NAMA
KELAS

JABATAN PELAJARAN SARAWAK

PEPERIKSAAN AKHIR TAHUN 2011   1449/2
TINGKATAN 4

MATHEMATICS

Kertas 2

Okt.

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

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tulis **nama** dan **kelas** anda pada petak yang disediakan.*

2. *Kertas soalan ini adalah dalam dwibahasa.*

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

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

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

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

Kertas soalan ini mengandungi 33 halaman bercetak.

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

5   Distance /*Jarak*

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

6   Midpoint / *Titik tengah*

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

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

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

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

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

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

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

10   Pythagoras' Theorem
      Teorem Pithagoras

      $c^2 = a^2 + b^2$

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

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

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

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

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

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SHAPES AND SPACE
BENTUK DAN RUANG

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

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

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

     Lilitan bulatan = $\pi d = 2\pi j$

3   Area of circle = πr^2

     Luas bulatan = πj^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 × length

     Isi padu prisma tegak = luas keratan rentas × panjang

7   Volume of cylinder = $\pi r^2 h$

     Isi padu silinder = $\pi j^2 t$

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

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

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

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

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

     Isi padu piramid tegak = $\frac{1}{3}$ × luas tapak × tinggi

11   Sum of interior angles of a polygon

     Hasil tambah sudut pedalaman poligon
     $= (n-2) \times 180°$

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

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

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

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

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

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

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

      Luas imej $= k^{2} \times$ luas objek

Section A
Bahagian A

[52 *marks*]
[52 *markah*]

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

1   The Venn diagram in the answer space shows sets *P*, *Q* and *R* such that the universal set, $\xi = P \cup Q \cup R$.
On the diagrams in the answer space, shade the set

Gambar rajah Venn di ruang jawapan menunjukkan set P, set Q dan set R dengan keadaan set semesta, $\xi = P \cup Q \cup R$.
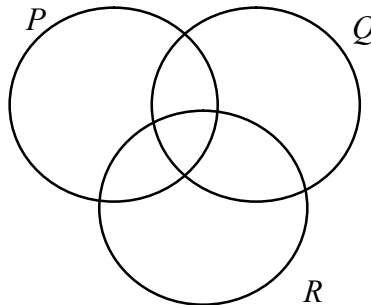*Pada rajah di ruang jawapan, lorek set*

(a) $P \cap Q$,
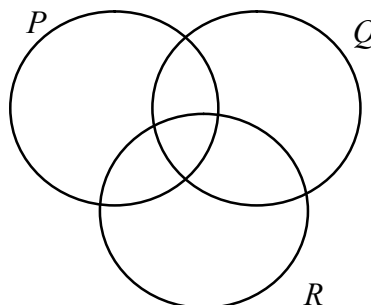
(b) $(P' \cap Q) \cup R$

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

Answer / *Jawapan:*

(a)

(b)

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2 Diagram 2 shows a cuboid. *M* and *N* are the midpoint of *DC* and *RS* respectively.

Rajah 2 *menunjukkan sebuah kuboid. M dan N ialah titik tengah bagi DC dan RS.*

(a) Name and mark the angle between the line *MQ* and the base *PQRS*.

Nama dan tandakan sudut di antara garis MQ dan tapak PQRS.

(b) Hence, calculate the angle between the line *MQ* and the base *PQRS*.

Seterusnya, hitung sudut antara garis MQ dengan tapak PQRS.

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

Answer / *Jawapan:*

(a)

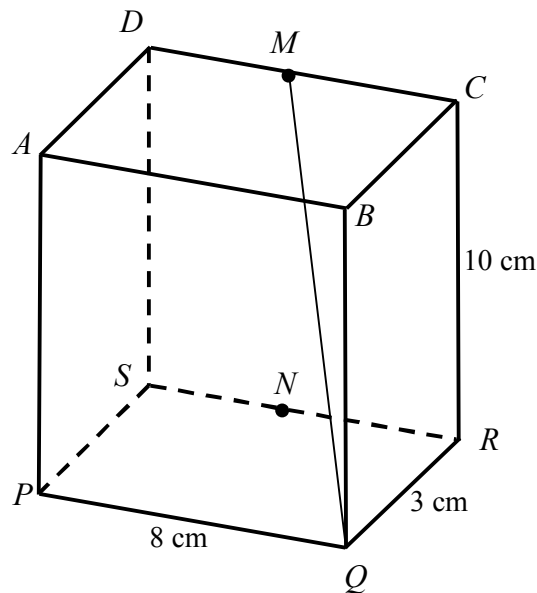
Diagram 2
Rajah 2

(b)

3   Solve the following quadratic equation:

Selesaikan persamaan kuadratik berikut:

$$2x(x - 3) = 4 + x$$

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

Answer / *Jawapan*:

---

4   Calculate the value of x and of y that satisfy the following simultaneous linear equations:
Hitung nilai x dan nilai y yang memuaskan persamaan linear serentak berikut:

$$2x + y = 3$$
$$3x - 4y = 10$$

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

Answer / *Jawapan*:

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5 (*a*) State whether the sentence below is a statement or non-statement.

Nyatakan sama ada ayat berikut suatu pernyataan atau bukan pernyataan.

> 7 is a factor of 20
>
> *7 ialah faktor bagi* 20

(*b*) State the **converse** of the following statement. Hence, determine whether its converse is true or false.

*Nyatakan **akas** bagi pernyataan berikut. Seterusnya, nyatakan sama ada akas itu benar atau palsu.*

> If *p* is a multiple of 6, then *p* is a multiple of 2
>
> *Jika p ialah gandaan* 6, *maka p ialah gandaan* 2

(*c*) The number of subsets of a set with *n* elements is 2^n. Given the set $Q = \{2, 4, 5\}$. Make one conclusion by deduction on the number of subsets of set *Q*.

Bilangan subset bagi satu set yang mempunyai n unsur ialah 2^n.
Diberi $Q = \{2, 4, 5\}$. Buat satu kesimpulan secara deduksi tentang bilangan subset bagi set Q.

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

Answer / *Jawapan*:

(*a*) …………………………………………………………………………………………

(*b*) …………………………………………………………………………………………

…………………………………………………………………………………………

(*c*) …………………………………………………………………………………………

…………………………………………………………………………………………

6   (*a*)   State whether the following compound statement is true or false.

Nyatakan sama ada pernyataan berikut adalah benar atau palsu.

> $3 < 4$ or $-4 < -5$
> $3 < 4$ *atau* $-4 < -5$

(*b*)   Write down two implications based on the following compound statement:

Tulis dua implikasi berdasarkan pernyataan berikut:

> Set $A \subset$ Set B if and only if $A \cap B = A$
> *Set $A \subset$ Set B jika dan hanya jika $A \cap B = A$*

(*c*)   Write down Premise 2 to complete the following argument:

Tulis Premis 2 untuk melengkapkan hujah berikut:

Premise 1:   If $k > 3$, then $2k > 6$.

Premis 1:   *Jika* $k > 3$, *maka* $2k > 6$.

Premise 2 / *Premis* 2:

……………………………………………………………………………….………

Conclusion: $k < 3$

Kesimpulan: $k < 3$

(*d*)   Make a general conclusion by induction for the sequence of numbers –2, 7, 22, … which follows the following pattern.

Buat satu kesimpulan umum secara aruhan bagi urutan nombor –2, 7, 22, … yang mengikut pola berikut.

$$-2 = 3(1^2) - 5$$
$$7 = 3(2^2) - 5$$
$$22 = 3(3^2) - 5$$
$$\ldots = \ldots\ldots$$

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

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Answer / *Jawapan*:

(*a*)   …………………………………………………………………………………………………

(*b*)   Implication 1 / *Implikasi* 1:

        ………………………………………………………………………….................

        Implication 2 / *Implikasi* 2:

        ………………………………………………………………………….................

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

        ...……………………………………………………………………………………..……

(*d*)   ..………………………………………………………………………………………………

7 (*a*)

B	E	A	U	T	Y

Diagram 7
Rajah 7

Diagram 7 shows 6 cards labelled with letters.
All these cards are put into a box. A card is picked at random from the box.

Rajah 7 menunjukkan 6 kad yang berlabel dengan huruf.
Kesemua kad ini dimasukkan ke dalam sebuah kotak. Sekeping kad dipilih secara rawak daripada kotak.

(i) List all sample space.

Senaraikan ruang sampel.

(ii) List all the outcomes of the events and find the probability that a card labelled with a vowel is chosen.

Senaraikan semua kesudahan peristiwa dan cari kebarangkalian bahawa sekeping kad dilabel dengan huruf vokal dipilih.

(*b*) A bag contains 12 yellow cards and some green cards. If a card is chosen at random from the bag, the probability of choosing a green card is $\frac{2}{5}$. Then 3 additional green cards are added into the bag and a card is chosen at random from the bag.
Find the probability of choosing a green card.

Sebuah beg mengandungi 12 keping kad kuning dan sebilangan kad hijau. Jika sekeping kad dipilih secara rawak daripada beg itu, kebarangkalian memilih sekeping kad hijau ialah $\frac{2}{5}$. Kemudian, 3 keping kad hijau baru dimasukkan ke dalam beg itu dan sekeping kad dipilih secara rawak daripada beg itu.
Cari kebarangkalian memilih sekeping kad hijau.

