PEPERIKSAAN AKHIR TINGKATAN 3

PAT3 2019

UJIAN BERTULIS

OGOS   **2 Jam**

50

Mathematics

ARAHAN:

1. Buka kertas peperiksaan ini apabila diberitahu.

2. Tulis **nama** dan **angka giliran** anda pada ruang yang disediakan.

3. Jawapan anda hendaklah ditulis pada ruang jawapan yang disediakan di dalam kertas peperiksaan ini.

4. Kertas peperiksaan ini hendaklah diserahkan kepada pengawas peperiksaan pada akhir peperiksaan.

Untuk Kegunaan Pemeriksa		
Nama Pemeriksa :		
Bahagian	**Markah Penuh**	**Markah Diperoleh**
A	20	
B	20	
C	60	
Jumlah	**100**	

NAMA : ………………………………………………………………..

ANGKA GILIRAN:

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 mungkin 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. Pythagoras' Theorem,
    Teorem Pythagoras,

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

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. $$\text{Average speed} = \frac{\text{Distance traveled}}{\text{Time taken}}$$

    $$Purata\ laju = \frac{Jarak\ yang\ dilalui}{Masa\ yang\ diambil}$$

8. $$\text{Mean} = \frac{\text{Sum of data}}{\text{Number of data}}$$

    $$Min = \frac{Hasil\ tambah\ nilai\ data}{Bilangan\ data}$$

9

$$\text{Mean} = \frac{\text{Sum of (classmark} \times \text{frequency)}}{\text{Sum of frequencies}}$$

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

10 Probability of an event,
Kebarangkalian suatu peristiwa,

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

11 Complement of an event,
Peristiwa Pelengkap,

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

12

$$\text{Gradient, } m = \frac{\text{Vertical distance}}{\text{Horizontal distance}}$$

$$Kecerunan, m = \frac{Jarak\ mencancang}{Jarak\ mengufuk}$$

13

$$\text{Gradient, } m = -\frac{y-\text{intercept}}{x-\text{intercept}}$$

$$Kecerunan, m = -\frac{Pintasan-y}{Pintasan-x}$$

14 Gradient,
Kecerunan,

$$m = \frac{y_1 + y_2}{x_1 + x_2}$$

15 $I = Prt$

16 $MV = P\left(1 + \dfrac{r}{n}\right)^{nt}$

17 $A = P + Prt$

SHAPES AND SPACE
BENTUK DAN RUANG

1   Area of rectangle = length $\times$ width
Luas segi empat tepat = panjang $\times$ lebar

2   Area of triangle $= \frac{1}{2} \times$ base $\times$ height
Luas segitiga $= \frac{1}{2} \times$ tapak $\times$ tinggi

3   Area of parallelogram = base $\times$ height
Luas segi empat selari = tapak $\times$ tinggi

4   Area of trapezium $= \frac{1}{2} \times$ sum of two parallel sides $\times$ height
Luas trapezium $= \frac{1}{2} \times$ hasil tambah dua sisi selari $\times$ tinggi

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

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

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

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

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

10   Volume of cuboid = length $\times$ width $\times$ height
Isipadu kuboid = panjang $\times$ lebar $\times$ tinggi

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

12   Volume of cone $= \frac{1}{3} \pi r^2 h$
Isipadu kon $= \frac{1}{3} \pi j^2 t$

13   Volume of sphere $= \frac{4}{3} \pi r^3$
Isipadu sfera $= \frac{4}{3} \pi j^3$

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

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

15   Sum of interior angles of polygon,
     Hasil tambah sudut pedalaman polygon,

$$(n-2) \times 180°$$

16 $\dfrac{\text{Arc length}}{\text{Circumference}} = \dfrac{\text{Angle subtended at centre}}{360°}$

     $\dfrac{Panjang\ lengkok}{Lilitan\ bulatan} = \dfrac{Sudut\ terangkum\ di\ pusat}{360°}$

17 $\dfrac{\text{Area of sector}}{\text{Area of circle}} = \dfrac{\text{Angle subtended at centre}}{360°}$

     $\dfrac{Luas\ sektor}{Luas\ bulatan} = \dfrac{Sudut\ terangkum\ di\ pusat}{360°}$

Answer **all** questions.
*Jawab **semua** soalan.*

SECTION A
***BAHAGIAN* A**
[20 marks/ *markah*]

1   Find the Highest Common Factor (HCF) of 24, 36 and 72.
Cari Faktor Sepunya Terbesar (FSTB) bagi 24, 36 dan 72.

    A   72

    B   36

    C   13

    D   12

2   Round off 0.029954 to 3 significant figures.
Bundarkan 0.029954 kepada 3 angka bererti.

    A   0.029900

    B   0.0299

    C   0.0300

    D   0.03

3   Given that a sphere with radius $r = 15.5$ cm.
Diberi sebuah sfera berjejari j = 15.5 cm.

Find the volume, in cm^3, of the sphere. Write the answer in standard form.
Cari isipadu sfera, dalam cm^3 tersebut dan tulis jawapan dalam bentuk piawai.

$$\left[\text{Use/} Guna\ \pi = \frac{22}{7} \right]$$

    A 1.1704×10^4

    B 1.5599×10^4

    C 1.5604×10^4

    D 1.5605×10^4

4 List all the integers from -3 to 2.

Senaraikan semua integer dari -3 hingga 2.

    A $-3, -2, -1, 0, 1, 2$

    B $-3, -2, -1, 1, 2$

    C $-2, -1, 0, 1, 2$

    D $-2, -1, 0, 1$

5 Diagram 5 shows the first four terms of a set of numbers arranged in a certain pattern.

Rajah 5 menunjukkan empat sebutan pertama satu set nombor yang disusun mengikut suatu pola tertentu.

$$6 + 0 \times 5, \quad 6 - 1 \times 5, \quad 6 + 2 \times 5, \quad 6 - 3 \times 5, \quad \ldots$$

Diagram 5

Rajah 5

What is the pattern for the 8th term?

Apakah pola bagi sebutan ke–8?

    A $6 - 7 \times 5$

    B $6 + 7 \times 5$

    C $6 - 8 \times 5$

    D $6 + 8 \times 5$

6 Given that $A = \{1, 3, 6, 8, 9, 12, 15\}$ and $B = \{6, 9, 12\}$.
Which of the following statements is **TRUE**?

Diberi bahawa set $A = \{1, 3, 6, 8, 9, 12, 15\}$ dan set $B = \{6, 9, 12\}$.
*Di antara pernyataan – pernyataan berikut, yang manakah **BENAR**?*

    A $B = A'$

    B $B = A$

    C $B \not\subset A$

    D $B \subset A$

7   Diagram 7 shows a regular hexagon *UVWXYZ*.
Rajah 7 *menunjukkan sebuah heksagon sekata UVWXYZ.*
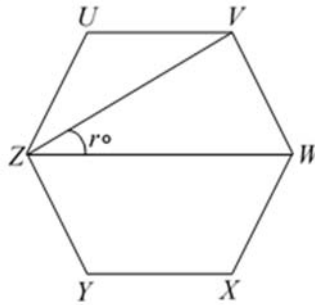
Diagram 7
Rajah 7

Find the value of r.
Cari nilai r.

A   30°

B   40°

C   45°

D   60°

8   Diagram 8 shows a heptagon *ABCDEFG*.
Rajah 8 *menunjukkan sebuah heptagon ABCDEFG.*
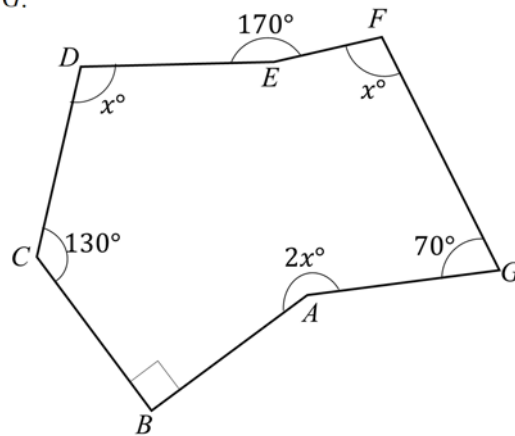
Diagram 8
Rajah 8

The value of x is
Nilai x adalah

A   105°

B   110°

C   120°

D   150°

9 Diagram 9 shows a thinking map of formulae involving measurements of a circle.
  Rajah 9 menunjukkan peta minda formula melibatkan pengukuran sebuah bulatan.

