

Name :

Form :



**BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH
DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PELAJARAN MALAYSIA**

**PEPERIKSAAN PERTENGAHAN TAHUN TINGKATAN 5 3472 / 1
ADDITIONAL MATHEMATICS**

Kertas 1

Mei 2011

2 jam

Dua jam

**JANGAN BUKA KERTAS SOALAN INI
SEHINGGA DIBERITAHU**

1. *Tulis nama dan tingkatan anda pada ruangan 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.*

<i>Untuk Kegunaan Pemeriksa</i>		
Soalan	Markah Penuh	Markah Diperolehi
1	2	
2	3	
3	3	
4	3	
5	3	
6	3	
7	4	
8	4	
9	3	
10	4	
11	4	
12	3	
13	3	
14	3	
15	3	
16	3	
17	3	
18	3	
19	4	
20	3	
21	3	
22	3	
23	4	
24	3	
25	3	
TOTAL	80	

Kertas soalan ini mengandungi 22 halaman bercetak

SULIT

2

3472/1

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HALAMAN KOSONG

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

ALGEBRA

$$1 \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$8 \quad \log_a b = \frac{\log_c b}{\log_c a}$$

$$2 \quad a^m \times a^n = a^{m+n}$$

$$9 \quad T_n = a + (n-1)d$$

$$3 \quad a^m \div a^n = a^{m-n}$$

$$10 \quad S_n = \frac{n}{2}[2a + (n-1)d]$$

$$4 \quad (a^m)^n = a^{mn}$$

$$11 \quad T_n = ar^{n-1}$$

$$5 \quad \log_a mn = \log_a m + \log_a n$$

$$12 \quad S_n = \frac{a(r^n - 1)}{r - 1} = \frac{a(1 - r^n)}{1 - r}, \quad (r \neq 1)$$

$$6 \quad \log_a \frac{m}{n} = \log_a m - \log_a n$$

$$13 \quad S_\infty = \frac{a}{1 - r}, \quad |r| < 1$$

$$7 \quad \log_a m^n = n \log_a m$$

CALCULUS

$$1 \quad y = uv, \quad \frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$$

4 Area under a curve

$$= \int_a^b y \, dx \quad \text{or}$$

$$2 \quad y = \frac{u}{v}, \quad \frac{dy}{dx} = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2},$$

$$= \int_a^b x \, dy$$

$$3 \quad \frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$$

5 Volume generated

$$= \int_a^b \pi y^2 \, dx \quad \text{or}$$

$$= \int_a^b \pi x^2 \, dy$$

GEOMETRY

$$1 \quad \text{Distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

5 A point dividing a segment of a line

$$(x, y) = \left(\frac{nx_1 + mx_2}{m + n}, \frac{ny_1 + my_2}{m + n} \right)$$

2 Midpoint

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

6 Area of triangle

$$= \frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)|$$

$$3 \quad |r| = \sqrt{x^2 + y^2}$$

$$4 \quad \hat{r} = \frac{xi + yj}{\sqrt{x^2 + y^2}}$$

STATISTIC

$$1 \quad \bar{x} = \frac{\sum x}{N}$$

$$2 \quad \bar{x} = \frac{\sum fx}{\sum f}$$

$$3 \quad \sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{N}} = \sqrt{\frac{\sum x^2}{N} - \bar{x}^2}$$

$$4 \quad \sigma = \sqrt{\frac{\sum f(x - \bar{x})^2}{\sum f}} = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2}$$

$$5 \quad m = L + \left[\frac{\frac{1}{2}N - F}{f_m} \right] C$$

$$6 \quad I = \frac{Q_1}{Q_0} \times 100$$

$$7 \quad \bar{I} = \frac{\sum w_1 I_1}{\sum w_1}$$

$$8 \quad {}^n P_r = \frac{n!}{(n-r)!}$$

$$9 \quad {}^n C_r = \frac{n!}{(n-r)!r!}$$

$$10 \quad P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$11 \quad P(X = r) = {}^n C_r p^r q^{n-r}, p + q = 1$$