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

Answer / *Jawapan*:

(*a*) (i)

    (ii)

(*b*)

8 In Diagram 8, *O* is the origin. Straight line *AOB*, straight line *BC* and straight line *OD* are drawn on a Cartesian plane. Straight line *OD* is parallel to straight line *BC*. The equation of straight line *OD* is $y = -2x$.

Dalam Rajah 8, O ialah asalan. Garis lurus AOB, garis lurus BC dan garis lurus OD dilukis pada suatu satah Cartesian. Garis lurus OD adalah selari dengan garis lurus BC. Persamaan garis lurus OD ialah $y = -2x$.
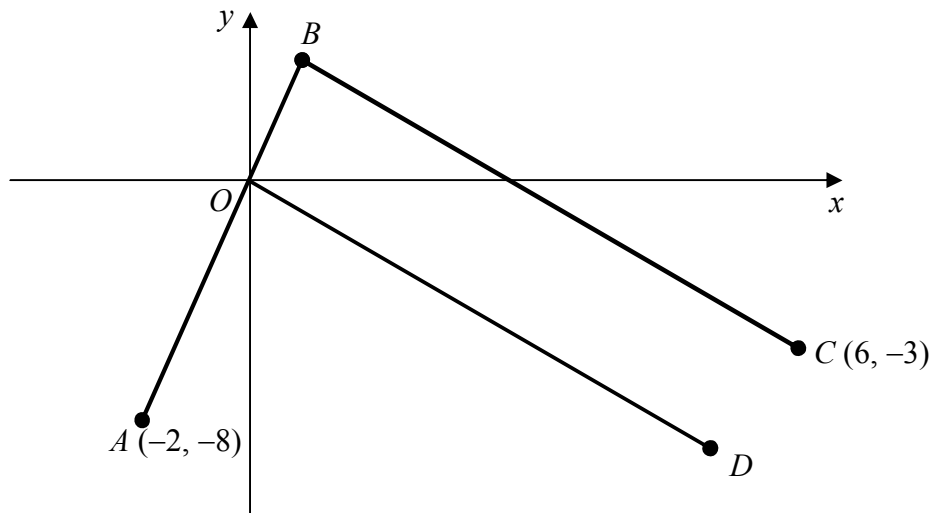

Diagram 8
Rajah 8

Find

Cari

(*a*) the gradient of straight line *OA*,

    kecerunan garis lurus OA,

(*b*) the equation of straight line *BC*,

    persamaan garis lurus BC,

(*c*) the *x*-intercept of straight line *BC*.

    pintasan-x bagi garis lurus BC.

[6 *marks*]

[6 *markah*]

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Answer / *Jawapan* :

(*a*)

(*b*)

(*c*)

9 Diagram 9 shows arcs *PQ* and *RS*, with common centre *O*. *OQR* is a right-angled triangle and *POR* is a straight line.

Rajah 9 *menunjukkan lengkok PQ dan RS, dengan pusat sepunya O. OQR ialah sebuah segi tiga bersudut tegak dan POR ialah garis lurus .*
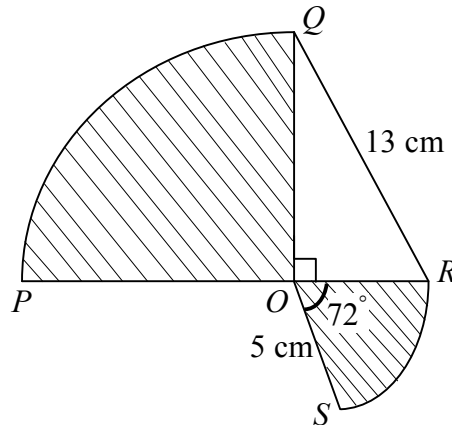

Diagram 9
Rajah 9

Use $\pi = \dfrac{22}{7}$ and give the answers correct to two decimal places.

Guna $\pi = \dfrac{22}{7}$ *dan beri jawapan betul kepada dua tempat perpuluhan.*

Calculate

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*]

Answer / *Jawapan* :

(*a*)

(*b*)

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10 Diagram 10 shows a right prism. Triangle *EFG* is the uniform cross-section of the prism. The area of the uniform cross-section, *EFG*, of the right prism is 30 cm^2. A cylinder with diameter 4 cm and height 10 cm is taken out from the solid.

Rajah 10 *menunjukkan sebuah prisma tegak. Segi tiga EFG ialah keratan rentas seragam prisma itu. Luas keratan rentas seragam prisma itu, EFG, ialah* 30 cm^2. *Sebuah silinder yang berdiameter* 4 cm *dan tinggi* 10 cm *dikeluarkan daripada pepejal itu.*
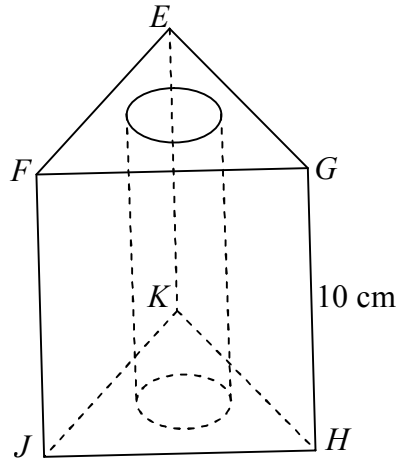
Diagram 10
Rajah 10

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

Give the answer correct to two decimal places.

Menggunakan $\pi = \dfrac{22}{7}$, *hitung isi padu, dalam* cm^3, *pepejal yang tinggal itu.*

Beri jawapan betul kepada dua tempat perpuluhan.

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

Answer / *Jawapan*:

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11   Diagram 11 shows a combined solid formed by joining a hemisphere and a cone. The diameters of the hemisphere and the cone are 14 cm.

Rajah 11 *menunjukkan sebuah gabungan pepejal yang terdiri daripada sebuah hemisfera dan sebuah kon. Diameter hemisfera dan kon ialah* 14 cm.
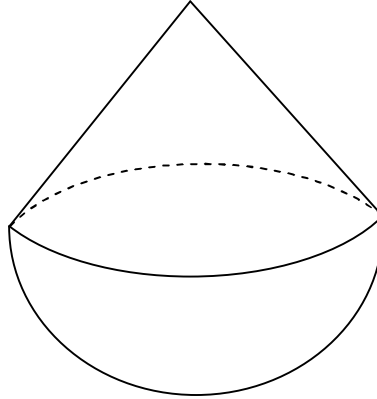
Diagram 11
Rajah 11

It is given that the volume of the combined solid is $1129\frac{1}{3}$ cm³ and the height of the cone is *h* cm. Calculate the value of *h*, in cm.

Diberi bahawa isi padu gabungan pepejal itu ialah $1129\frac{1}{3}$ cm³ *dan tinggi kon itu ialah h* cm. *Hitung nilai h, dalam* cm.

[Use / *Guna* $\pi = \frac{22}{7}$]

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

Answer / *Jawapan*:

Section B
Bahagian B

[48 *marks*]

[48 *markah*]

Answer any **four** questions from this section.

Jawab mana-mana **empat** *soalan dalam bahagian ini.*

12 (*a*) Complete Table 12 in the answer space for the equation $y = x^3 - 8x + 7$ by writing down the values of y when $x = -2$, $x = 1$, $x = 2$ and $x = 4$.

[4 *marks*]

Lengkapkan Jadual 12 *di ruang jawapan bagi persamaan* $y = x^3 - 8x + 7$ *dengan menulis nilai-nilai y apabila* $x = -2$, $x = 1$, $x = 2$ *dan* $x = 4$.

[4 *markah*]

(*b*) For this part of the question, use the graph paper provided on page **19**. 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 $y = x^3 - 8x + 7$ for $-3 \le x \le 4$.

[4 *marks*]

Untuk ceraian soalan ini, gunakan kertas graf yang disediakan pada halaman **19** *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* $y = x^3 - 8x + 7$ *untuk* $-3 \le x \le 4$.

[4 *markah*]

(*c*) By using the graph drawn in 12(*b*), find

Menggunakan graf yang dilukis dalam 12(*b*), *cari*

  (i)   the values of x when $y = 5$,

        nilai-nilai x apabila y = 5,

  (ii)   the value of y when $x = 1.5$.

        nilai y apabila x = 1.5.