Measurements *Pengukuran*	Area of circle *Luas bulatan*	as *sebagai*	**X**	as *sebagai*	**Y**
Formula *Rumus*	πr^2		$\dfrac{\vartheta}{360°} \times 2\pi r$		$\dfrac{\vartheta}{360°} \times \pi r^2$
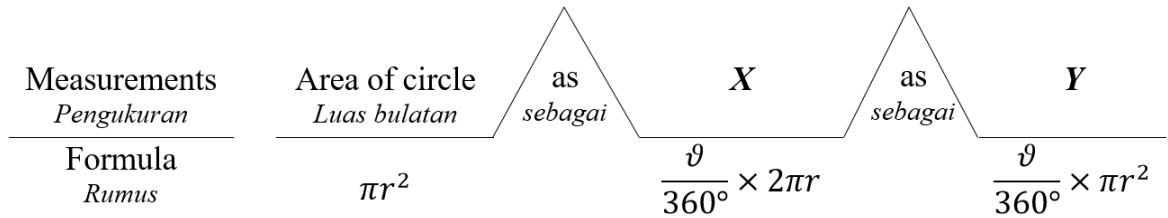
[Note: radius, *r*, where *r* = *j*]
[*Nota*: *jejari, j, di mana r = j*]

Diagram 9
Rajah 9

X and **Y** refer to
X dan Y merujuk kepada

A   **X** = Circumference of circle,   **Y** = Area of sector
        = *Perimeter bulatan*   = *Luas sektor*

B   **X** = Circumference of circle   **Y** = Length of arc
        = *Perimeter bulatan*   = *Panjang lengkok*

C   **X** = Length of arc,   **Y** = Area of sector
        = *Panjang lengkok*   = *Luas sektor*

D   **X** = Length of arc,   **Y** = Circumference of circle
        = *Panjang lengkok*   = *Perimeter bulatan*

10 Diagram 10 shows a right–angled triangle *PRS*. *PQR* is a straight line.
   Rajah 10 *menunjukkan sebuah segitiga bersudut tegak PRS. PQR ialah garis lurus.*

Diagram 10
Rajah 10
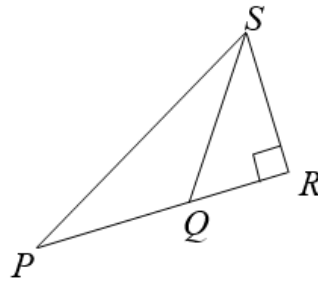
Given that *RS* = 8 cm, *QS* = 10 cm and *PS* = 17 cm.
Calculate the length, in cm, of *PQ*.
Diberi bahawa RS = 8 cm, *QS* = 10 cm *dan PS* = 17 cm.
Hitung panjang, dalam cm, PQ.

A   6

B   9

C   10

D   15

11 Diagram 11 shows an object *P* with its image *P'*.
   Rajah 11 *menunjukkan suatu objek P dengan imejnya, P'.*

Diagram 11
Rajah 11
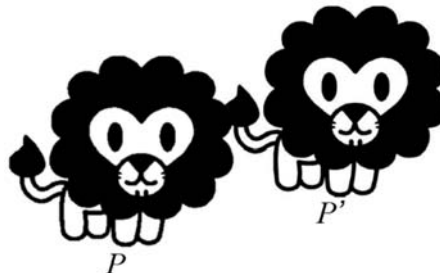
Which of the transformations below is applied to the diagram?
Yang manakah daripada transformasi berikut diaplikasi pada rajah itu?

A   Reflection
     Pantulan

B   Translation
     Translasi

C   Rotation
     Putaran

D   Rotational Symmetry
     Putaran bersimetri

12   $(2p - 3)(5p + 4) =$

      A $3p^2 - 12$

      B $10p^2 - 12$

      C $10p^2 - 7p - 12$

      D $10p^2 + 7p - 12$

13   Given $2p = \dfrac{q}{r-4}$, calculate the value of r if $p = 3$ and $q = -30$.

    Diberi $2p = \dfrac{q}{r-4}$, *hitung nilai r jika p = 3 dan q = –30.*

      A -9

      B -6

      C -2

      D -1

14   Given that x and y are positive integers such that $x > y$.
    Which of the following inequalities is ***true***?
    Diberi x dan y ialah integer positif.
    Antara ketaksamaan berikut, yang manakah adalah ***benar***?

      A $x + 5 < y + 5$

      B $5 - x < 5 - y$

      C $\dfrac{x}{5} < \dfrac{y}{5}$

      D $\dfrac{5}{x} > \dfrac{5}{y}$

15 Which of the following descriptions of the gradient is **true**?
*Antara berikut, yang manakah **benar** tentang huraian kecerunan?*

A
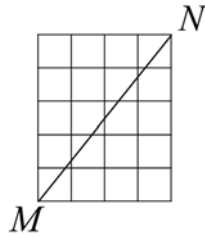
| Horizontal distance = 8 |
| *Jarak mengufuk* = 8 |
| |
| Vertical distance = 10 |
| *Jarak mencancang* = 10 |
| |
| Gradient of *MN*= 0.8 |
| *Kecerunan MN* = 0.8 |

B
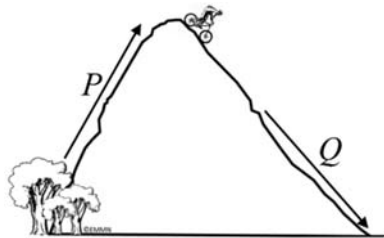
| *P* is steeper than *Q* |
| *P lebih curam daripada Q* |
| |
| *P* inclined upwards |
| *P condong ke atas* |
| |
| *Q* inclined downwards |
| *Q condong ke bawah* |

C

| *S* inclined downwards |
| *S condong ke bawah* |
| |
| *R* inclined upwards |
| *R condong ke atas* |
| |
| *S* is steeper than *R* |
| *S lebih curam daripada Q* |

D
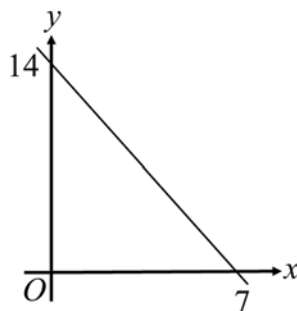
| y − intercept = 14 |
| *pintasan* − y = 14 |
| |
| x − intercept = 7, |
| *pintasan* − x = 7 |
| |
| gradient = 2 |
| *kecerunan* = 2 |

16   Diagram 16 shows the portion of four main ingredients to serve a plate of fried kuey teow.
Rajah 16 *menunjukkan pembahagian empat bahan utama dalam menyediakan sepinggan kuey teow goreng.*
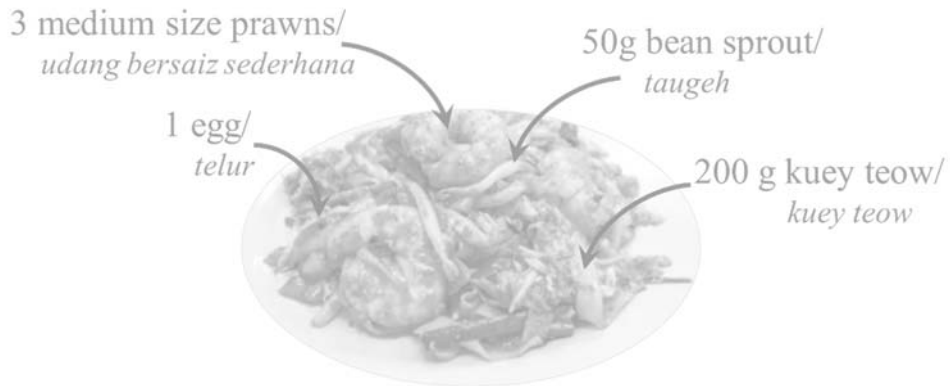
Diagram 16
Rajah 16

Siti is going to cook 25 servings of fried kuey teow. Choose a correct list of ingredients for making the fried kuey teow.
Siti ingin menghasilkan 25 *hidangan kuey teow goreng. Pilih senarai bahan-bahan yang betul dalam penyediaan tersebut.*

A

0.5 kg kuey teow
kuey teow

1.25 kg bean sprouts
taugeh

75 prawns
udang

25 eggs
telur

C

5 kg kuey teow
kuey teow

1.25 kg bean sprouts
taugeh

75 prawns
udang

25 eggs
telur

B

5 kg kuey teow
kuey teow

0.125 kg bean sprouts
taugeh

75 prawns
udang

25 eggs
telur

D

0.5 kg kuey teow
kuey teow

0.125 kg bean sprouts
taugeh

75 prawns
udang

25 eggs
telur

[Lihat halaman sebelah

17 A bag contains 40 blue cards, 24 yellow cards and 16 red cards. If a card is selected at random from the bag, find the probability that a red card is chosen.
Sebuah beg mengandungi 40 kad biru, 24 kad kuning dan 16 kad merah. Jika sekeping kad dipilih secara rawak daripada beg itu, cari kebarangkalian bahawa kad yang berwarna merah dipilih.

