen.

[6*marks*]
[6*markah*]

Answer/*Jawapan:*

(*a*)

(*b*)

9 In Diagram 9, *AC* is the diameter of a semicircle *ABC* with centre*O* and *EC* is the diameter of semicircle *EDC*. *BFO* is an arc of circle with centre*A* and *E* is the midpoint of *OC*. *AC* = 28cm.
Dalam Rajah 9*, AC ialah diameter bagisemibulatan ABC berpusat O dan EC adalah diameter bagisemibulatan EDC. BFO ialahlengkukbulatanberpusat A dan E adalahtitiktengah OC. AC* = 28 cm.

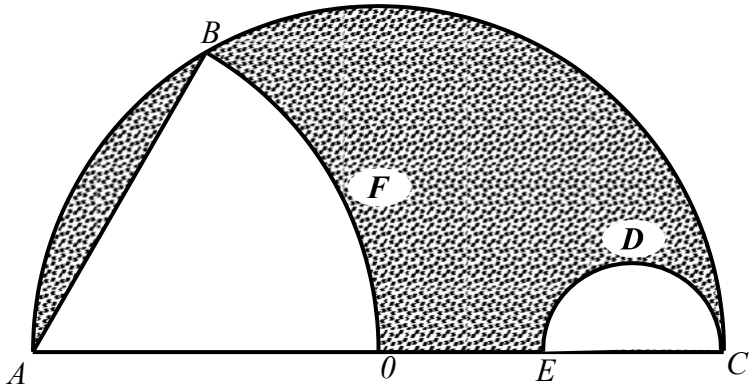


Diagram 9
Rajah 9

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

Denganmenggunakan $\pi = \frac{22}{7}$ *,kirakan*

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

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

[6*marks*]
[6*markah*]

Answer/*Jawapan*:

(*a*)

(*b*)

10 Diagram 10 shows a speed-time graph for the movement of a particle for a period of 45 seconds.
Rajah 10 *menunjukkanmenunjukkangraflaju-masa bagisuatuzarahdalamtempoh*45 *saat.*

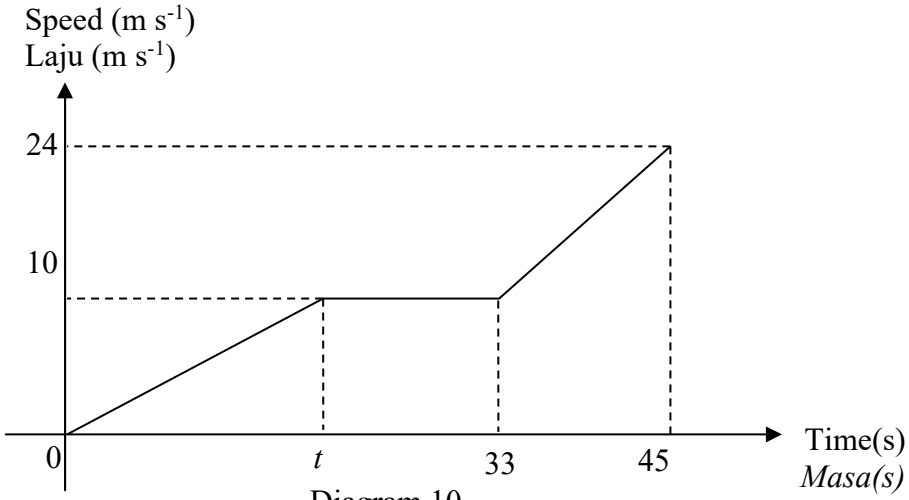


Diagram 10
Rajah 10

(a) Given that the distance travelled by uniform speed is 140 m.
Calculate the value of*t*.
*Diberibahawajarakdilaluidenganlajuseragamialah*140 m.
Hitungkannilai t.

(b) Calculate the rate of change of speed, in m s^{-2}, of the particle in the last 12seconds.
*Hitungkankadarperubahanlaju, dalam*ms^{-2}*, zarahitudalam*12 *saatterakhir.*

(c) Calculate the total distance travelled by theparticle.
Hitungkanjumlahjarak yang dilaluiolehzarahitu.

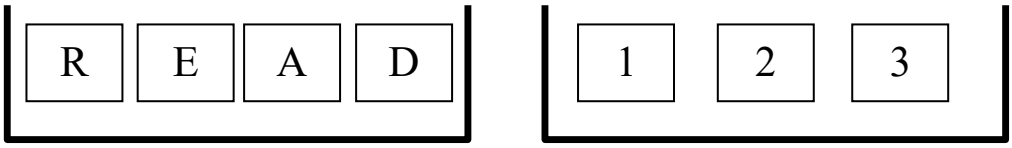
[6 *marks*]
[6 *markah*]

Answer/*Jawapan*:
(*a*)

(*b*)

(*c*)

11 Diagram 11 shows a set of cards labeled with letters in Box Aand a set of cards labeled with numbers in Box*B*.
Rajah 11 *menunjukkansatu set kadberlabeldenganhuruf di dalamkotakAdansatu set kadberlabeldengannombor di dalam Kotak B.*



Box *A*
Kotak A

Box *B*
Kotak B

Diagram 11
Rajah 11

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

(a) List the samplespace.
Senaraikanruangsampel.