$$12 \quad \text{Mean } \mu = np$$

$$13 \quad \sigma = \sqrt{npq}$$

$$14 \quad z = \frac{x - \mu}{\sigma}$$

TRIGONOMETRY

$$1 \quad \text{Arc length, } s = r\theta$$

$$2 \quad \text{Area of sector, } L = \frac{1}{2} r^2 \theta$$

$$3 \quad \sin^2 A + \cos^2 A = 1$$

$$4 \quad \sec^2 A = 1 + \tan^2 A$$

$$5 \quad \operatorname{cosec}^2 A = 1 + \cot^2 A$$

$$6 \quad \sin 2A = 2 \sin A \cos A$$

$$7 \quad \begin{aligned} \cos 2A &= \cos^2 A - \sin^2 A \\ &= 2 \cos^2 A - 1 \\ &= 1 - 2 \sin^2 A \end{aligned}$$

$$8 \quad \tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$$

$$9 \quad \sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$10 \quad \cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$11 \quad \tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

$$12 \quad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$13 \quad a^2 = b^2 + c^2 - 2bc \cos A$$

$$14 \quad \text{Area of triangle} = \frac{1}{2} ab \sin C$$

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

*For
 examiner's
 use only*

- 1 Given that $P = \{1, 3, 5\}$, $Q = \{2, 4, 6, 8, 10\}$ and the relation between set P and set Q is defined as a set of ordered pairs $\{(1, 2), (1, 4), (3, 6), (5, 10)\}$,

Diberi bahawa $P = \{1, 3, 5\}$, $Q = \{2, 4, 6, 8, 10\}$ dan hubungan di antara set p dan set Q ditakrifkan oleh satu set pasangan tertib $\{(1, 2), (1, 4), (3, 6), (5, 10)\}$,

State,
 Nyatakan,

- (a) the range of the relation,
Julat bagi hubungan itu,
 (b) determine the type of relation
tentukan jenis hubungan itu.

[2 marks]
 [2 markah]

Answer/Jawapan:

(a)

(b)

1

2

- 2 Given $f(x) = \frac{x+5}{x-1}, x \neq 1$ and $g(x) = 2x+3$.

Diberi $f(x) = \frac{x+5}{x-1}, x \neq 1$ dan $g(x) = 2x+3$.

Find,
 Cari,

- (a) $g^{-1}(x)$,
 (b) $fg^{-1}(-1)$,

[3 marks]
 [3 markah]

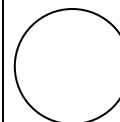
Answer/Jawapan:

(a)

(b)

2

3



For
examiner's
use only

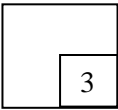
- 3 The function h and function gh are defined as $h: x \rightarrow 2x+7$ and $gh: x \rightarrow 3-4x^2$,
Find the function $g(x)$. [3 marks]

*Fungsi h dan fungsi gh ditakrifkan oleh $h: x \rightarrow 2x+7$ dan $gh: x \rightarrow 3-4x^2$,
Cari fungsi $g(x)$.*

[3 markah]

Answer/Jawapan:

3



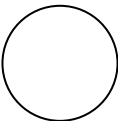
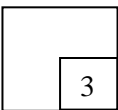
- 4 Solve the quadratic equation $(x-2)(3x+1) = 2x(x-5)$. Give your answer correct to three significant figures. [3 marks]

Selesaikan persamaan kuadratik $(x-2)(3x+1) = 2x(x-5)$. Berikan jawapan betul kepada tiga angka bererti.

[3 markah]

Answer/Jawapan:

4



- 5 The quadratic equation $4x - h = 2x(x - 3)$ has two different roots.
Find the range of values of h .

[3 marks]

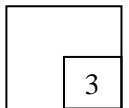
*Persamaan kuadratik $4x - h = 2x(x - 3)$ mempunyai dua punca yang berbeza.
Cari julat nilai-nilai h .*

[3 markah]

Answer/Jawapan:

*For
examiner's
use only*

5



- 6 Find the range of values x for which $(2x - 1)(x + 4) > 18$.