A $\dfrac{1}{16}$

B $\dfrac{1}{5}$

C $\dfrac{1}{4}$

D $\dfrac{1}{3}$

18 Based on the following index notations, which is equivalent to x^2?
Berdasarkan tatatanda indeks berikut, yang manakah bersamaan dengan x^2?

A $x^{10} \div x^8$

B $(x^4)^{-\frac{1}{2}}$

C $(x^0)^2$

D $x^{-4} \times x^6$

19 Given that $\sqrt[3]{-a} = -4$ dan $b = 27$.
Diberi bahawa $\sqrt[3]{-a} = -4$ dan $b = 27$.

Find the value of $a - \sqrt[3]{b}$.
Find the value of $a - \sqrt[3]{b}$.

A -67

B -15

C 55

D 61

20 Diagram 20 shows five pentagons on a grid of equal squares.
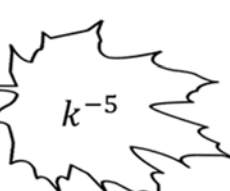*Diagram* 20 *menunjukkan lima pentagon dilukis di atas segi empat sama.*
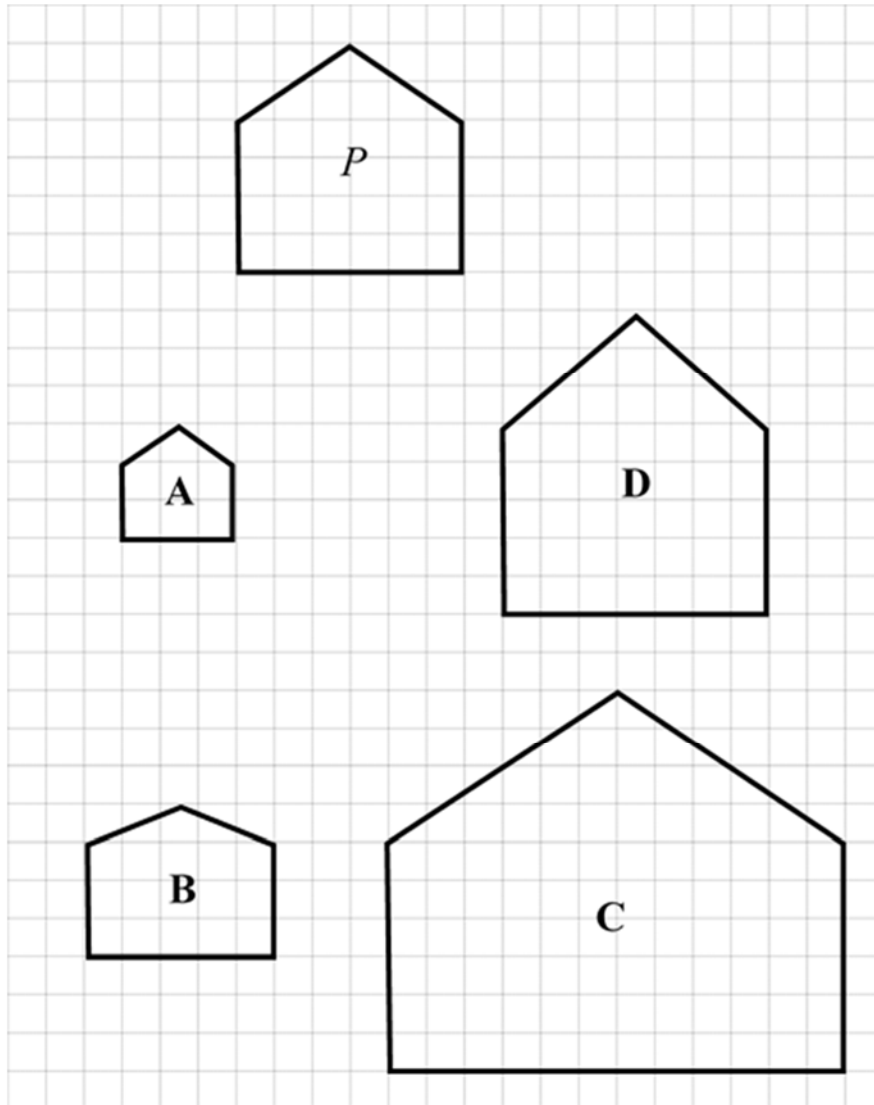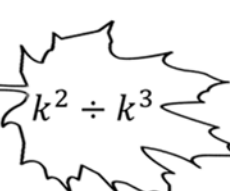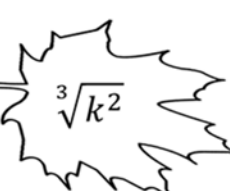
Diagram 20
Rajah 20

Which of the pentagons **A**, **B**, **C** or **D** is the scaled drawing of pentagon *P* ?
Antara pentagon **A**, **B**, **C** *atau* **D** *yang manakah adalah lukisan berskala bagi pentagon P ?*

SECTION B
BAHAGIAN B
[20 marks/ *markah*]

1   Tick '✓' for the correct answer inside the empty box.

Tandakan '✓' untuk jawapan yang betul di dalam kotak kosong.

[4 marks/ *markah*]

Index Notation *Tatatanda Indeks*	Answer *Jawapan*	
(a) $(k^3)^{-2}$	k^{-5}	k^{-6}
(b) $k^3 \times k^2$	k^5	k^6
(c) $k^{\frac{2}{3}}$	$k^2 \div k^3$	$\sqrt[3]{k^2}$
(d) $\dfrac{k^{-3}}{k^2}$	k^{-1}	k^{-5}

2   (a)   Match the following mathematical operations to the correct answers.
Padankan operasi matematik berikut kepada jawapan yang betul.

[2 marks/*markah*]

Answer / *Jawapan*:

Mathematical operation Operasi matematik

Answer Jawapan

4

$-3 - (-9)$

6

$-24 \div (-6)$

10

(b)   Diagram 2(b)(i) shows a real credit card.

Rajah 2(b)(i) *menunjukkan kad kredit sebenar.*

Diagram 2(b)(i)
Rajah 2(*b*)(i)

Based on Diagram 2(b)(ii), label Diagram 2(b)(i) completely.

Rajah 2(b)(ii), *label Rajah* 2(b)(i) *selengkapnya.*

Account number *Nombor akaun*	Bank Identification Number *Nombor pengenalan bank*	Brand mark *Tanda jenama*	Card verification value *Nilai pengesahan kad*

Diagram 2(b)(ii)
Rajah 2(*b*)(ii)

[2 marks/markah]

[Lihat halaman sebelah

3 (a) Match each of the following linear inequalities with its correct solution.
Padankan setiap ketaksamaan linear dengan penyelesaiannya yang betul.

| Linear Inequalities *Ketaksamaan Linear* | | $6 - x > 4$ | | $1 \leq 5x - 9$ |

| Solutions *Penyelesaian* | $x < 2$ | $x \leq 2$ | $x > 2$ | $x \geq 2$ |

[2 marks/ *markah*]

(b) Diagram 3(b) shows the relation between set *P* and set *Q*.
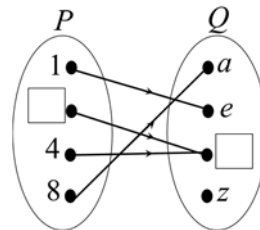*Rajah 3(b) menunjukkan hubungan di antara set P dan set Q.*

Diagram 3(b)
Rajah 3(b)

Based on the ordered pair written below, complete the diagram above.
Berdasarkan kepada pasangan tertib yang ditulis di bawah, lengkapkan rajah di atas.

$$\{(1, e), (3, y), (4, y), (8, a)\}$$

[2 marks/*markah*]

4   (a)   Ahmad and his friends carried out an experiment to study the relationship between the pressure, P kPa, and the volume, V cm^3, of gas in an enclosed container. The relationship between the pressure and the volume of the gas is represented by the equation $P = \frac{150}{V}$. He constructed a table to show the relation of the pressure and the volume of the gas, as shown in Table 4(a).