(b) List all the outcomes of events and find the probabilitythat
Senaraikansemuakesudahanperistiwadancarikebarangkalianbahawa

(i) one of the cards picked is labelled with avowel.
satukad yang dipilihberlabelhurufvokal.

(ii) a card labelled R and a card with a prime number arepicked.
satukadberlabel R dansatukadnomborperdanadipilih.

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

Answer/*Jawapan:*

(*a*)

(*b*) (i)

(ii)

Section B
Bahagian B

[48 marks]
[48 *markah*]

Answer any **four** questions in this section.
*Jawab**empat**soalan di bahagianini.*

12 (*a*) Complete Table 12 in the answer space for the equation $y=x^3-4x-5$ by writing down the values of y when $x = -2$ and $x = 3$.
*LengkapkanJadual*12 *di* $y=x^3-4x-5$ *dengan ruangjawapanbagipersamaanmenulisnilai-nilai y apabila* $x = -2$ *dan* $x = 3$.

[2*marks*]
[2*markah*]

(b) For this part of the question, use the graph paper provided. You may use a flexible curverule.
Untukceraiansoalanini, gunakankertasgraf yang disediakan.Andabolehmenggunakanpembarisfleksibel.

By using the scale of 2 cm to 1 unit on the x-axis and 2 cm to 5 units on the y-axis, draw the graphof $y=x^3-4x-5$ for$-3 \le x \le 3.5$.
*Denganmenggunakanskala*2 cm *kepada*1 *unit padapaksi-x dan*2 cm *kepada*5 *unitpadapaksi-y, lukisgraf* $y=x^3-4x-5$ *bagi*$-3 \le x \le 3.5$.

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

(c) By using the graph drawn in **12(b),**find
Denganmenggunakangraf yang dilukis di **12(b)***, cari*

(i) the value of y when $x = 1.5$,
nilai y apabila $x = 1.5$,

(ii) the value of x when $y = 5$.
nilai x apabila $y = 5$.

[2*marks*]
[2*markah*]

(d) Draw a suitable straight line on your graph to find all the values of x whichsatisfy theequation $x^3-9x+5=0$ for $-3 \le x \le 3.5$.
State these values of x.
Lukis satugarislurus yang sesuaipadagrafandauntukmencarinilai-nilai x yang memuaskan $x^3-9x+5=0$ *bagi* $-3 \le x \le 3.5$. *persamaanNyatakannilai-nilai xitu.*

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

Answer/*Jawapan:*

(*a*)

x	–3	–2.5	–2	–1	0	1	2	3	3.5
y	–20	–10.6		–2	–5	–8	–5		23.9

Table 12
Jadual 12

(*b*) Refer graphprovided.
Rujukgraf yang disediakan.

(*c*) (i) y = ……

(ii) x = ……

(*d*) x = …… ,……

13 Diagram 13.1 shows the point $A(7, 5)$ and point P drawn on a Cartesianplane.
Rajah 13.1 *menunjukkantitik*$A(7, 5)$ *dantitik P dilukispadasuatusatahCartesan.*

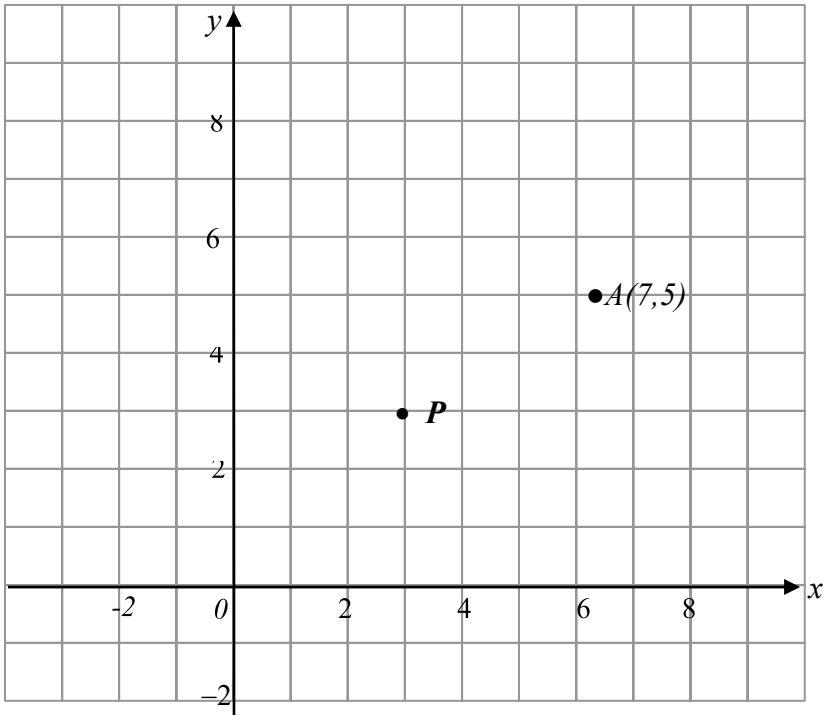


Diagram 13.1
Rajah 13.1

(a) Transformation **T** is atranslation $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$ and transformation R is an anticlockwise rotation of 90^o about thrcentre$P$. State the coordinates of the images of point $A(7,5)$ under each of the following transformations.