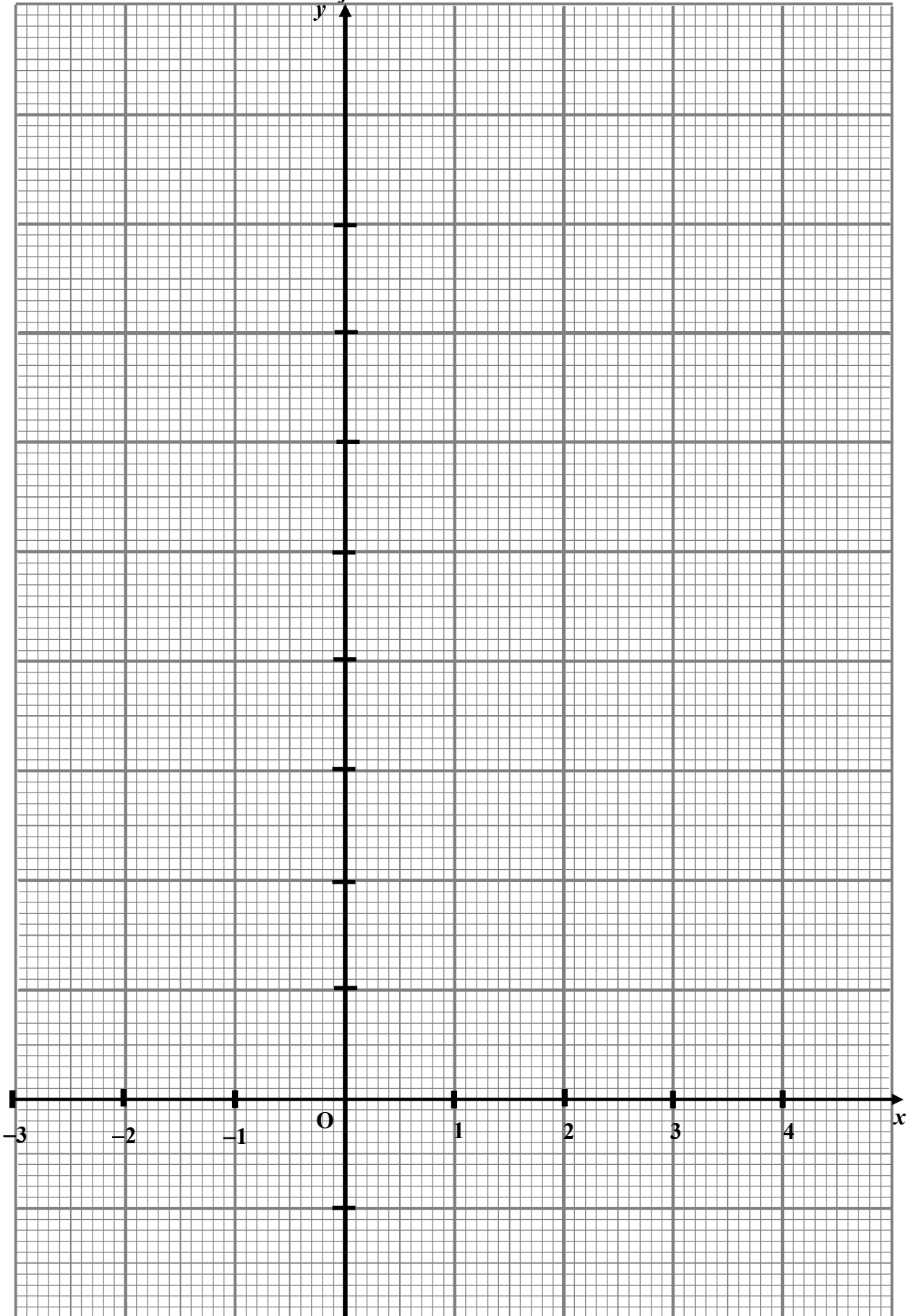[4 *marks*]

[4 *markah*]

Answer / *Jawapan*:

(*a*)

x	−3	−2	−1	0	1	2	3	4
y	4		14	7			10	

Table 12

Jadual 12

(*b*) Refer graph on page **19**.

Rujuk graf pada halaman **19**.

(*c*) (i) $x = $ _____, _____, _____.

  (ii) $y = $ _____.

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Graph for Question 12
Graf untuk Soalan 12

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13 (*a*) In Diagram 13.1, the straight line *AB* is parallel to the straight line *OC* and the straight line *AC* is parallel to the *x*-axis. *O* is the origin.

Dalam Rajah 13.1*, garis lurus AB adalah selari dengan garis lurus OC dan garis lurus AC adalah selari dengan paksi-x. O ialah asalan.*
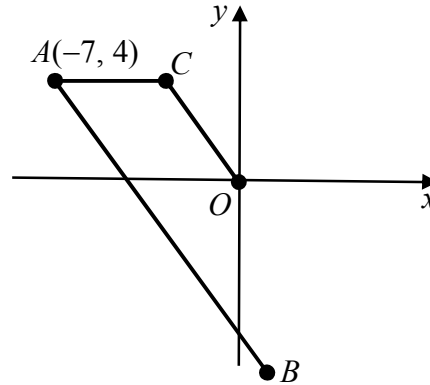

Diagram 13.1
Rajah 13.1

Given that the equation of the line *AB* is $5x + 7y + 14 = 0$, find

Diberi persamaan garis lurus AB ialah $5x + 7y + 14 = 0$*, cari*

(i)   the gradient of the line *AB,*

       kecerunan garis lurus AB,

(ii)   the *x*-intercept of the line *AB,*

       pintasan-x bagi garis lurus AB,

(iii) the equation of the line *CO.*

       persamaan garis lurus CO.

[7 *marks*]
[7 *markah*]

Answer / *Jawapan:*

(i)

(ii)

(iii)

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(*b*) Diagram 13.2 shows a right prism with a horizontal rectangular base *EFGH*. *EFLK* is the uniform cross-section of the prism.

Rajah 13.2 *menunjukkan sebuah prisma tegak dengan tapak segi empat tepat mengufuk EFGH. EFLK ialah keratan rentas seragam bagi prisma itu.*

(i)   Name and mark the angle between the plane *EFJ* and the base *EFGH*.

         Nama dan tandakan sudut di antara satah EFJ dengan tapak EFGH

(ii)   Hence, calculate the angle between the plane *EFJ* and the base *EFGH*.

         Seterusnya, hitung sudut di antara satah EFJ dengan tapak EFGH.

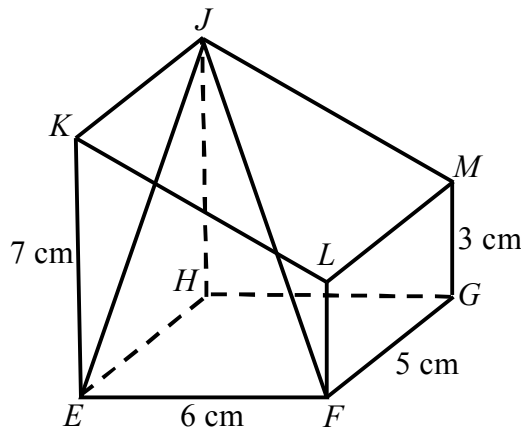[5 *marks*]
[5 *markah*]

Answer / *Jawapan*:

(i)

Diagram 13.2
Rajah 13.2

(ii)

14 The data in Diagram 14 shows the monthly savings, in RM, of 30 students.

Data dalam Rajah 14 menunjukkan simpanan bulanan, dalam RM, bagi 30 orang murid.

140	165	152	153	157	160
148	143	133	146	127	157
135	172	122	174	151	161
128	147	137	142	163	131
139	149	141	145	162	150

Diagram 14
Rajah 14

(*a*) Based on the data in Diagram 14, complete Table 14 in the answer space.

[4 *marks*]

Berdasarkan data di Rajah 14, lengkapkan Jadual 14 di ruang jawapan.

[4 *markah*]

(*b*) Based on Table 14, calculate the estimated mean of the monthly savings, in RM, of the students.

[3 *marks*]

Berdasarkan Jadual 14, hitung min anggaran simpanan bulanan, dalam RM, murid-murid itu.

[3 *markah*]

(*c*) For this part of the question, use the graph paper provided on page **24**.
Using the scale of 2 cm to RM 10 on the horizontal axis and 2 cm to 1 student on the vertical axis, draw a frequency polygon for the data.

[4 *marks*]

*Untuk ceraian soalan ini, guna kertas graf yang disediakan pada halaman **24**.*
Menggunakan skala 2 cm kepada RM 10 pada paksi mengufuk dan 2 cm kepada 1 murid pada paksi mencancang, lukis satu poligon kekerapan bagi data tersebut.

[4 *markah*]

(*d*) State one information based on the frequency polygon in **14**(*c*).

[1 *mark*]

*Nyatakan satu maklumat berdasarkan poligon kekerapan di **14**(*c*).*

[1 *markah*]

Answer / *Jawapan*:

(*a*)

Monthly savings *Simpanan Bulanan*	Midpoint *Titik tengah*	Frequency *Kekerapan*
120 - 129		

Table 14
Jadual 14

(*b*)

(*c*)   Refer graph on page **24**.

Rujuk graf pada halaman **24**.