Ahmad dan rakan-rakannya menjalankan satu ujikaji untuk mengkaji hubungan di antara tekanan, P kPa, dan isipadu, V cm^3, gas di dalam bekas tertutup. Hubungan di antara tekanan dan isipadu gas tersebut diwakili oleh persamaan P $= \frac{150}{V}$.

Dia membina jadual untuk menunjukkan hubungan di antara tekanan dan isipadu gas, seperti yang ditunjukkan dalam Jadual 4(a).

Volume, V (cm^3)	10	20	30	40	50	60	70
Pressure, P (kPa)	15	7.5	5	3.8	3	2.1	1.9

Table 4(a)
Jadual 4(a)

     (i)   Complete the plotting points on the graph paper given on page 20.
               Lengkapkan titik–titik yang diplotkan pada kertas graf yang disediakan di halaman 20.

     (ii)   Hence, draw the graph of the function.
               Seterusnya, lukis graf fungsi itu.

[2 marks/*markah*]

Answer / *Jawapan* : (i), (ii)

[2 marks/*markah*]

(b) Table 4(*b*) shows the marks obtained by a group of 20 students in a test.
Jadual 4(b) menunjukkan markah yang diperolehi sekumpulan 20 orang pelajar dalam suatu ujian.

Mark *Markah*	6	7	8	9	10
Frequency *Kekerapan*	2	3	5	6	4

Table 4(b)
Jadual 4(b)

State '**TRUE**' or '**FALSE**' for each of the following statements.
Nyatakan 'BENAR' atau 'PALSU' bagi setiap pernyataan berikut.

[2 marks/ *markah*]

Answer / *Jawapan*:

The number of students who obtained less than 9 marks is 10.
Bilangan pelajar yang memperoleh kurang daripada 9 markah ialah 10.

The mode of the data is 5.
Mod bagi data ialah 5.

5   Tick "✓" for the advantages of credit card and "✗" for disadvantages of credit cards.
Tandakan "✓" untuk kelebihan kad kredit dan "✗" untuk kekurangan kad kredit.

Answer / *Jawapan*:

Statement *Pernyataan*	Tandakan "✓" or "✗" *Tandakan ✓ atau ✗*
Convenience of buying goods and services online. *Kemudahan membeli barangan dan perkhidmatan dalam talian.*	
Incur charges such as annual fees, finance charges (interest), cash advance interest charges and late payment charges. *Mempunyai caj seperti yuran tahunan, caj kewangan (faedah), caj faedah pendahuluan tunai dan caj lewat.*	
Overspending. *Terlebih belanja.*	
Does not require us to carry a lot of cash. *Tidak memerlukan kita membawa wang tunai yang banyak.*	

[4 marks/ *markah*]

SECTION C
BAHAGIAN C
[60 marks/ *markah*]

6 (a)(i) Given $a : b : c = 5 : 10 : 35$ and c = 7, write the equivalent ratio.
Diberi $a : b : c = 5 : 10 : 3$ dan $c = 7$, tuliskan nisbah yang setara dengannya.

[1 mark/ *markah*]

Answer / *Jawapan* :

(ii) It takes a minute for a photostat machine to print out 12 copies of examination paper. How long, in seconds, does it take to print out 60 copies of the examination paper.
Sebuah mesin fotostat mengambil masa seminit untuk mencetak 12 salinan kertas peperiksaan. Berapa lamakah masa, dalam saat, yang diambil untuk mencetak 60 salinan kertas peperiksaan tersebut.

[2 marks/ *markah*]

Answer / *Jawapan*:

(b)   Diagram 6(*b*) shows heptagon *P'Q'R'S'T'U'V'* is the image of heptagon *PQRSTUV* under a rotation.

Rajah 6(b) *menunjukkan heptagon P'Q'R'S'T'U'V' yang merupakan imej bagi heptagon PQRSTUV di bawah suatu putaran.*
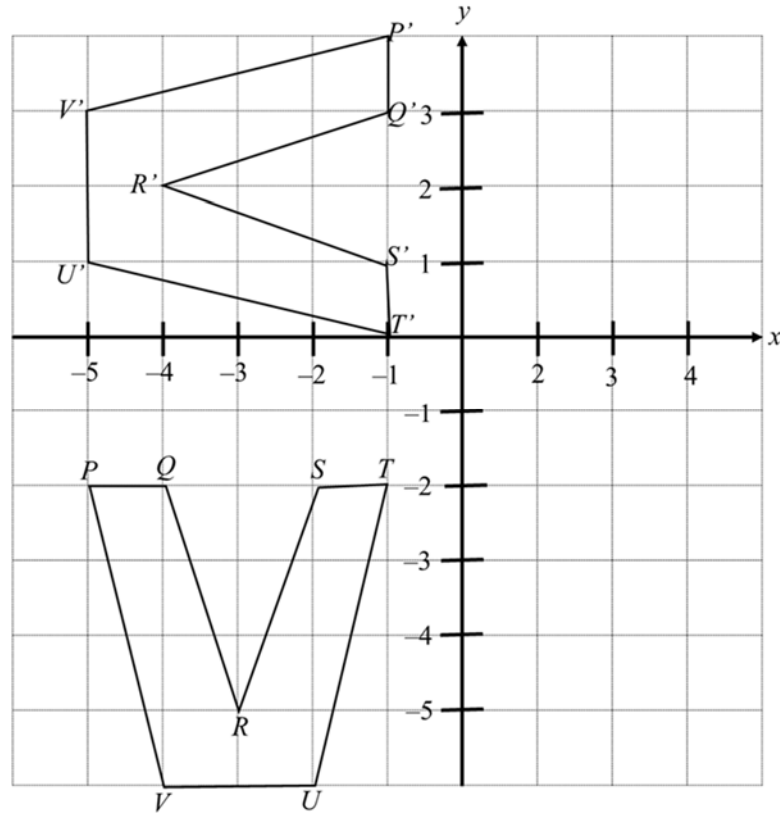
Diagram 6(*b*)
Rajah 6(*b*)

State:
Nyatakan:

(i)   the angle and direction of the rotation.
      sudut dan arah putaran tersebut

(ii) coordinate of the centre of rotation.
      koordinat pusat putaran tersebut

[2 marks/*markah*]

Answer / *Jawapan*:

(i)

(ii)

(c)(i)   Diagram 6(*c*)(i) shows an unfolded cuboid box.
Rajah 6(c)(i) *menunjukkan bukaan bagi kotak berbentuk kuboid.*

$3q^2$ cm

p cm
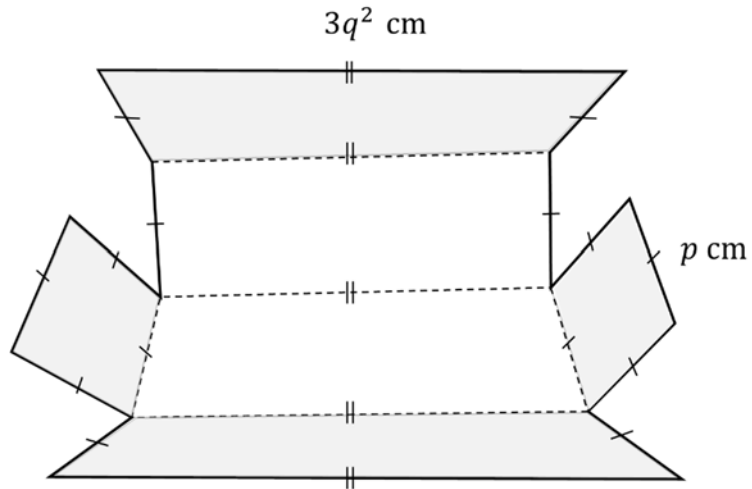
Diagram 6(*c*)(i)
Rajah 6(*c*)(i)

(a)   Express the volume of the box in terms of *p* and *q*.
Ungkapkan isipadu kotak itu dalam sebutan p dan q.

[1 mark/ *markah*]

(b)   Calculate the volume, in cm³, of the box if *p* = 2 cm and *q* = 5 cm.
Kirakan isipadu, dalam cm³, *kotak itu jika p* = 2 cm *dan q* = 5 cm.