*Penjelmaan**T**ialahtranslasi* $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$ *dan penjelmaan R ialah putaran* 90^o *lawan arah jam berpusat di P. Nyatakankoordinatimejbagititik A(7,5) di bawah penjelmaan berikut:*

(i) T,

(ii) TR.

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

(b) Diagram 13.2 shows three pentagons, *ABCDE, FGHIJ* and *FKLMN,* drawn on a Cartesianplane.
Rajah 13.2 menunjukkantiga pentagon ABCDE, FGHIJ dan FKLMN, dilukispadasuatusatahCartesan.

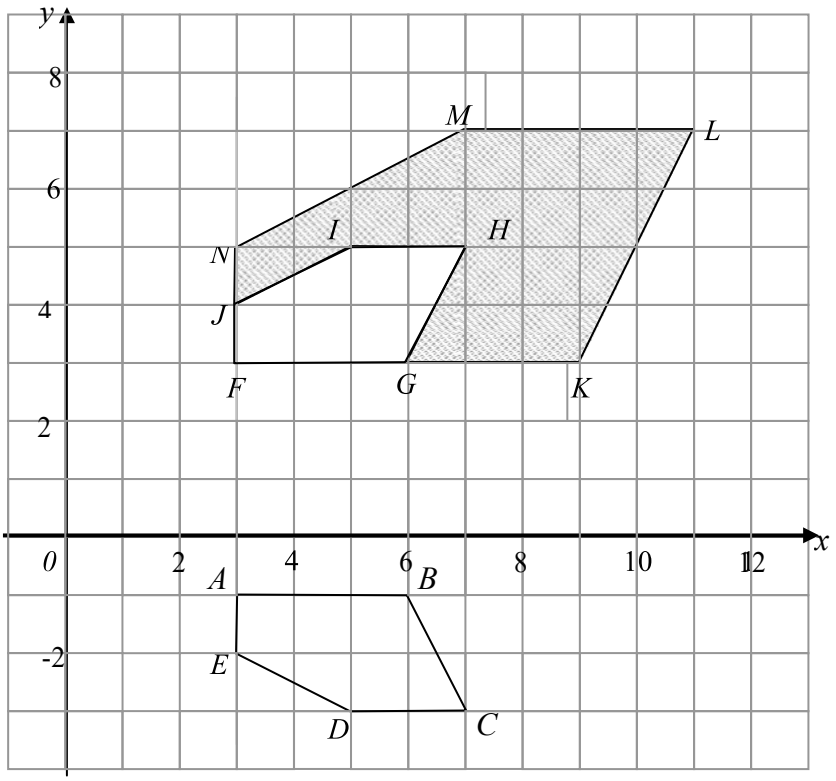


Diagram 13.2
Rajah 13.2

(i) *FKLMN* is the image of *ABCDE* under a combined transformation**VU.**
*FKLMN ialahimejbagi ABCDE di bawahgabunganpenjelmaan***VU**.

Describe in full the transformation
Huraikanselengkapnyapenjelmaan

(a) U,

(b) V.

(ii) It is given that the area of the shaded region is 112.5 m^2. Calculate the area, in m^2, of the pentagon*ABCDE.*
*Diberibahawaluaskawasanberlorekialah*112.5 m^2.*Hitungluas, dalam* m^2*, pentagon ABCDE.*

[8*marks*]
[8*markah*]

Answer/*Jawapan :*

(a) (i)

(ii)

(b) (i) (*a*)

(*b*)

(ii)

15 You are **not** allowed to use graph paper to answer thisquestion.
*Anda**tidak**dibenarkanmenggunakankertasgrafuntukmenjawabsoalanini.*

(a) Diagram 14.1 shows a solid right prism with a rectangular base *JKQR* on a horizontal plane. The surface *KQPL* is the uniform cross-section of the prism. The rectangle *MLPN* is an inclined plane. *KL* and *QP* are verticaledges.
Rajah 14.1 *menunjukkansebuahpepejalberbentukprismategakdengantapaksegiempattepat JKQR terletak di atassatahmengufuk.Permukaan KQPL ialahkeratanrentasseragamprismaitu.Segiempattepat MLPN ialahsatahcondong.Tepi KL dan QP adalahtegak.*