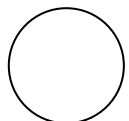
[3 marks]

Carikan julat nilai x bagi $(2x - 1)(x + 4) > 18$.

[3 markah]

Answer/Jawapan:

6



For
examiner's
use only

7 Diagram 7 shows the graph of a quadratic function $f(x) = 4 - a(x - 2)^2$, where a is a constant.

Rajah 7 menunjukkan suatu graf fungsi kuadratik $f(x) = 4 - a(x - 2)^2$, dengan keadaan a ialah pemalar.

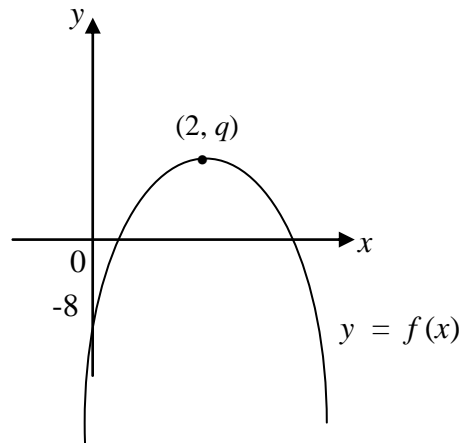


Diagram 7
Rajah 7

The curve $y = f(x)$ has a maximum point of $(2, q)$, where q is a constant.

Lengkung $y = f(x)$ mempunyai titik maksimum $(2, q)$, dengan keadaan q ialah pemalar.

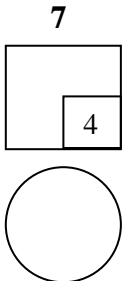
State,
Nyatakan

- (a) the value of q ,
nilai q .
- (b) the value of a ,
nilai a ,
- (c) the equation of the axis of symmetry.
persamaan paksi simetri.

[4 marks]
[4 markah]

Answer/Jawapan:

- (a)
- (b)
- (c)



8

Given the $\log_5 a = h$ and $\log_5 b = k$, express $\log_{25} \left(\frac{b}{125a} \right)$ in terms of h and k .

[4 marks]

Diberi $\log_5 a = h$ dan $\log_5 b = k$, ungkapkan $\log_{25} \left(\frac{b}{125a} \right)$ dalam sebutan h dan k .

[4 markah]

Answer/Jawapan:

*For
examiner's
use only*

8



9

Solve the equation:

Selesaikan persamaan:

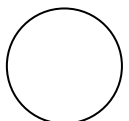
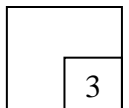
$$\sqrt{81^{n+3}} = \frac{1}{3^n \cdot 27^{n-1}}$$

[3 marks]

[3 markah]

Answer/Jawapan:

9



For
examiner's
use only

- 10 Given that $2p+8$, $3p-1$ and $p+8$ are the first three terms of an arithmetic progression .

Diberi $2p+8$, $3p-1$ dan $p+8$ adalah tiga sebutan pertama dalam suatu jangjang aritmetik.

*Find,
Cari*

- (a) the value of p ,
nilai p ,
- (b) the n^{th} term.
sebutan ke n .

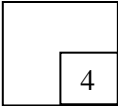
[4 marks]
[4 markah]

Answer/Jawapan:

(a)

(b)

10



- 11 The sum to infinity of a geometric progression with a first term of 5 is 25.
Hasil tambah ketakterhinggaan bagi suatu jangjang geometri dengan sebutan pertama 5 ialah 25.

*Find
Cari*

- (a) the common ratio,
Nisbah sepunya,
- (b) the sum of the first three terms of the progression.
Jumlah 3 sebutan pertama jangjang tersebut.