[2 marks/ *markah*]

Answer/ *Jawapan*:

(a)

(b)

(c)(ii) Syasya bought a cubical shaped accessories box. She found out that the total surface area of the box is $24(2x-1)^2$ cm^2.
Find the volume, in cm^3, of the box.

Syasya membeli kotak perhiasan berbentuk kubus. Dia mendapati bahawa jumlah luas permukaan kotak itu ialah $24(2x-1)^2$ cm².
Cari isipadu, dalam cm³*, kotak tersebut.*

[3 marks/ *markah*]

Answer/ *Jawapan*:

7 (a)(i) Diagram 7(a)(i) shows a circle with centre O.
Rajah 7(a)(i) *menunjukkan satu bulatan dengan pusat O.*
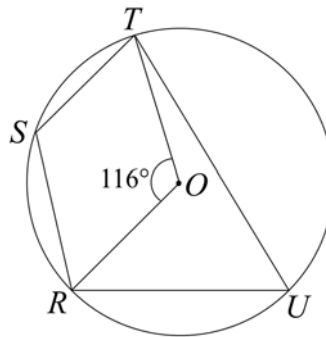
Diagram 7(*a*)(i)
Rajah 7(*a*)(i)

Find the value of $\angle TUR$.
Cari nilai $\angle TUR$.

[1 mark/ *markah*]

Answer / *Jawapan:*

(ii) Diagram 7(a)(ii) shows a circle with centre *O*. Given that arc *PQ* = arc *RS*. *POS* and *TOR* are straight lines.

Rajah 7(a)(ii) *menunjukkan sebuah bulatan dengan pusat O. Diberi lengkuk PQ = lengkuk RS. POS dan TOR ialah garis lurus.*
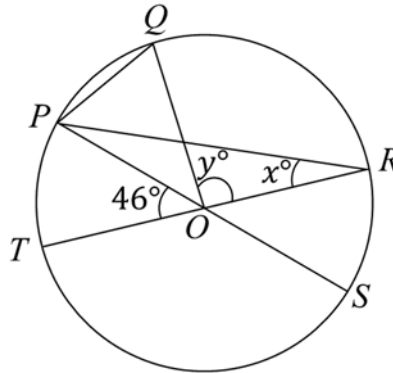
Diagram 7(*a*)(ii)
Rajah 7(*a*)(ii)

Find the value of angle *x* and angle *y*.
Cari nilai bagi sudut x dan sudut y.

[3 marks/ *markah*]

Answer / *Jawapan*:

(b)   In Diagram 7(b), *PQST* is a parallelogram and *QRS* is an isosceles triangle. *PQR* and *QWS* are straight lines.

Dalam Rajah 7(b), PQST adalah segi empat selari dan QRS adalah segi tiga sama kaki. PQR dan QWS adalah garis lurus.
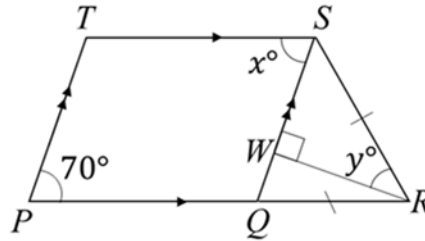
Diagram 7(*b*)
Rajah 7(b)

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

[3 marks/ *markah*]

Answer / *Jawapan:*

(c) Diagram 7(c)(i) shows a square with area of 64 cm² formed using a string. The string is cut to form another two congruent rectangles with length of 5 cm, as shown in Diagram 7(c)(ii).

Rajah 7(c)(i) menunjukkan sebuah segi empat sama dengan luas 64 cm² yang dibentuk menggunakan seutas benang. Benang tersebut kemudiannya dipotong untuk membentuk dua buah segi empat tepat yang kongruen dengan panjang 5 cm seperti yang ditunjukkan dalam Rajah 7(c)(ii).
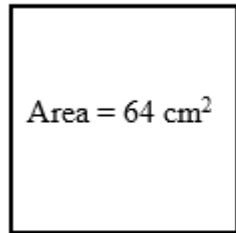
Diagram 7(c)(i)
Rajah 7(c)(i)
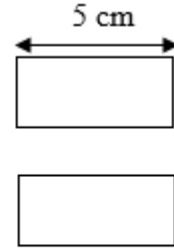
Diagram 7(c)(ii)
Rajah 7(c)(ii)

Calculate the area, in cm², of one of the rectangles.

Kira luas, dalam cm², salah sebuah daripada segi empat tepat tersebut.

[3 marks/ *markah*]

Answer / *Jawapan:*

8 (a)(i) Solve $v + 12 = -3v$.

Selesaikan $v + 12 = -3v$.

[2 marks/*markah*]

Answer / *Jawapan:*

[Lihat halaman sebelah

(ii)   Given the equation of a straight line is $2x + y = 7$, find the gradient of the equation.
Diberi suatu persamaan garis lurus ialah $2x + y = 7$, cari kecerunan bagi persamaan tersebut.

[2 marks/*markah*]

Answer / *Jawapan:*

(b)   Diagram 8(b) in the answer space shows a quadrilateral *EFGH* drawn on a square grid.
Rajah 8(b) dalam ruang jawapan menunjukkan sisi empat EFGH dilukis pada grid segi empat sama.

Draw the image of the quadrilateral *EFGH* under the reflection on the straight line *PQ* .
Lukis imej bagi sisi empat EFGH tersebut di bawah pantulan pada garis lurus PQ.

Answer / *Jawapan*:
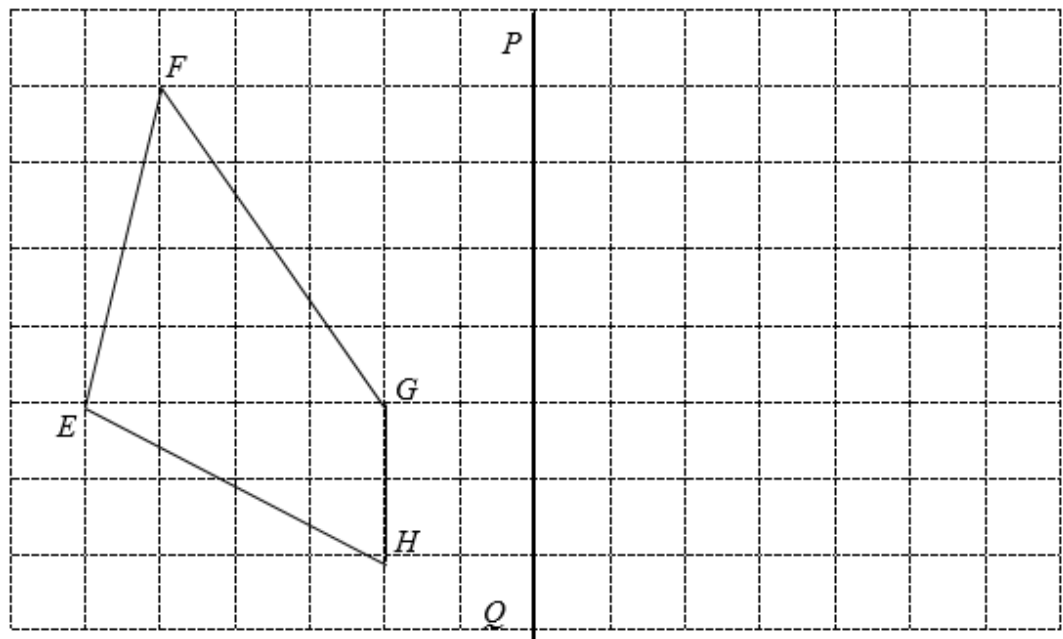
Diagram 8(b)
Rajah 8(b)

[2 marks/*markah*]

(c)   Diagram 8(c) shows a flag pole. Sharif raises the Malaysian flag every morning. There is a gap of 10 cm from the top of the raised flag to the peak of the flag pole.