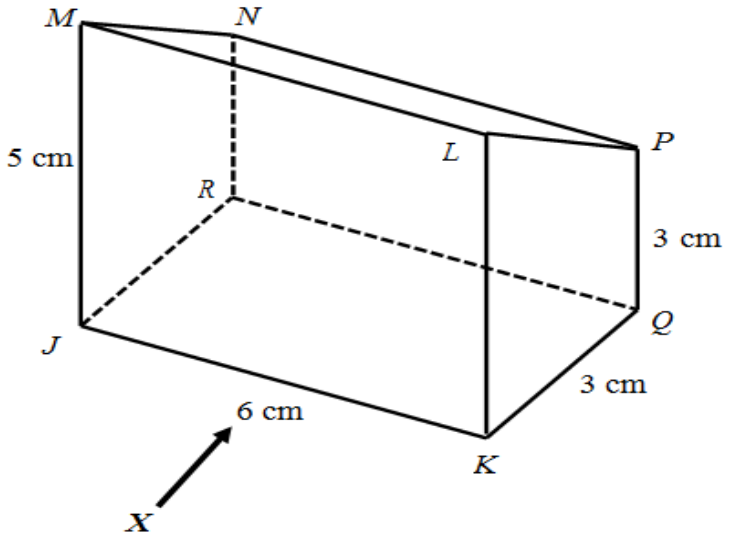


Diagram 14.1
Rajah 14.1

Draw to full scale, the elevation of the solid on a vertical plane parallel to *JK* as viewed from *X*.
Lukis denganskalapenuh, dongakanpepejalitupadasatahmencancang yang selaridengan JK sebagaimanadilihatdari X.

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

(b) Another solid right prism with trapezium *WVUT* as the cross-section is joined to the prism in Diagram 14.1 at the vertical plane *RQPN*. The composite solid is shown in Diagram 14.2. The base *JKQVWR* is on a horizontal plane and rectangle*SPUT* is an inclinedplane.

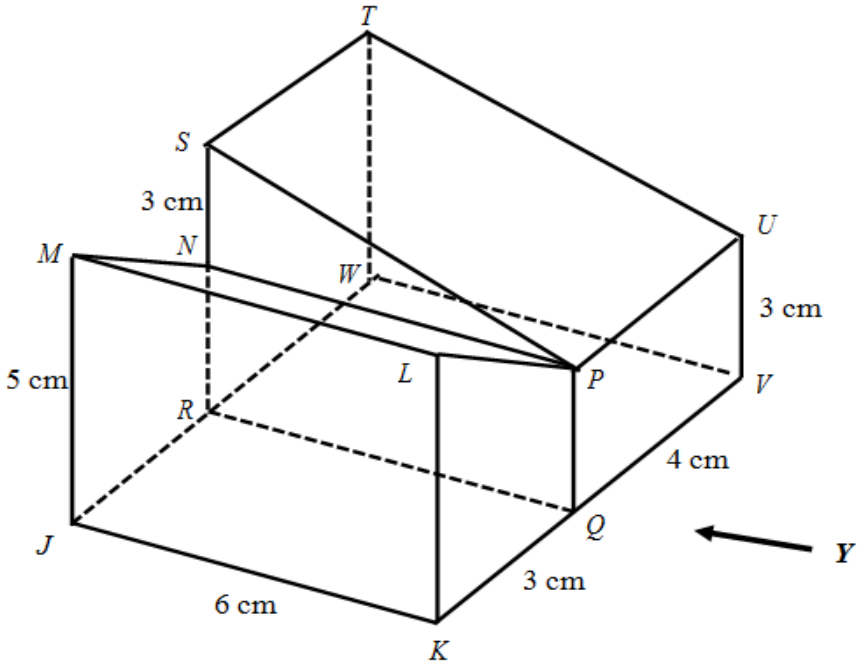


Diagram 14.2
Rajah 14.2

Draw to full scale,
Lukis denganskalapenuh,

(i) the plan of the compositesolid,
pelangabunganpepejalitu,

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

(ii) the elevation of the composite solid on a vertical plane parallel to *KV* as viewed from***Y***.
*dongakangabunganpepejalitupadasatahmencancang yang selaridengan KV sebagaimanadilihatdari**Y**.*

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

Answer/*Jawapan*:

14.*(a)*

SULIT

Answer/*Jawapan*:

(*b*) (i)

2
3

1449/2

For Examiner's Use

(ii)

For Examiner's Use

15 The data in Diagram 15 shows the score of 40 participants in a written Mathematics quiz competition.
Data dalam Rajah 15 *menunjukkanskor yang diperolehioleh*40 *orang pesertadalamsuatupertandinganKuizMatematiksecarabertulis.*

25	26	34	45	33	30	39	32
40	43	17	48	37	42	37	43
31	37	36	35	29	31	33	23
45	28	44	36	50	39	27	40
34	39	24	30	38	34	44	35

Diagram 15
Rajah 15

(a) Based on the data in Diagram 15, complete Table 15 in the answer space. [3 *marks*]
Berdasarkan data di Rajah 15*, lengkapkanJadual*15 *di ruangjawapan.*[3 *markah*]

Based on Table 15, calculate the estimated mean of the score obtained by a participant. [3*marks*]
*BerdasarkanJadual*15*, hitung min anggaranskor yang diperolehiolehpeserta.* [3 *markah*]