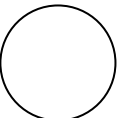
[4 marks]
[4 markah]

Answer/Jawapan:

(a)

(b)

11



12

Diagram 12 shows a straight line graph of $\frac{1}{y}$ against $\frac{1}{x}$.

Rajah 12 menunjukkan garis lurus $\frac{1}{y}$ melawan $\frac{1}{x}$.

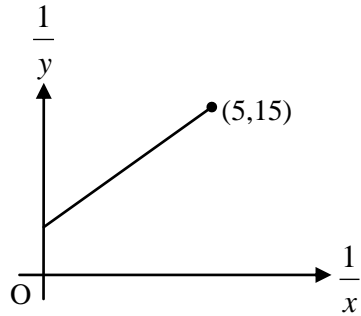


Diagram 12
Rajah 12

If the gradient of the straight line is 2, express y in terms of x .

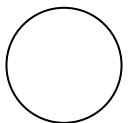
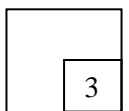
Jika kecerunan garis lurus adalah 2, ungkapkan y dalam sebutan x .

[3 marks]
[3 markah]

Answer/Jawapan:

*For
examiner's
use only*

12



For
examiner's
use only

- 13 Diagram 13 shows the graph of $\log_{10} y$ against x . The variables x and y are related by the equation $y = ab^x$, where a and b are constants
Rajah 13 menunjukkan graf $\log_{10} y$ melawan x . Pemboleh ubah x dan y dihubungkan dengan persamaan $y = ab^x$, di mana a dan b adalah pemalar.

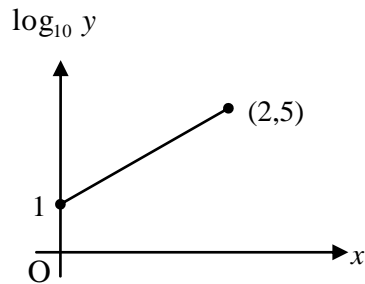


Diagram 13
Rajah 13

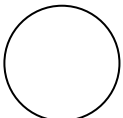
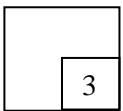
Find the value of a and of b .

Cari nilai a dan nilai b .

[3 marks]
[3 markah]

Answer/Jawapan:

13



- 14 Point Q divides internally the straight line joining point $P(10,8)$ and point $S(2,4)$ such that $PQ : QS = 3 : 1$.
Find the coordinates of Q .

[3 marks]

*For
examiner's
use only*

*Titik Q membahagi dalam garis lurus yang menghubungkan titik $P(10,8)$ dan $S(2,4)$ dengan keadaan $PQ : QS = 3 : 1$.
Cari koordinat Q .*

[3 markah]

Answer/Jawapan:

14



- 15 A point P moves such that its distance from the points $A(1,4)$ and $B(5,-1)$ are in the ratio of $2 : 3$.
Find the equation of the locus of point P .

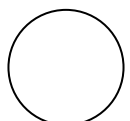
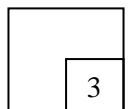
[3 marks]

*Titik P bergerak dengan keadaan jaraknya dari titik $A(1,4)$ dan $B(5,-1)$ adalah dalam nisbah $2 : 3$.
Cari persamaan lokus bagi titik P .*

[3 markah]

Answer/Jawapan:

15



For
examiner's
use only

- 16 Diagram 16 shows a vector \overrightarrow{OR} drawn on a Cartesian plane.
Rajah 16 menunjukkan vector \overrightarrow{OR} yang dilukis di atas satah Cartesian.

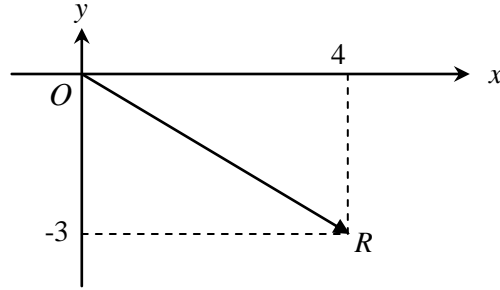


Diagram 16

Rajah 16

- (a) Find the magnitude of vector \overrightarrow{OR} .
Cari magnitud bagi vektor \overrightarrow{OR} .
- (b) Write the unit vector in the direction of \overrightarrow{OR} .
Tuliskan vektor unit dalam arah \overrightarrow{OR} .