Rajah 8(c) *menunjukkan sebatang tiang bendera. Setiap pagi* Sharif *menaikkan bendera* Malaysia. *Terdapat jurang* 10 cm *di antara bahagian atas bendera yang dinaikkan dengan puncak tertinggi tiang tersebut.*
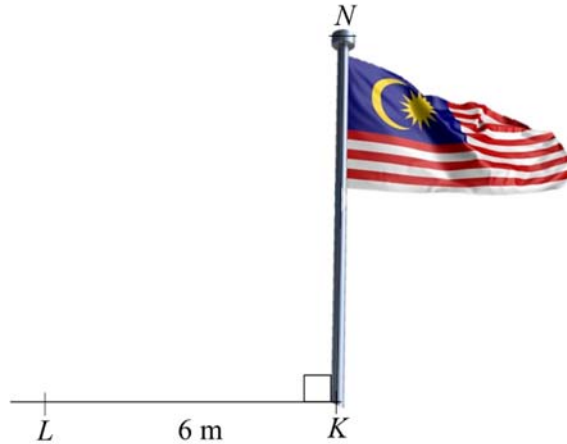
Diagram 8(c)
Rajah 8(c)

Given that the angle of elevation of the peak of the flag pole from point L is 55°. What is the maximum height, in m, of the flag. Give your answer in 2 decimal places.

Diberi bahawa sudut dongak puncak tiang tersebut dari titik L ialah 55°. *Berapakah ketinggian maksimum, dalam* m, *bendera tersebut.Tulis jawapan anda dalam* 2 *titik perpuluhan.*

[3 marks/*markah*]
.

Answer / *Jawapan*:

9   (a)(i)   Diagram 9(a)(i) shows a circular speedometer with a diameter of 54 cm.
Rajah 9(a)(i) *menunjukkan sebuah meter laju berbentuk bulatan dengan diameter* 54 cm.
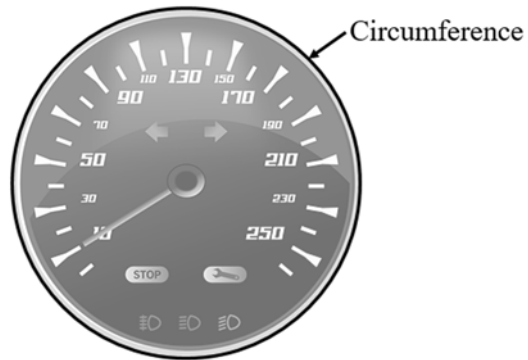
Diagram 9(*a*)(i)
Rajah 9(*a*)(i)

Find the circumference, in cm, of the speedometer.
Cari lilitan bulatan, dalam cm, *bagi meter laju tersebut.*
[Use/*Guna* $\pi = \frac{22}{7}$]

[2 marks/*markah*]

Answer / *Jawapan:*

(ii)   Diagram 9(a)(ii) shows a container truck moving on a straight–through highway. The truck moves equidistantly from the left and the right roadsides.
Rajah 9(a)(ii) menunjukkan sebuah trak kontena yang sedang bergerak di atas sebuah lebuhraya yang lurus. Trak itu bergerak sama jarak dari bahu kiri dan bahu kanan jalan itu.
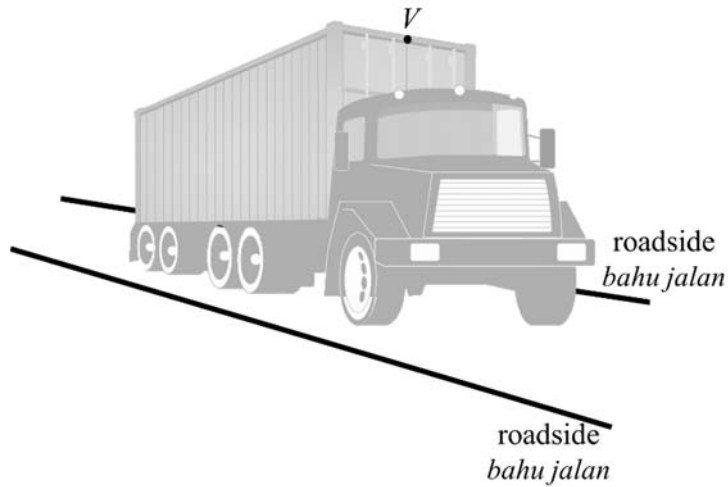
Diagram 9(a)(ii)
Rajah 9(a)(ii)

[2 marks/*markah*]

(a)   On Diagram 9(a)(iii) in the answer space, draw the locus of the moving truck.
Pada Rajah 9(a)(iii) di dalam ruang jawapan, lukis lokus bagi pergerakan trak itu.

Answer / *Jawapan*:

roadside
bahu jalan

roadside
bahu jalan
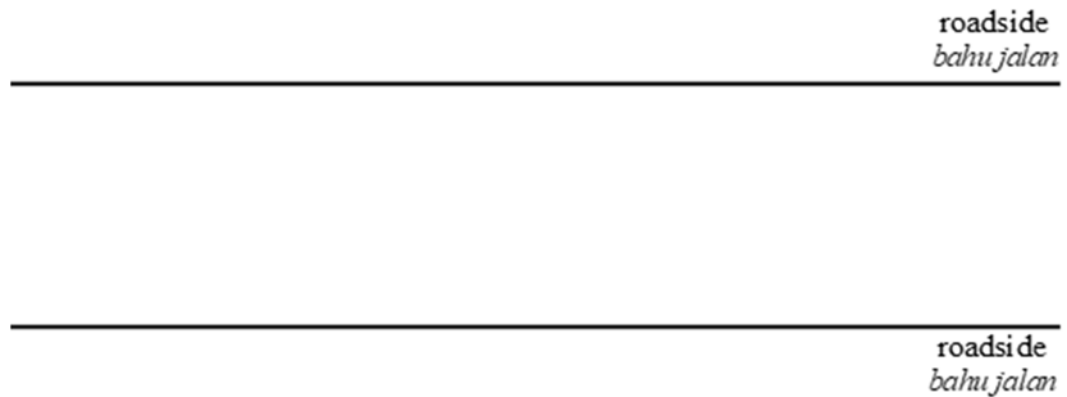
Diagram 9(a)(iii)
Rajah 9(a)(iii)

(b)   Based on your answer in Diagram 9(a)(iii), state the locus of the moving truck.
Berdasarkan jawapan anda dalam Rajah 9(a)(iii), nyatakan lokus bagi pergerakan trak itu.

Locus/ *lokus*: _____

[Lihat halaman sebelah

(b)   Simplify:
Permudahkan:

$$\left[\frac{5n+4}{n(n+2)}\right] \div \frac{10n+8}{n^2-4}$$

[4 marks*/markah*]

Answer / *Jawapan*:

(c) Diagram 9(c) shows a composite solid consisting of a right pyramid with a square base *EFJK* and a right prism with a rectangular base *ABCD* on a horizontal plane.

Rajah 9(c) menunjukkan gabungan pepejal yang terdiri daripada sebuah pyramid tegak bertapak segi empat sama EFJK dan sebuah prisma tegak bertapak segi empat tepat ABCD di atas satah mengufuk.
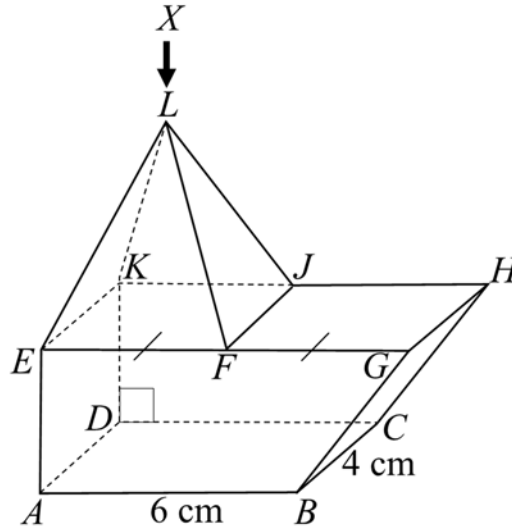

Diagram 9(*c*)
Rajah 9(*c*)

Draw to full scale, the orthogonal projection of the composite solid on a horizontal plane, as viewed from *X*.

Lukis dengan skala penuh, unjuran ortogon bagi gabungan pepejal di atas satah mengufuk dari pandangan X.

[2 marks*/markah*]

Answer / *Jawapan* :

10   (a)   Determine the coordinate of the image of point $G(-1, -4)$ under the translation $\begin{pmatrix} -8 \\ 0 \end{pmatrix}$.

Tentukan koordinat imej bagi titik $G(-1, -4)$ *di bawah translasi* $\begin{pmatrix} -8 \\ 0 \end{pmatrix}$.