(b) For this part of the question, use the graph paperprovided.
Untukceraiansoalanini, gunakertasgrafyangdisediakan. [4*marks*]

By using the scale of 2 cm to 5 marks on the horizontal axis and the scale of 2 cm to 5 participants on the vertical axis, draw an ogive for the data.
*Denganmenggunakanskala*2 cm *kepada*5 *markahpadapaksimengufukdan* 2 cm*kepada*5 *peserta padapaksimencancang, lukissatuogifbagi data tersebut.* [4*markah*]

(*d*) Based on the ogive in **15**(*c*), find the interquartilerange.
Berdasarkanogif di **15***(c), hitungjulatantarakuartil.*

[2*marks*]
[2*markah*]

Answer/*Jawapan:*

(*a*)

Class interval *Selangkelas*	**Frequency** *Kekerapan*	**Upper Boundary** *SempadanAtas*	**Cumulative Frequency** *Kekerapanlonggokan*
11 – 15			
16 – 20			
21 – 25			
26 – 30			
31 – 35			
36 – 40			
41 – 45			
46 – 50			

Table 15
*Jadual*15

(*b*)

(c) Refer to the provided graph.
Rujukgraf yang disediakan.

(d)

16 In Diagram 16, *P* (40°*N*, 58°*W*), *Q*, *R*and *X* are four points on the surface of the earth. *PQ* is the diameter of the parallel of latitude of 40°*N*. *X* lies 3780 nautical miles due south of*R*.

Dalam Rajah 16*, P* (40°*U,* 58°*B*)*, Q, R dan X ialahempattitik di ataspermukaanbumi.PQ ialah diameter selarianlatitud*40°*U. X terletak*3780 *batunautikakeselatan R.*

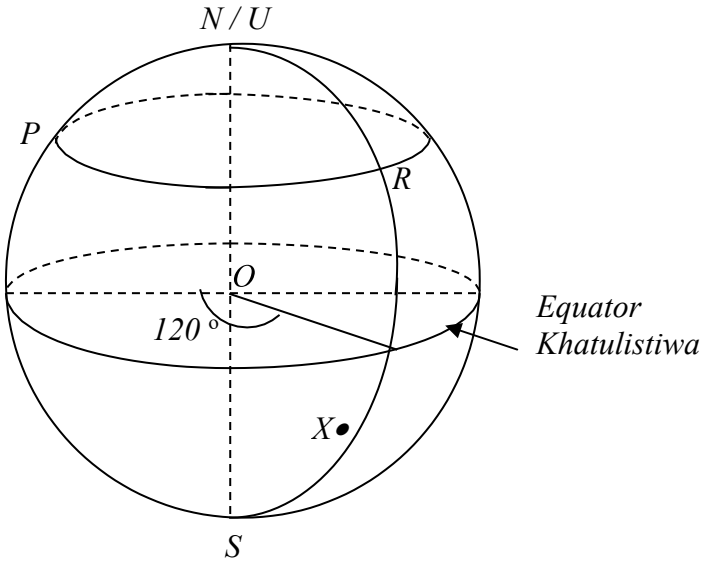


Diagram 16
Rajah 16

(a) (i) State the longitude of*R*.
Nyatakanlongitudbagi R.

(ii) State the location of *Q*.
*Nyatakankedudukanbagi**Q*.

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

(b) Calculate the shortest distance, in nautical mile, from *P* to *Q* measured along the surface ofthe earth. [2*marks*]

Hitungjarakterpendek, dalambatunautika, dari P ke Q diukursepanjangpermukaanbumi. [2*markah*]

(c) Calculate the distance, in nautical mile, from *P* to *R* measured along the common paralleloflatitude. [3*marks*]

Hitungjarak, dalambatunautika, dari P ke R diukursepanjangselarianlatitudsepunya. [3*markah*]

(d) An aeroplane took off from *P* and flew due east to *R* and then flew due south to *X*. The average speed for the whole flight was 680knots.
Calculate the time, in hours, taken for the whole flight.
Sebuahkapalterbangberlepasdari P arahketimurke R danterbangarahkeselatanke X. Puratalajuseluruhpenerbanganituialah 680 knot.
Hitungkan masa, dalam jam, yang diambiluntukseluruhpenerbanganitu.

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

Answer/*Jawapan :*

(*a*) (i)

(ii)

(*b*)

(*c*)

(*d*)

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES

1. This question paper consists of two sections: **Section A** and **SectionB**.
*Kertassoalaninimengandungiduabahagian :***Bahagian A** *dan***bahagian B.**

2. Answer **all** questions in **Section A** and **four** questions from **SectionB**.
*Jawabsemuasoalandalam***Bahagian A** *dan mana-mana* **empat***soalandaripada***Bahagian B.**

3. Write your answers in the spaces provided in the questionpaper.
Tulisjawapanpadaruang yang disediakandalamkertassoalanini.