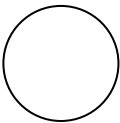
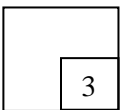
[3 marks]
[3 markah]

Answer/Jawapan:

(a)

(b)

16



- 17 Diagram 17 shows a triangle LMN . It is given that K is the midpoint of MN , $\overrightarrow{LN} = 6\underline{x} - 2\underline{y}$ and $\overrightarrow{LM} = 4\underline{y}$.

Rajah 17 menunjukkan segitiga LMN . Diberi K ialah titik tengah MN , $\overrightarrow{LN} = 6\underline{x} - 2\underline{y}$ dan $\overrightarrow{LM} = 4\underline{y}$.

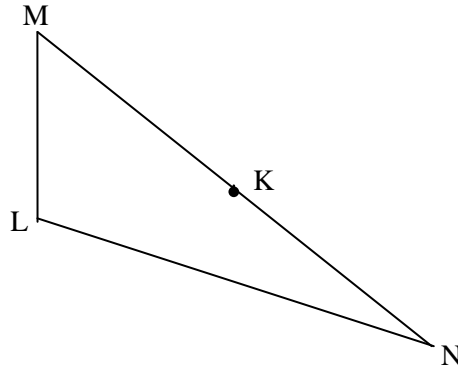


Diagram 17
Rajah 17

Find, in terms of \underline{x} and \underline{y} .

Cari, dalam sebutan \underline{x} dan \underline{y} .

(a) \overrightarrow{MN} ,

(b) \overrightarrow{LK} .

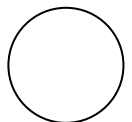
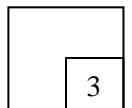
[3 marks]
[3 markah]

Answer/Jawapan:

(a)

(b)

17



- 18 Diagram 18 shows a triangle ROQ and semicircle PQS with centre O . The line QR is a tangent to the semicircle at point Q .

*For
examiner's
use only*

Rajah 18 menunjukkan segitiga ROQ dan separuh bulatan PQS dengan berpusat di O . Garis QR adalah tangen kepada separuh bulatan PQS pada titik Q .

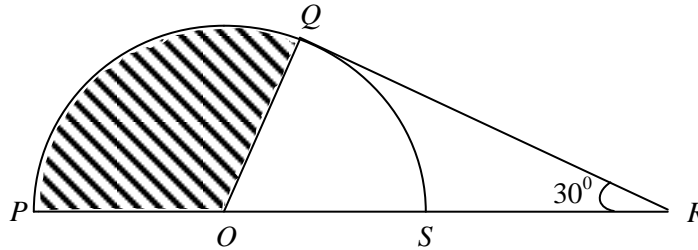


Diagram 18

Rajah 18

Given that the $\angle ORQ = 30^\circ$ and the radius of the semicircle is 6 cm.

Diberi bahawa $\angle ORQ = 30^\circ$ dan jejari separuh bulatan adalah 6 cm.

Find

Cari

- (a) $\angle ROQ$, in radian,
 $\angle ROQ$, dalam radian,
- (b) the area of the shaded region.
luas bahagian yang berlorek

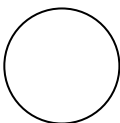
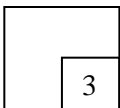
[3 marks]
[3 markah]

Answer/Jawapan:

(a)

(b)

18



19 Solve the equation $6\sin^2\theta - 4 = \cos\theta$ for $0^\circ \leq \theta \leq 360^\circ$.

[4 marks]

Selesaikan persamaan $6\sin^2\theta - 4 = \cos\theta$ untuk $0^\circ \leq \theta \leq 360^\circ$

[4 markah]

Answer/Jawapan :

*For
examiner's
use only*

19

4

20 Given that $f(x) = \frac{2x-1}{1-3x}$, evaluate $f'(-1)$.

[3 marks]

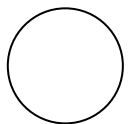
Diberi $f(x) = \frac{2x-1}{1-3x}$, nilaikan $f'(-1)$.