[2 marks/*markah*]

Answer / *Jawapan* :

(b)(i)   Diagram 10(b)(i) shows an interest rate per annum offers by a bank. On 1 January 2018, Puan Suriati saved RM 15 000 in her fixed deposit account.
Diagram 10(b)(i) menunjukkan kadar faedah bagi suatu akaun simpanan tetap setahun yang ditawarkan oleh sebuah bank. Pada 1 Januari 2018, Puan Suriati telah menyimpan sebanyak RM 15 000 dalam akaun simpanan tetapnya.

Fixed Deposit Account
Akaun Simpanan Tetap

5.5%   Interest rate per annum
Kadar faedah setahun

Diagram 10(*b*)(i)
Rajah 10(b)(i)

After a year, how much money, in RM, in her fixed deposit account if the interest is compounded once every four months.
Selepas setahun, berapakah jumlah wang, dalam RM, dalam akaun simpanan tetapnya jika kadar faedah di kompaun setiap empat bulan sekali.

[2 marks/*markah*]

Answer / *Jawapan* :

(ii)   A box contains 3 blue marbles, 4 green marbles and x red marbles. A marble is choosen at random from the box. The probability of getting a green marble is $\frac{1}{3}$. Find the value of x.

Sebuah kotak mengandungi 3 biji guli biru, 4 biji guli hijau dan x biji guli merah. Sebiji guli dipilih secara rawak daripada kotak tersebut. Kebarangkalian untuk mendapatkan sebiji guli hijau ialah $\frac{1}{3}$. Cari nilai x.

[3 marks/*markah*]

Answer / *Jawapan* :

(c)   A van moves with a speed of 70 km/h accelerates to 90 km/h in 10 seconds while a car accelerates from a speed of 36 km/h to 60 km/h in 8 seconds.
Is the acceleration of the van is more than the acceleration of the car? Show your calculation to support your answer.

Sebuah van bergerak dengan kelajuan 70 km/j memecut sehingga ke 90 km/j dalam masa 10 saat manakala sebuah kereta memecut dari kelajuan 36 km/j hingga ke 60 km/j dalam masa 8 saat. Adakah pecutan van itu melebihi pecutan kereta? Tunjukkan pengiraan untuk menyokong jawapan anda.

[3 marks/*markah*]

Answer / *Jawapan* :

11 (a)(i) In Diagram 11(a), *ABC and DBE* are straight lines.
Dalam Diagram 11(a), *ABC dan DBE adalah garis lurus.*
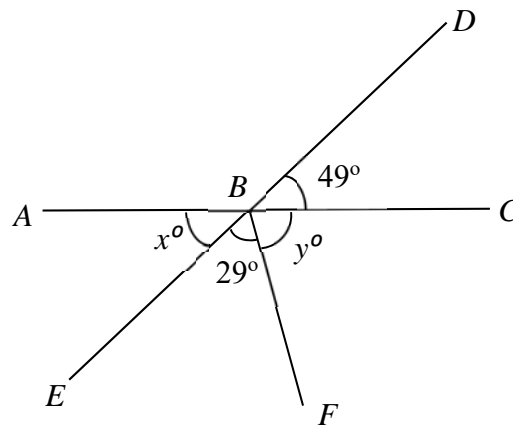
Diagram 11(a)
Rajah 11(a)

Calculate the value of *x* and the value of *y*.
Kira nilai x dan nilai y.

[3 marks*/markah*]

Answer/ *Jawapan* :

(ii) Without using a calculator, solve $4 \sin 30° + \sqrt{2} \cos 45°$.
Tanpa menggunakan kalkulator, selesaikan $4 \sin 30° + \sqrt{2} \cos 45°$.

[2 marks*/markah*]

Answer/ *Jawapan*:

TERHAD

(b)   Diagram 11(b) shows the stem–and–leaf plot of the weight, in kg for 20 students of Class 3 Jujur.

Rajah 11(b) *menunjukkan plot batang–dan–daun bagi berat, dalam kg bagi* 20 *orang pelajar* Kelas 3 Jujur.

Weight, in kg for 20 students of Class 3 Jujur
Berat, dalam **kg** *bagi* **20** *orang pelajar* **Kelas 3 Jujur**

Stem *Batang*	Leaf *Daun*
4	8 8 8 8 9 9 9
5	5 5 6 7 7 8 8 9 9
6	2 4 5
7	1

Key:
Kunci:

    4 | 8 means 48 kg
             bermaksud

Diagram 11(b)
Rajah 11(b)

20% of the students are overweight while the rest of them has ideal weight. List all the possible weights of the students who are overweight.

20% daripada bilangan pelajar itu mempunyai berat badan berlebihan manakala pelajar–pelajar lain mempunyai berat badan unggul. Senaraikan semua kemungkinan berat pelajar yang mempunyai berat badan berlebihan.

[2 marks/ *markah*]

Answer/ *Jawapan*:

[Lihat halaman sebelah

(c)   Ali and Ahmad plan to visit Turkey with the budget of RM 2 690 per person. Ali pays a deposit of RM 1 190 while Ahmad pays RM 1 690 to the tourist agent. Each months Ali saves RM 300 and Ahmad saves RM 200.

Ali dan Ahmad *merancang percutian ke Turki dengan peruntukkan sebanyak* RM 2 690 *seorang.* Ali *membayar deposit kepada agensi pelancongan sebanyak* RM 1 190 *manakala* Ahmad *membayar* RM 1 690.

      (a)   How long, in month, must they save so that their savings are enough to pay for the trip?

              Berapa lamakah, dalam bulan, mereka perlu menyimpan supaya simpanan mereka mencukupi untuk membayar perjalanan itu?

                                                       [2 marks/ *markah*]
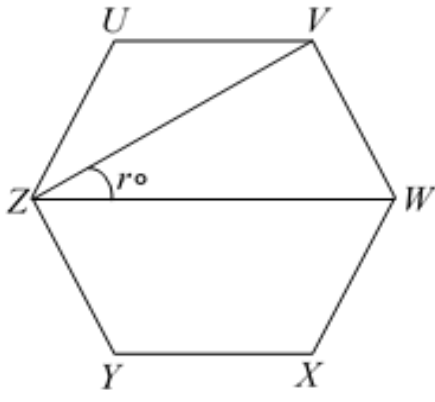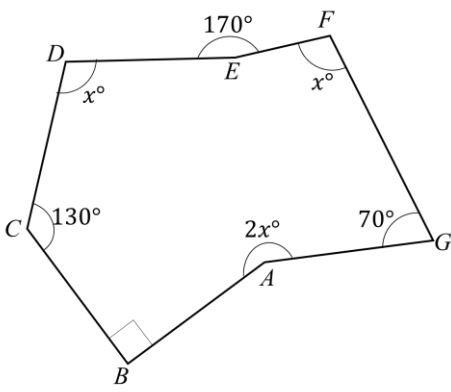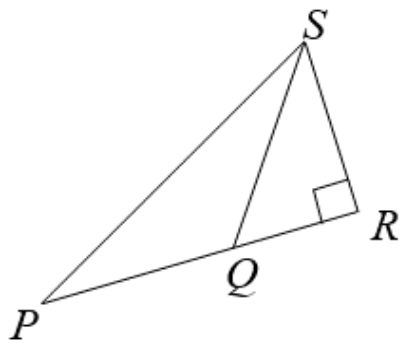
Answer / *Jawapan* :

END OF QUESTION PAPER

KERTAS SOALAN TAMAT

Listed here are the Diagram for PT3 Examination 2019.