4. Show your working. It may help you to getmarks.
Tunjukkankerjamengiraanda.Inibolehmembantuandauntukmendapatkanmarkah.

5. If you wish to change your answer, cross out the answer that you have done. Then write down the newanswer.
Jikaandahendakmenukarjawapan, batalkanjawapan yang telahdibuat.Kemudiantulisjawapan yang baharu.

6. The diagrams in the questions provided are not drawn to scale unlessstated.
Rajah yang mengiringisoalantidakdilukismengikutskalakecualidinyatakan.

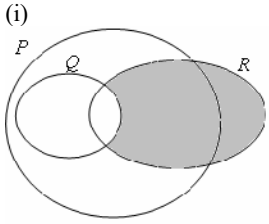
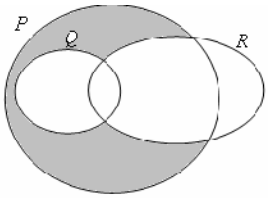
7. The marks allocated for each question and sub-part of a question are shown inbrackets.
Markah yang diperuntukkanbagisetiapsoalandanceraiansoalanditunjukkandalamkurungan.

8. A list of formulae is provided on page 2 to3.
Satusenarairumusdisediakan di halaman 2 hingga 4.

9. You may use a non-programmable scientificcalculator.
Andadibenarkanmenggunakankalkulatorsaintifik yang tidakbolehdiprogram.

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

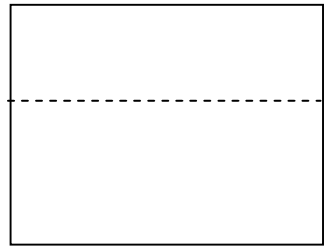
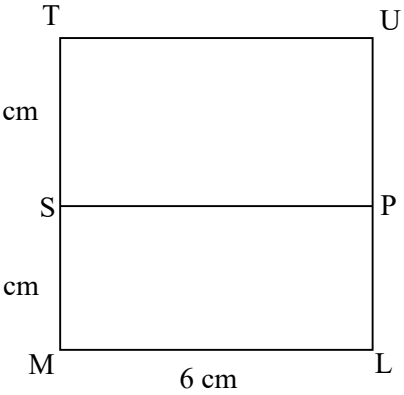
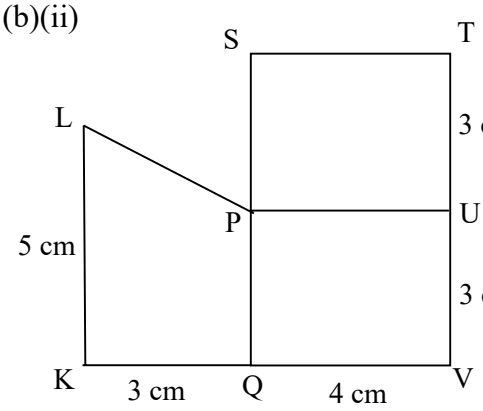
PAPER2
SectionA
[52*marks***]**

No	Marking Scheme	Marks	
1	(i)  (ii) 	P1, P2	**3**
2.	$2t^2 - 11t - 6 = 0$ $(2t+1)(t-6) = 0$ $t = -\frac{1}{2}$, 6, maka roket air tiba di permukaantanahpada masa 6 saat	K1 K1 N1N1	**4**
3.	$x + y = 40$…….(1) $x + 3y = 64$……. (2) $2y = 24$, $y = 12$, $x + 12 = 40$, $x = 28$ $2x+2y = 2(28) + 2(12)$ = RM 80	K1 K1 K1 N1	**4**
4.	a) $\angle ZLNM$ (b) $\tan \angle ZLNM = \frac{12}{4}$ ορ εθυιϖαλεντ $\angle ZLNM = 71.57^o$	P1 K2 N1	**4**

No	Marking Scheme	Marks	
5.	(a) If $P \subset Q$ then $P \cap Q = \varnothing$. If $P \cap Q = \varnothing$ then $P \subset Q$.	P1P 1	
	(b) $n \neq 2$	P1	
	(c) $5n^2 + 2$; $n = 1,2,3,...$	K1, P1	**5**
6.	$\frac{1}{3} \times \frac{22}{7} \times 9^2 \times 21$	K1	
	$\frac{1}{3} \times \frac{22}{7} \times 9^2 \times 21 - 6 \times 6 \times 6$	K1	
	1566	N1	**4**
7.	$(a) B(1,7)$	P1	
	$x = 1$	P1	
	(b) $m_{CD} = 2$	P1	
	$\frac{y-5}{x-3} = 2$ *or* $5 = 2(3) + c$	K1	
	$y = 2x - 1$	N1	**5**
8.	$A^{-1} = \frac{1}{5 \times 4 - 6 \times 3} \begin{pmatrix} 4 & -6 \\ -3 & 5 \end{pmatrix}$	K1	
	$= \frac{1}{2} \begin{pmatrix} 4 & -6 \\ -3 & 5 \end{pmatrix}$	N1	
	$5x + 6y = 19$ $3x + 4y = 12.40$	P1	
	$\begin{pmatrix} 5 & 6 \\ 3 & 4 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 19 \\ 12.40 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{2} \begin{pmatrix} 4 & -6 \\ -3 & 5 \end{pmatrix} \begin{pmatrix} 19 \\ 12.40 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{2} \begin{pmatrix} 1.60 \\ 5 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 0.80 \\ 2.50 \end{pmatrix}$	K1	
	x = 0.80, y = 2.50	N1N1	**6**