[3 markah]

Answer/Jawapan :

20

3



For
examiner's
use only

21 Given $y = \frac{2}{3x^2} - 36x$, find

Diberi $y = \frac{2}{3x^2} - 36x$, cari

(a) $\frac{dy}{dx}$

(b) The value of x when y is minimum.

Nilai x apabila y minimum.

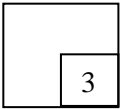
[3 marks]
[3 markah]

Answer/Jawapan:

(a)

(b)

21



22 Given that $\int \frac{1}{(1-2x)^n} dx = p(1-2x)^4 + c$, where n , p and c are constants.

Find the value of n and of p .

[3 marks]

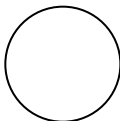
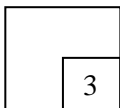
Diberi $\int \frac{1}{(1-2x)^n} dx = p(1-2x)^4 + c$, di mana n , p dan c adalah pemalar

Cari nilai n dan nilai p .

[3 markah]

Answer/Jawapan:

22



23

Given that $\int_{-1}^2 f(x)dx = 4$, find

Diberi $\int_{-1}^2 f(x)dx = 4$, cari

(a) the value of $\int_2^{-1} f(x)dx$

nilai $\int_2^{-1} f(x)dx$

(b) the value of k if $\int_{-1}^2 [f(x) - k]dx = 5$

nilai k jika $\int_{-1}^2 [f(x) - k]dx = 5$.

[4 marks]
[4 markah]

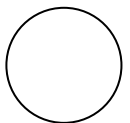
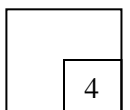
Answer/Jawapan:

(a)

(b)

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23



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use only*

- 24 Table 24 shows the distribution for the ages of 80 members of a Sport Club.
Jadual 24 menunjukkan taburan umur bagi 80 orang ahli sebuah Kelab Sukan.

Age/Umur	11 - 20	21 - 30	31 - 40	41 - 50	51 - 60	61 - 70
Number of members <i>/Bilangan ahli</i>	4	11	17	25	15	8

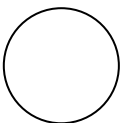
Table 24
Jadual 24

Calculate the median age of the Sport Club members.
Hitungkan median umur bagi ahli Kelab Sukan tersebut.

[3 marks]
[3 markah]

Answer/*Jawapan*:

24



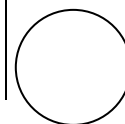
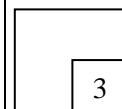
- 25 Given a set of data 5, 5, 3, 11, 7, 5, 14 and 6. Determine the standard deviation of the data. [3 marks]

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Diberi suatu set data 5, 5, 3, 11, 7, 5, 14 dan 6. Tentukan sisihan piawai bagi data tersebut. [3 markah]

Answer/Jawapan:

25



END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **25** questions
Kertas soalan ini mengandungi 25 soalan
2. Answer **all** questions.
Jawab semua soalan
3. Write your answers in the spaces provided in the question paper.
Tulis jawapan anda dalam ruang yang disediakan dalam kertas soalan.
4. Show your working. It may help you to get marks.
Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.
5. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
Sekiranya anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.
6. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
7. The marks allocated for each question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan.
8. A list of formulae is provided on pages 3 to 4.
Satu senarai rumus disediakan di halaman 3 hingga 4.
9. A booklet of four-figure mathematical tables is provided.
Sebuah buku sifir matematik empat angka disediakan.
10. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.
11. Hand in this question paper to the invigilator at the end of the examination.
Serahkan kertas soalan ini kepada pengawas peperiksaan di akhir peperiksaan.