(*d*)

Graph for Question 14

Graf untuk Soalan 14

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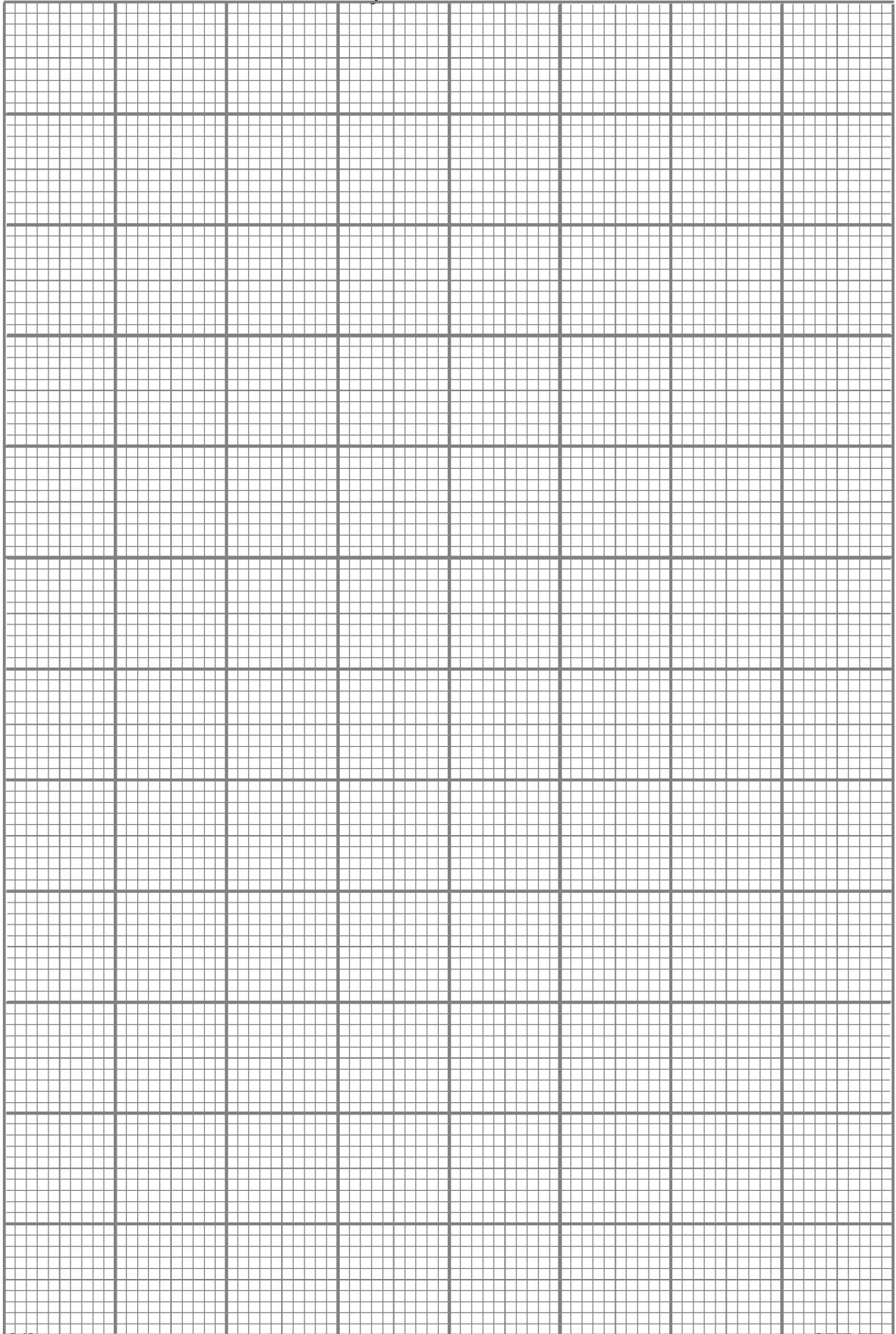
15 Table 15.1 shows the frequency distribution of the marks of 48 students in a monthly test.

Jadual 15.1 *menunjukkan taburan kekerapan markah bagi* 48 *orang murid dalam satu ujian bulanan.*

Marks *Markah*	Frequency *Kekerapan*
25 – 29	2
30 – 34	6
35 – 39	8
40 – 44	12
45 – 49	12
50 – 54	6
55 – 59	2

Table 15.1
Jadual 15.1

(*a*) Based on Table 15.1, complete Table 15.2 in the answer space by writing down the values of the upper boundary and the cumulative frequency.

[3 *marks*]

Berdasarkan Jadual 15.1, *lengkapkan Jadual* 15.2 *di ruang jawapan dengan menulis nilai-nilai sempadan atas dan kekerapan longgokan.*

[3 *markah*]

(*b*) For this part of the question, use the graph paper provided on page **27**. You may use a flexible curve rule.
By using a scale of 2 cm to 5 marks on the *x*-axis and 2 cm to 5 students on the *y*-axis, draw an ogive for the data.

[4 *marks*]

Untuk ceraian soalan ini, gunakan kertas graf yang disediakan di halaman **27**. *Anda boleh menggunakan pembaris fleksibel.*
Dengan menggunakan skala 2 cm *kepada* 5 *markah pada paksi-x dan* 2 cm *kepada* 5 *murid pada paksi-y, lukis satu ogif bagi data tersebut.*

[4 *markah*]

(*c*) Using the ogive in **15**(*b*), find the interquartile range .

[3 *marks*]

Menggunakan ogif di **15**(*b*), *cari julat antara kuartil.*

[3 *markah*]

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(*d*) 50% of the students with marks less than *p* marks will attend for tuition class.
Using the ogive in **15**(*c*), find the value of *p*.

[2 marks]

50% daripada murid-murid yang memperoleh markah kurang daripada p markah akan menghadiri kelas tuisyen.
*Dengan menggunakan ogif di **15**(c), cari nilai bagi p.*

[2 *markah*]

Answer / *Jawapan*:

(*a*)

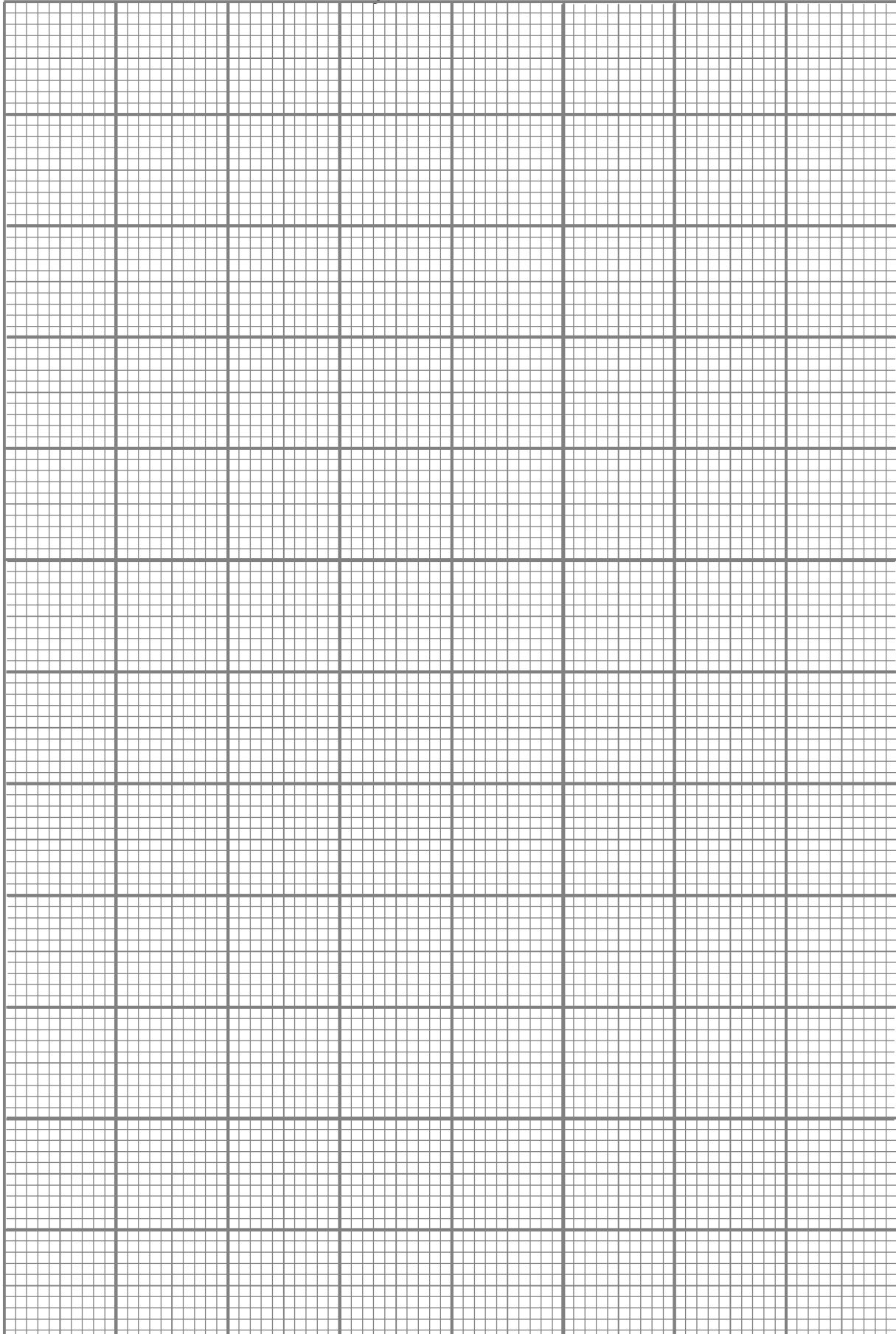| Upper Boundary *Sempadan Atas*	Cumulative Frequency *Kekerapan Longgokan*
24.5	0
29.5	
59.5	48

Table 15.2
Jadual 15.2

(*b*)   Refer graph on page **27**.
      *Rujuk graf di halaman **27**.*

(*c*)

(*d*)

Graph for Question 15
Graf untuk Soalan **15**

16 (*a*)   Diagram 16 shows a set of 8 data.