No	Marking Scheme	Marks	
9.	(*a*) $\frac{180}{360}\times 2\times\frac{22}{7}\times 14$ *or* $\frac{180}{360}\times 2\times\frac{22}{7}\times\frac{7}{2}$ *or* $\frac{60}{360}\times 2\times\frac{22}{7}\times 14$	K1	
	$\frac{180}{360}\times 2\times\frac{22}{7}\times 14+\frac{180}{360}\times 2\times\frac{22}{7}\times\frac{7}{2}$ $\frac{60}{360}\times 2\times\frac{22}{7}\times 14+14+$	K1	
	$90\frac{2}{3}$ or 90.67	N1	
	(*b*) $\frac{180}{360}\times\frac{22}{7}\times 14^2$ *or* $\frac{180}{360}\times\frac{22}{7}\times\left(\frac{7}{2}\right)^2$ *or* $\frac{60}{360}\times 2\times\frac{22}{7}\times 14^2$	K1	
	$\frac{180}{360}\times\frac{22}{7}\times 14^2-\frac{180}{360}\times\frac{22}{7}\times\left\lvert\frac{7}{2}\right\rvert^2-\frac{60}{360}\times\frac{22}{7}\times 14^2$	K1	
	186.08	N1	**6**
10	(*a*) $(33-t)10=140$	K1	
	$t=19$	N1	
	(*b*) $\frac{24-10}{12}$	K1	
	1.17	N1	
	(*c*) $\frac{1}{2}\times 19\times 10+140+\frac{1}{2}(10+24)12$ 2	K1	
	439	N1	**6**
11	(a) {(*R*, 1)(R,2), (R,3), (E,1), (E,2), (E,3), (A,1), (A,2), (A,3), (D,1), (D,2),(*D*, 3)}	P1	
	(b))V={(*E*, 1) (E,2), (E,3), (A,1), (A,2),(*A*, 3)}	K1	
	P(V) = $\frac{6}{12}=\frac{1}{2}$	N1	
	(c) R= {(*R*, 2),(*R*, 3)}	K1	
	P(R) = $\frac{2}{12}=\frac{1}{6}$	N1	**5**

No	Marking Scheme	Marks	
12	(a) x | -2 | 3 y | -5 | 10	K1K1	
	(b) ***Graph***		
	Axes drawn in the correct direction , the uniform scale is in the range given.	K1	
	9 coordinates plotted correctly in the range given.	K2	
	Smooth curve drawn continuously in the range without a straight line at any part and passed through 9 correct coordinates .	N1	
	(c) (i) $y = -7.5 \pm 0.5$	P1	
	(ii) $x = 2.75 \pm 0.1$	P1	
	(d) Identify the equation $y = 5x - 10$ orequivalent. Draw the line $y = 5x - 10$	K1 K1	
	$x = 0.6 \pm 0.1$, 2.6 ± 0.1	N1 N1	**12**
13	(a) (i) (4 , 7)	P2	
	(ii) (–2 , 9)	P2	
	(b) (i) U = Reflection in the line $y = 1$	P2	
	(ii) V = Enlargement with scale factor 2 about centre F or (3 ,3)	P3	
	(b)(ii) $2^2(ABCDE) - ABCDE = 112.5$ **or** $\frac{112.5}{3}$ $37.5\ m^2$.	K2 N1	**12**

No	Marking Scheme	Marks	
14	(a)  Correct shape of rectangle JKLM Dotted line Correct measurement ±0.2cm	K1 K1 N1	
	(b)(i)  Correct shape of two rectangle. TU > TS > SM Correctmeasurement 0.2 cm	K1 K1 N2	
	(b)(ii)  Correct shape of two rectangle and a trapezium KQ = TU = UV = 3 cm LK > QV > KQ /TU/UV Correctmeasurement 0.2 cm	K1 K1 K1 N2	**12**

No	Marking Scheme	Marks	
15	(a)		

	Class Interval	Frequency	Upper Boundary	Cumulative Frequency
I	11 – 15	0	15.5	0
II	16 – 20	1	20.5	1
III	21 – 25	3	25.5	4
IV	26 – 30	6	30.5	10
V	31 – 35	10	35.5	20
VI	36 – 40	11	40.5	31
VI1	41 – 45	7	45.5	38
VIII	46 – 50	2	50.5	40

Frequency	:	(I to VIII) correct	P1
Upperboundary	:	(I to VIII) correct	P1
CumulativeFrequency	:	(I to VIII)correct	P1