SECTION A

QUESTION NUMBER	DIAGRAM
7 (Diagram 7)	
8 (Diagram 8)	
10 (Diagram 10)	

16 (Diagram 16)	 3 medium size prawns/ *udang bersaiz sederhana* 1 egg/ *telur* 50g bean sprout/ *taugeh* 200 g kuey teow/ *kuey teow*
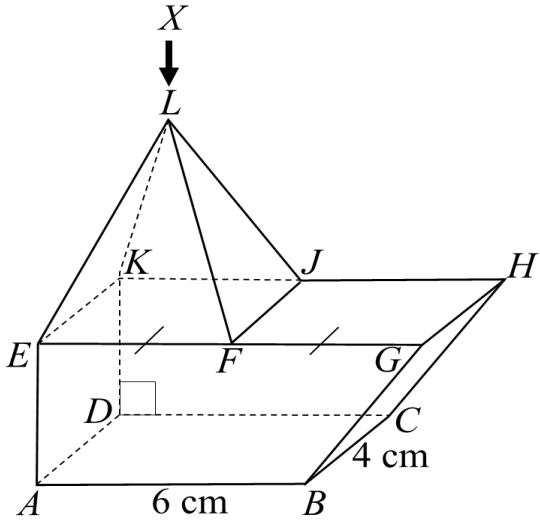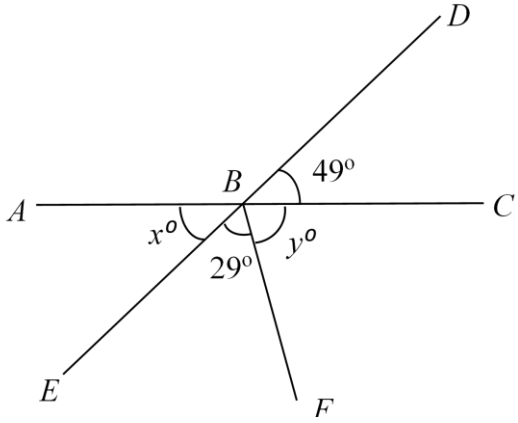
SECTION B

QUESTION NUMBER	DIAGRAM
2 (b) (Diagram 2(b)(i))	

SECTION C

QUESTION NUMBER	DIAGRAM
6 (c) (Diagram 6(c)(i))	$3q^2$ cm p cm
7(a) (Diagram 7(a)(i))	T S $116°$ O R U
7(a) (Diagram 7(a)(ii))	Q P $y°$ R $46°$ $x°$ T O S

QUESTION NUMBER	DIAGRAM
7 (b) (Diagram 7(b))	
9(a) (Diagram 9(a)(i))	
9(a) (Diagram 9(a)(ii))	

QUESTION NUMBER	DIAGRAM
9 (c) (Diagram 9(c))	
10(b) (Diagram 10(b)(i))	
11(a) (Diagram 11(a))	

- Terdapat sedikit kesalahan skala pada paksi-*x* dalam rajah 6 (b) sebelum ini.

SECTION C

QUESTION NUMBER	DIAGRAM
6 (b) (Diagram 6(b))	

PEPERIKSAAN AKHIR TINGKATAN 3

PT3 2019

UJIAN BERTULIS	
OGOS	2 Jam
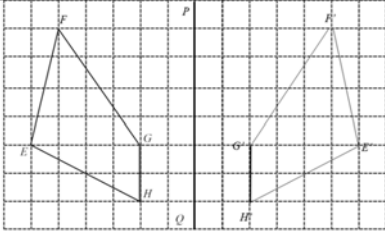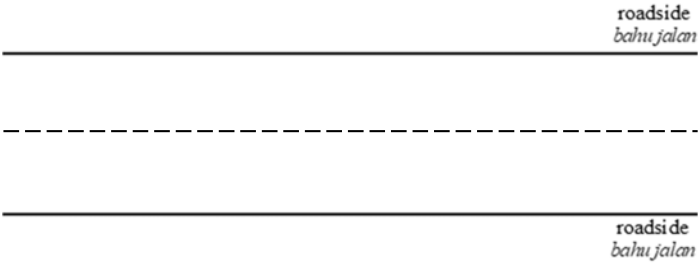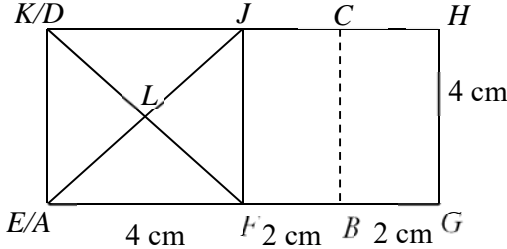
Mathematics 50

PANDUAN

PENSKORAN

TERHAD

SECTION A [20 MARKS]

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
D	C	D	A	A	D	A	A	C	B	B	C	D	B	B	C	B	A	D	C

SECTION B [20 MARKS]

QUESTION	MARKING SCHEME	MARKS	
1	k^{-6} √ k^{5} √ $\sqrt[3]{k^2}$ √ k^{-5} √	N1 N1 N1 N1	4
2 (a)		N1 N1	4
(b)		P1 P1	
3 (a)		N1 N1	4
(b)	3 y	P1 P1	
4(a)	Point plotted correctly Smooth curve joining all the 7 points seen	K1 N1	4
(b)	TRUE FALSE	P1 P1	
5	✓ ✗ ✗ ✓	P1 P1 P1 P1	4

PAT3/50 ©2019 Hak Cipta Bahagian Pendidikan Menengah MARA   **TERHAD**

SECTION C [60 MARKS]		
QUESTION	**MARKING SCHEME**	**MARKS**
6(a) (i)	$1:2:7$	N1
(ii)	60×5	K1
	300 seconds	N1
(b) (i)	90° clockwise	P1
(ii)	$(0,-1)$	P1
(c) (i)(a)	$V = 3p^2q^2$	N1
(b)	$3(2)^2(5)^2$	K1
	300	N1
(c) (ii)	$\frac{24(2x-1)^2}{6}$ or $2(2x-1)$ seen	P1
	$[2(2x-1)]^3$	K1
	$8(2x-1)^3$	N1
7(a) (i)	58°	N1
(ii)	23°	N1
	$180° - 46° - 46°$ or equivalent	K1
	88°	N1
(b)	$x = 70°$ or $y = 20°$ seen	P1
	$70° + 20°$	K1
	90°	N1
(c)	8 _or_ 3 seen	P1
	3×5	K1
	15	N1
8(a) (i)	$4v = -12$ _or_ equivalent	K1
	-3	N1
(ii)	$y = -2x + 7$	K1
	-2	N1
(b)		
	Any two points correctly plotted.	P1
	Correct image	P1
	Note: Shaded image P0P0	
(c)	$\frac{NK}{6} = \tan 55°$	K1
	[Note : Award P1 if NK = 8.5689 seen]	
	$NK - 0.1$	K1
	8.47	N1

Marks: 11, 10, 9

9 (a)(i)	$(\frac{22}{7} \times 54)$ _or_ equivalent 169.71 Final answer correctly rounded off to at least 2 d.p.	K1 N1	
(ii)(a)	 Note: Accept solid line	N1	
(ii)(b)	A straight line	N1	
(b)	$(n + 2)(n - 2)$ or $2(5n + 4)$ seen $\dfrac{5n + 4}{n(n + 2)} \times \dfrac{(n + 2)(n - 2)}{2(5n + 4)}$ [Note: K1 for changing reciprocal, K1 for all correct factorization] $\dfrac{n - 2}{2n}$	P1 K1K1 N1	11
(c)	 Correct shape with square _EFJK_ and _FGHJ_. All solid lines except dotted line _CB_. _EF=EK=KJ=JF=JH=HG=GF=4_ cm, _FB=GB=JC=CH=_2 cm and dotted line _CB_ is seen Measurements correct to $\pm$0.2 cm and all angles of square= 90° $\pm$0.1°	K1 K1 N1	

10 (a)	$G'(-1+(-8), -4+0)$ _or_ equivalent	K1	
	$(-9, -4)$	N1	
(b)(i)	$15000\left(1 + \dfrac{0.055}{3}\right)^{3(1)}$	K1	
	RM 15840.22	N1	
(b)(ii)	$\dfrac{4}{x+7} = \dfrac{1}{3}$ _or_ equivalent	K1	10
	$12 - 7$	K1	
	5	N1	
(c)	Van's acceleration $= \dfrac{90-70}{10}$ _or_ equivalent	K1	
	Car's acceleration $= \dfrac{60-36}{8}$ _or_ equivalent	K1	
	No, car's acceleration is more than van's acceleration.	N1	
11 (a)(i)	$x = 49^\circ$	K1	
	$y = 180^\circ - 49^\circ - 29^\circ$	K1	
	$= 102^\circ$	N1	
(a)(ii)	$4\left(\dfrac{1}{2}\right) + \sqrt{2}\left(\dfrac{1}{\sqrt{2}}\right)$	K1	
	3	N1	
(b)	Number of students = 4 seen	P1	9
	62, 64, 65, 71 all correct listed	N1	
(c)	Note: Give N2 if all 4 listing are correct		
	Ali : $\dfrac{2690-1190}{300} = 5$ months and Ahmad : $\dfrac{2690-1690}{200} = 5$ months	K1	
	or other equivalent methods seen		
	5 months	N1	

APPENDIX: SECTION B QUESTION 4(b)

Answer / *Jawapan* : (i), (ii)