Rajah 16 *menunjukkan sekumpulan* 8 *data.*

$$3, \; 5, \; 1, \; 2, \; 4, \; 6, \; 3, \; 9$$

Diagram 16
Rajah 16

(i)   Find the range of the set of data.

Cari julat bagi set data itu.

(ii)   State the mode of the set of data.

Nyatakan mod bagi set data itu.

(iii)   Calculate the median of the set of data.

Hitung median bagi set data itu.

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

Answer / *Jawapan*:

(*a*)   (i)

(ii)

(iii)

(*b*) Table 16 shows the frequency distribution of the ages of 30 tourists who visited to West Malaysia.

Jadual 16 *menunjukkan taburan kekerapan umur bagi* 30 *orang pelancong yang melancong ke Semenanjung Malaysia.*

Age (years) *Umur* (*tahun*)	Frequency *Kekerapan*
10 - 19	4
20 - 29	8
30 - 39	5
40 - 49	2
50 - 59	7
60 - 69	3
70 - 79	1

Table 16
Jadual 16

(i) For this part of the question, use the graph paper provided on page **31**.

Using the scale of 2 cm to 10 years on the horizontal axis and 2 cm to 1 tourist on the vertical axis, draw a histogram for the data.

[4 *marks*]

Untuk ceraian soalan ini, guna kertas graf yang disediakan pada halaman **31**. *Menggunakan skala* 2 cm *kepada* 10 *tahun pada paksi mengufuk dan* 2 cm *kepada* 1 *orang pelancong pada paksi mencancang, lukis satu histogram bagi data tersebut.*

[4 *markah*]

(ii) State

Nyatakan

(*a*) the modal class,

kelas mod,

(*b*) the size of the class interval.

saiz bagi selang kelas.

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

(iii) Using the histogram in **16**(*b*)(i), find the percentage of tourists whose age are above 39.5 years old.

[2 *marks*]

Menggunakan histogram di **16**(*b*)(i), *cari peratus pelancong yang berumur lebih daripada* 39.5 *tahun.*
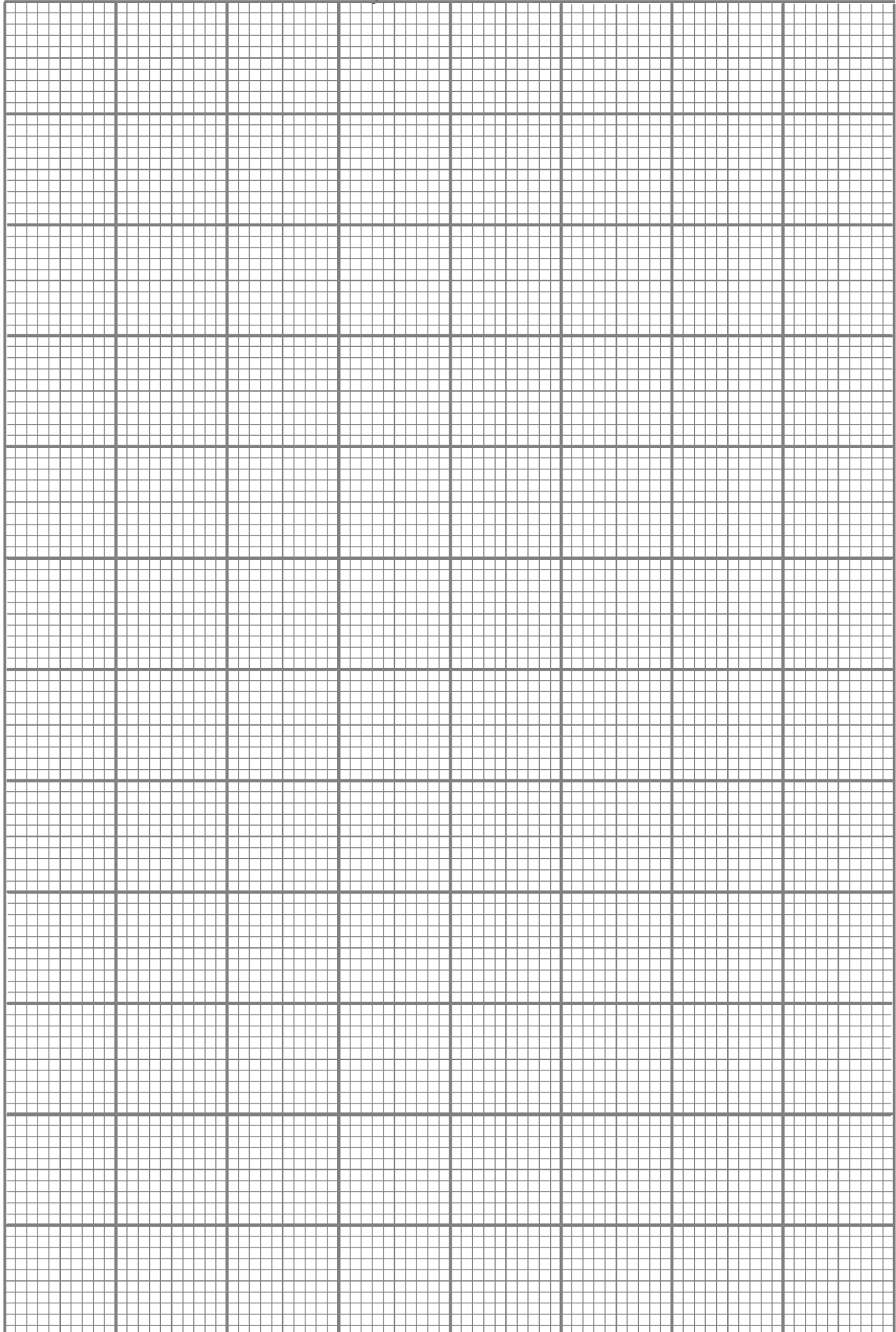
[2 *markah*]

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Answer / *Jawapan*:

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

    (ii) (*a*)

        (*b*)

    (iii)

Graph for Question 16
Graf untuk Soalan 16

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HALAMAN KOSONG

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

JABATAN PELAJARAN SARAWAK

_____

PEPERIKSAAN AKHIR TAHUN 2011   **1449/2(PP)**
TINGKATAN 4
MATHEMATICS
Kertas 2
Peraturan Pemarkahan
Okt.

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UNTUK KEGUNAAN PEMERIKSA SAHAJA
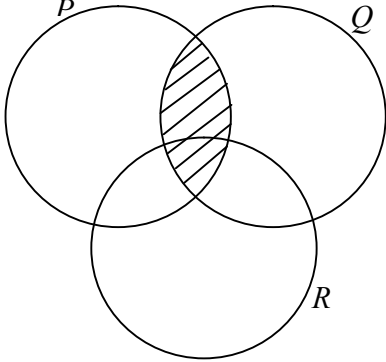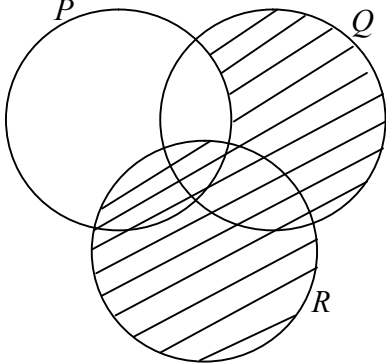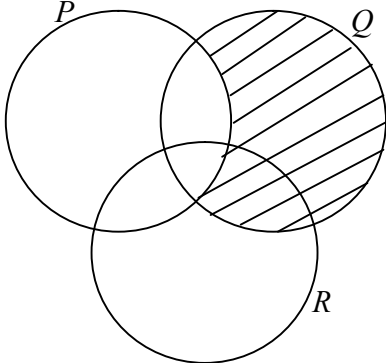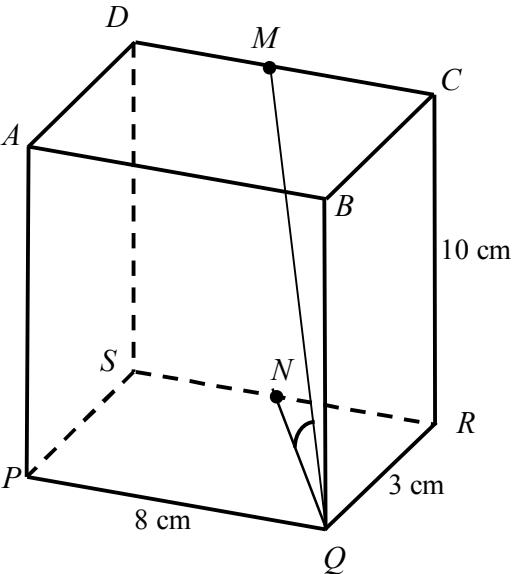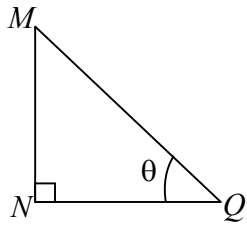
_____
Peraturan pemarkahan ini mengandungi 22 halaman bercetak.