(b)

$$\frac{(18 \times 1) + (23 \times 3) + (28 \times 6) + (33 \times 10) + (38 \times 11) + (43 \times 7) + (48 \times 2)}{40}$$ K2

or $\frac{1400}{40}$

35 N1

(c) ***Ogive****(Refergraph)*

Axes drawn in the correct direction , uniform scale for $15.5 \leq x \leq 50.5$ and $0 \leq y \leq 40$. K1

Horizontal axis labeled using upper boundary or use the values of upper boundary for plotting K1

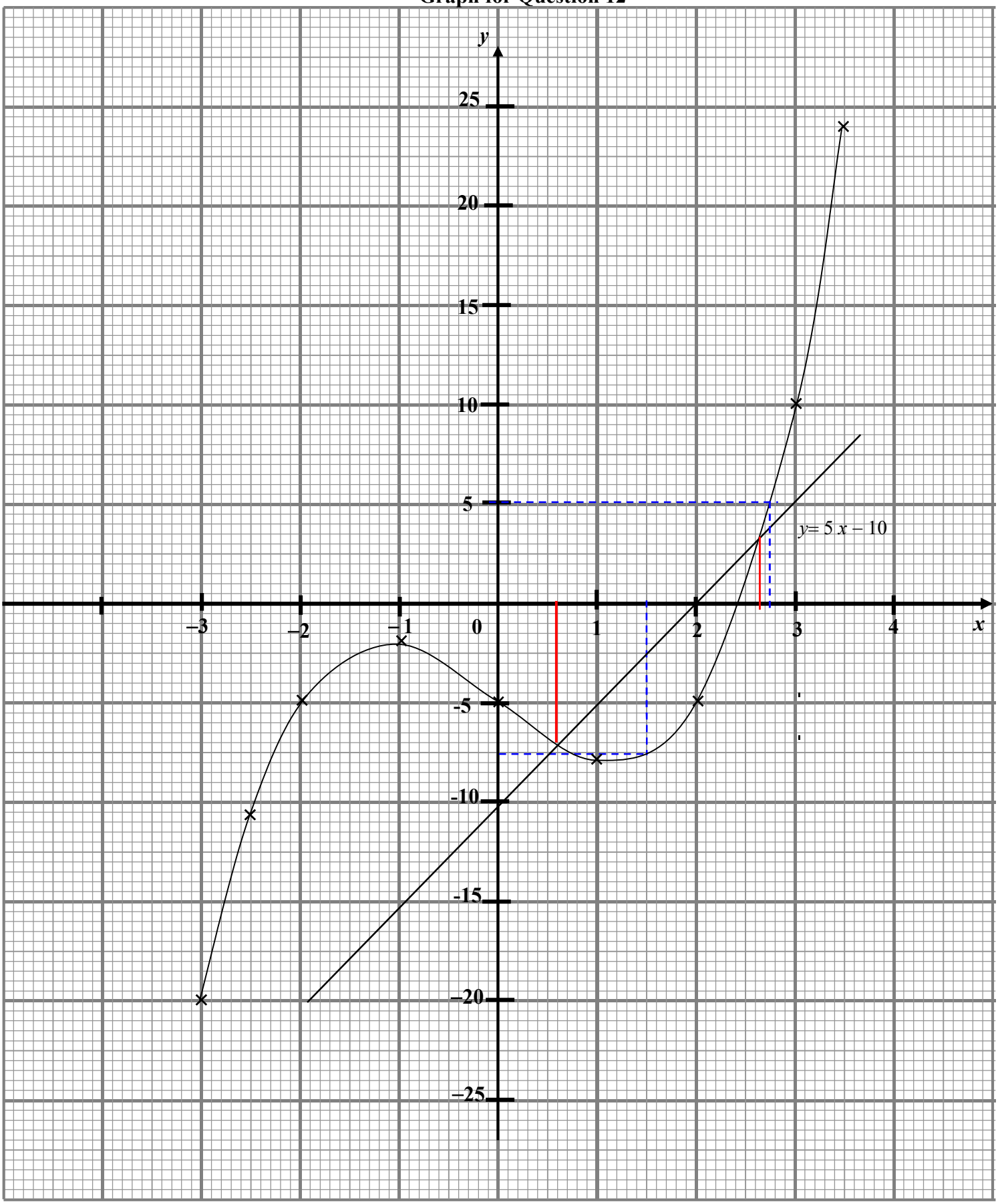
8 points plotted correctly *or* the ogive passed through them. K1

The ogive completed and passed through 8 points correctly. N1

(d) 40 – 30.5
9.5 K1
N1 **12**

No	Marking Scheme	Marks	
16	(a)(i) $62^{o}E$	P1 P1	
	(ii) Q ($40^{o}N$, $122^{o}E$)	P1 P1	
	(b) 100 x 60	K1	
	6000	N1	
	(c) cos40 seen	K1	
	120 x 60 x *cos* 40	K1	
	5515.52	N1	
	(d) $\frac{5515.52+3780}{680}$ or $\frac{9295.52}{680}$	K1 K1	
	13.67 hours	N1	**12**

Graph for Question 12



Graph for Question no 15