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Question	Solution and Mark Scheme	Sub Mark	Mark
1(*a*)		**K1**	
(*b*)	 Note: , award K1	**K2**	**3**

Question	Solution and Mark Scheme	Sub Mark	Mark
2 (*a*)	$\angle MQN$ <u>or</u> $\angle NQM$ stated.	**P1**	
	$\angle MQN$ <u>or</u> $\angle NQM$ marked on the diagram .	**P1**	
(*b*)			
	$\tan \theta = \dfrac{10}{5}$ <u>or</u> $\tan \theta = 2$ <u>or</u> *equivalent*	**K2**	
	$\theta = 63.43°$ <u>or</u> $63°26'$	**N1**	**5**
	<u>Note:</u>		
	If 5 seen, award K1.		

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Question	Solution and Mark Scheme	Sub Mark	Mark
3	$2x^2 - 7x - 4 = 0$ _or equivalent_	**K1**	
	$(2x + 1)(x - 4) = 0$ _or equivalent_	**K1**	
	OR		
	$x = \dfrac{-(-7) \pm \sqrt{(-7)^2 - 4(2)(-4)}}{2(2)}$ _or equivalent_ (K1)		
	$x = -\dfrac{1}{2}$ _or_ -0.5	**N1**	
	$x = 4$	**N1**	**4**
	NOTE:		
	1. Accept without "= 0".		
	2. Accept three correct terms on the same side, in any order.		
	3. Accept $(x + \dfrac{1}{2})(x - 4) = 0$ with $x = -\dfrac{1}{2}$, 4 for Kk2.		
	4. Accept correct answers from three correct terms without factorisation for Kk2.		

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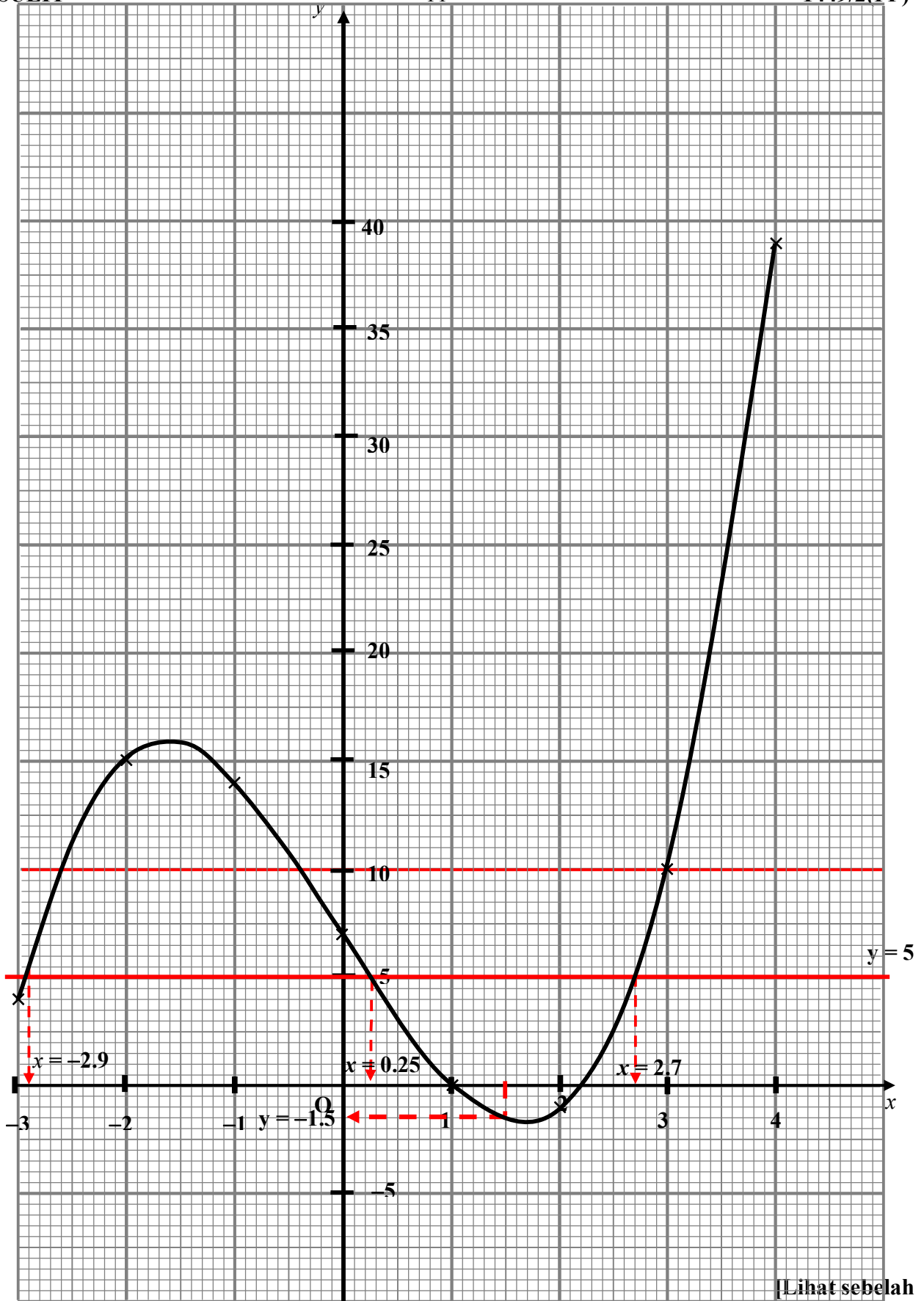| Question	Solution and Mark Scheme	Sub Mark	Mark
4	$y = 3 - 2x$ <u>or</u> $x = \dfrac{3-y}{2}$ <u>or</u> equivalent	**K1**	
	$11x = 22$ <u>or</u> $-11y = 11$ <u>or</u> equivalent	**K1**	
	Note: Attempt to make one of the unknowns as the subject with two terms on the other side, award K1.		
	OR $8x + 4y = 12$ <u>or</u> $6x + 3y = 9$ <u>or</u> equivalent (K1) Note: Attempt to equate the coefficient of one of the unknowns, award K1.		
	$11x = 22$ <u>or</u> $11y = -11$ <u>or</u> equivalent (K1)		
	OR $\begin{pmatrix} 2 & 1 \\ 3 & -4 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3 \\ 10 \end{pmatrix}$ $\begin{pmatrix} x \\ y \end{pmatrix} = \dfrac{1}{2(-4) - 1(3)}\begin{pmatrix} -4 & -1 \\ -3 & 2 \end{pmatrix}\begin{pmatrix} 3 \\ 10 \end{pmatrix}$ (K2) Note: Attempt to write matrix equation, award K1.		
	$x = 2$	**N1**	
	$y = -1$	**N1**	**4**
	Note: If $\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$ as final answer, award N1.		

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Question	Solution and Mark Scheme	Sub Mark	Mark
5(*a*)	Statement // *Pernyataan*	**P1**	
(*b*)	If p is a multiple of 2, then p is a multiple of 6 // *Jika p ialah gandaan* 2, *maka p ialah gandaan* 6.	**P1**	
	False // *Palsu*	**P1**	
(*c*)	Number of subsets of set $Q = 2^3 = 8$ // *Bilangan subset bagi set* $Q = 2^3 = 8$	**K1N1**	**5**
6(*a*)	True // *Benar*	**P1**	
(*b*)	If Set $A \subset$ Set B, then $A \cap B = A$ // *Jika Set* $A \subset$ *Set B*, *maka* $A \cap B = A$	**P1**	
	If $A \cap B = A$, then Set $A \subset$ Set B // *Jika* $A \cap B = A$, *maka Set* $A \subset$ *Set B*	**P1**	
(*c*)	$2k < 6$	**K1**	
(*d*)	$3n^2 - 5$ $n = 1, 2, 3, \ldots$	**K1** **N1**	**6**

Question	Solution and Mark Scheme	Sub Mark	Mark
7(*a*)(i)	{ *B*, *E*, *A*, *U*, *T*, *Y* }	**P1**	
(ii)	{ *E*, *A*, *U* }	**K1**	
	$\dfrac{3}{6}$ *or* $\dfrac{1}{2}$	**N1**	
(*b*)	$\dfrac{x}{12+x}=\dfrac{2}{5}$ *or* $x=8$	**K1**	
	$\dfrac{11}{23}$	**N1**	**5**
8(*a*)	$\dfrac{-8-0}{-2-0}$ *or* $\dfrac{-8}{-2}$ *or* 4 *or* equivalent	**P1**	
(*b*)	$m_{BC}=m_{OD}=-2$	**P1**	
	$-3=-2(6)+c$ *or* $y-(-3)=2(x-6)$	**K1**	
	$y=-2x+9$	**N1**	
(*c*)	$0=-2x+9$ *or* $-\dfrac{9}{x-\text{intercept}}=-2$	**K1**	
	$x=\dfrac{9}{2}$ *or* 4.5 *or* $4\dfrac{1}{2}$	**N1**	**6**

Question	Solution and Mark Scheme	Sub Mark	Mark
9(*a*)	$\dfrac{90^{\circ}}{360^{\circ}} \times 2 \times \dfrac{22}{7} \times 12$ _or_ $\dfrac{72^{\circ}}{360^{\circ}} \times 2 \times \dfrac{22}{7} \times 5$ _or equivalent_	**K1**	
	$\left(\dfrac{90^{\circ}}{360^{\circ}} \times 2 \times \dfrac{22}{7} \times 12\right) + 13 + \left(\dfrac{72^{\circ}}{360^{\circ}} \times 2 \times \dfrac{22}{7} \times 5\right) + 5 + 12$	**K1**	
	55.14 _or_ 55.15	**N1**	
	Note:		
	If 12 shown, award K1.		
(*b*)	$\dfrac{90^{\circ}}{360^{\circ}} \times \dfrac{22}{7} \times 12^2$ _or_ $\dfrac{72^{\circ}}{360^{\circ}} \times \dfrac{22}{7} \times 5^2$ _or equivalent_	**K1**	
	$\dfrac{90^{\circ}}{360^{\circ}} \times \dfrac{22}{7} \times 12^2 + \dfrac{72^{\circ}}{360^{\circ}} \times \dfrac{22}{7} \times 5^2$	**K1**	
	128.85 _or_ 128.86	**N1**	**6**
	NOTE:		
	1. Accept π for K mark.		
	2. Accept correct value from incomplete substitution for K mark.		
	3. Correct answer from incomplete working, award Kk2.		

Question	Solution and Mark Scheme	Sub Mark	Mark
10	$\dfrac{22}{7} \times 2^2 \times 10$ <u>or</u> *equivalent*	**K1**	
	30×10	**K1**	
	$30 \times 10 - \dfrac{22}{7} \times 2^2 \times 10$	**K1**	
	174.29	**N1**	**4**
11	$\dfrac{1}{2} \times \dfrac{4}{3} \times \dfrac{22}{7} \times 7^3 + \dfrac{1}{3} \times \dfrac{22}{7} \times 7^2 \times h = 1129\dfrac{1}{3}$ <u>or</u> *equivalent*	**K2**	
	$51\dfrac{1}{3}h = 410\dfrac{2}{3}$ <u>or</u> *equivalent*	**K1**	
	8	**N1**	**4**
	<u>NOTE</u>: If $\dfrac{1}{2} \times \dfrac{4}{3} \times \dfrac{22}{7} \times 7^3$ <u>or</u> $\dfrac{1}{3} \times \dfrac{22}{7} \times 7^2 \times h$ shown, award K1.		

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Question	Solution and mark scheme	Sub Mark	Mark
12 (*a*)	15	**K1**	
	0	**K1**	
	−1	**K1**	
	39	**K1**	**4**
(*b*)	<u>Graph</u>		
	Axes drawn in the correct directions with uniform scales for $-3 \le x \le 4$ and $-1 \le y \le 39$.	**P1**	
	All 4 points and *4 points correctly plotted <u>or</u> curve passes through all the points for $-3 \le x \le 4$ and $-1 \le y \le 39$.	**K2**	
	<u>Note</u> : 1. 6 or 7 points correctly plotted, award K1 2. Ignore curve out of range		
	A smooth and continuous curve without any straight line passes through all 8 points using the given scales for $-3 \le x \le 4$ and $4 \le y \le 39$.	**N1**	**4**
(*c*)	(i) $-3.0 \le x \le -2.8,$	**P1**	
	$0.15 \le x \le 0.35,$	**P1**	
	$2.60 \le x \le 2.80$	**P1**	
	(ii) $-2.0 \le y \le -1.0,$	**P1**	**4**
	<u>Note:</u>		**12**
	1. Allow P mark if values of *x* and *y* are shown on graph. 2. Values of *x* and *y* obtained by calculation, award P0.		

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Question	Solution and mark scheme	Sub Mark	Mark
13(*a*)(i)	$5x + 7y + 14 = 0$ $7y = -5x - 14$ $y = -\dfrac{5}{7}x - 2$ _or_ equivalent $m = -\dfrac{5}{7}$ _or_ equivalent	P1 K1	2
(ii)	$5x + 7(0) + 14 = 0$ _or_ equivalent $5x + 14 = 0$ $5x = -14$ $-\dfrac{14}{5}$ _or_ equivalent	K1 N1	2
(iii)	$m_{CO} = -\dfrac{5}{7}$ $y = mx + c$ $c = 0$ $y = -\dfrac{5}{7}x$ _or_ equivalent	P1 K1N1	3

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13(*b*)(i)
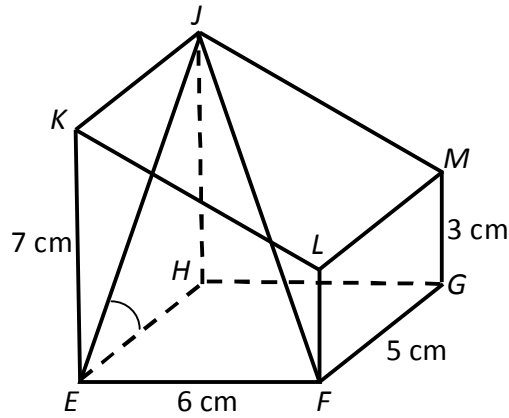
(ii)   ∠ *HEJ* *or* ∠ *JEH* stated.   **P1**

∠ *HEJ* *or* ∠ *JEH* marked on the diagram.   **P1**

$\tan \angle HEJ = \dfrac{7}{5}$ *or* equivalent   **K2**

54° 28′ or 54.46°   **N1**   5

12

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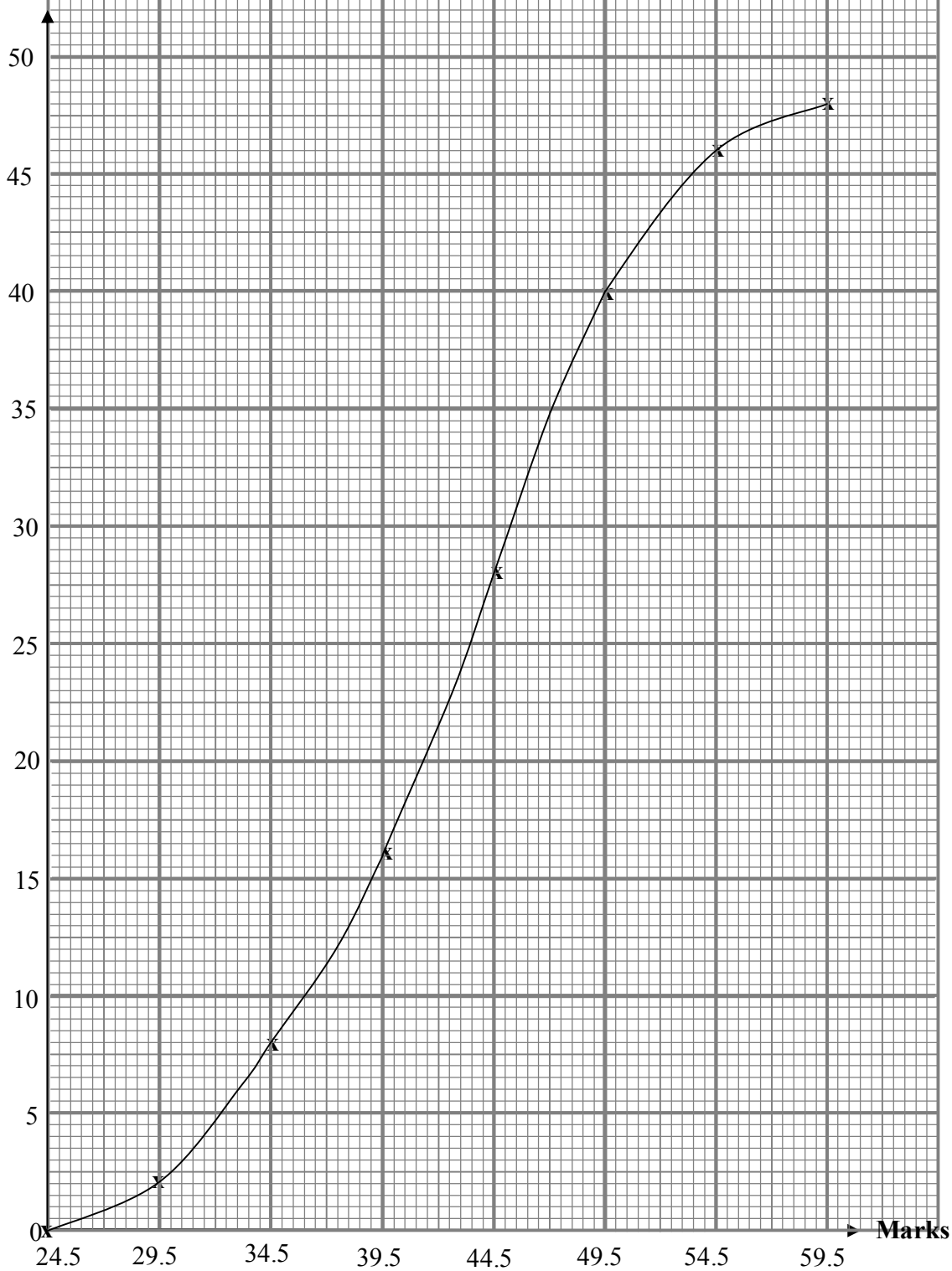| Question	Solution and Mark Scheme	Sub Mark	Mark
14(a)	<table><tr><th>Monthly savings *Simpanan Bulanan*</th><th>Mid-point *Titik tengah*</th><th>Frequency *Kekerapan*</th><th></th></tr><tr><td>120 -129</td><td>124.5</td><td>3</td><td>I</td></tr><tr><td>130 – 139</td><td>134.5</td><td>5</td><td>II</td></tr><tr><td>140 – 149</td><td>144.5</td><td>9</td><td>III</td></tr><tr><td>150 – 159</td><td>154.5</td><td>6</td><td>IV</td></tr><tr><td>160 – 169</td><td>164.5</td><td>5</td><td>V</td></tr><tr><td>170 - 179</td><td>174.5</td><td>2</td><td>VI</td></tr></table> Monthly savings : (II to VI) Midpoint : (I to VI) Frequency : (I to VI) Note : Allow one mistake in frequency for P1.	 **P1** **P1** **P2**	 4

(b)	$$\frac{(124.5\times3)+(134.5\times5)+(144.5 \times 9)+(154.5\times6)+(164.5\times5)+(174.5\times2)}{30}$$
	
	$148\ \frac{1}{6}$ *or* 148.17
	
	Note:
	  1) Allow two mistakes in midpoint for K1
	
	  2) $\dfrac{4445}{30}$, award Kk2
		K2
		
		N1
			
			3

(c)	Axes drawn in correct direction and uniform scale for $114.5 \leq x \leq 184.5$ and $0 \leq y \leq 9$.
	
	*8 points correctly plotted *or* line passes through all the points for $114.5 \leq x \leq 184.5$ and $0 \leq y \leq 9$.
	  Note :
	  *6 or *7 points correctly, award K1.
		P1
		
		K2	

		Correct line passes through all 8 correct points for using given scales $114.5 \leq x \leq 184.5$ and $0 \leq y \leq 9$.	**N1**	**4**
	(*d*)	Modal class = 140 - 149 from *frequency polygon only. <u>or</u> equivalent	**K1**	**1**
				12

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Question	Solution and Mark Scheme	Sub Mark	Mark
15(*a*)			

Upper Boundary *Sempadan atas*	Cumulative Frequency *Kekerapan Longgokan*	
24.5	0	I
29.5	2	II
34.5	8	III
39.5	16	IV
44.5	28	V
49.5	40	VI
54.5	46	VII
59.5	48	VIII

Upper Boundary   :   (III to VII)   **P1**

Cumulative Frequency   :   (II to VII)   **P2**   **3**

<u>Note</u> :
Allow one mistake in cumulative frequency for P1.

(*b*)   Axes drawn in correct direction and uniform scale for
$24.5 \le x \le 59.5$ and $0 \le y \le 48$.   **P1**

*8 points correctly plotted <u>or</u> curve passes through all the points
for $24.5 \le x \le 59.5$ and $0 \le y \le 48$.   **K2**

<u>Note :</u>
*6 or *7 points correctly plotted, award K1.

A smooth and continuous curve without any straight line and
passes through all 8 correct points using the given scales for
$24.5 \le x \le 59.5$ and $0 \le y \le 48$.   **N1**   **4**

(*c*)   47.5±0.5 <u>or</u> 37.5±0.5   **K1**

47.5 – 37.5 <u>or</u> equivalent   **K1**

10±1   **N1**   **3**

	Note:		
	1. Correct answer from incomplete working, award Kk2.		
(*d*)	$\frac{50}{100}$ x 48 = 24	**K1**	
	43±0.5	**N1**	**2**
			12

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Question	Solution and Mark Scheme	Sub Mark	Mark
16 (*a*)(i)	8	P1	
	3	P1	
	1, 2, 3, 3, 4, 5, 6, 9 *or* 9, 6, 5, 4, 3, 3, 2, 1	K1	
	3.5	N1	4
(*b*)(i)	Axes drawn in correct directions with uniform scales for $9.5 \le x \le 79.5$ and $0 \le y \le 8$.	P1	
	7 bars drawn correctly using the midpoint/ upper boundary/ class interval for $9.5 \le x \le 79.5$ and $0 \le y \le 8$. Note: 1. *5 or *6 bars correctly drawn, award K1.	K2	
	Correct histogram using the given scales for $9.5 \le x \le 79.5$ and $0 \le y \le 8$.	N1	4
(ii)(*a*)	20 – 29	P1	
(*b*)	10	P1	2
(iii)	$\dfrac{*13}{30} \times 100\%$	K1	
	43.33% *or* equivalent Note: *13 must be obtained from *histogram only.	N1	2
			12

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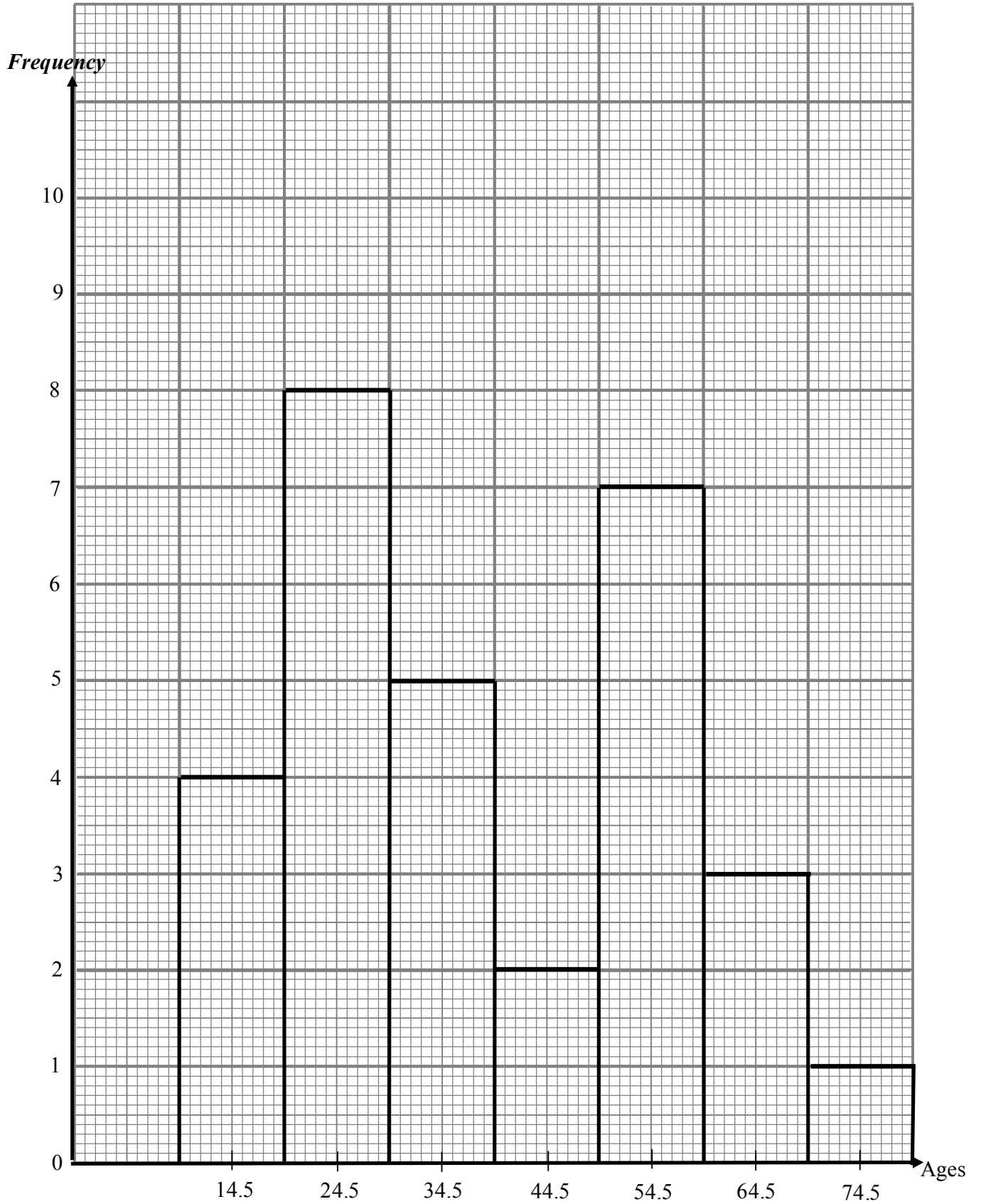
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