

SULIT

3472/1
Additional
Mathematics
Kertas 1
Sept. 2008
2 Jam



Nama :

Tingkatan :

JABATAN PELAJARAN NEGERI JOHOR
PEPERIKSAAN PERCUBAAN SPM 2008
ADDITIONAL MATHEMATICS
Kertas 1
Dua jam

3472/1

**JANGAN BUKA KERTAS SOALAN
INI SEHINGGA DIBERITAHU**

- 1 Tulis *nama* dan *kelas* 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.

Untuk Kegunaan Pemeriksa		
Soalan	Markah Penuh	Markah Diperolehi
1	2	
2	4	
3	3	
4	2	
5	3	
6	3	
7	3	
8	4	
9	2	
10	3	
11	2	
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16	4	
17	4	
18	4	
19	3	
20	3	
21	3	
22	4	
23	4	
24	3	
25	4	
Jumlah	80	

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[Lihat sebelah
SULIT]

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

ALGEBRA

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

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

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

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

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

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

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

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

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

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

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

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

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

CALCULUS

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

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

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

4 Area under a curve

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

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

5 Volume generated

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

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

GEOMETRY

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

2 Midpoint

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

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

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

5 A point dividing a segment of a line

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

6 Area of triangle

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

ALGEBRA

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

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5 A point dividing a segment of a line

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6 Area of triangle

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

Answer all questions.

- 1 Diagram 1 shows the relation between set P and set Q .
Rajah 1 menunjukkan hubungan antara set P dan set Q .

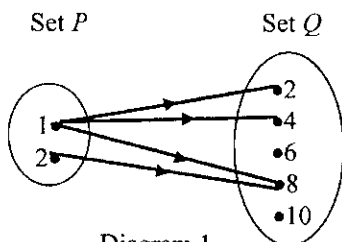


Diagram 1
Rajah 1

State

Nyatakan

- (a) the codomain of the relation,
kodomain hubungan itu,

- (b) the type of the relation.
jenis hubungan itu.

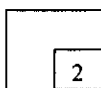
[2 marks]

[2 markah]

Answer/ Jawapan : (a)

(b)

1



- 2 Given the inverse of function k is $k^{-1} : x \rightarrow \frac{7}{x-2}, x \neq 2$.

Diberi fungsi songsangan bagi k adalah $k^{-1} : x \rightarrow \frac{7}{x-2}, x \neq 2$.

- (a) Calculate the value of $k(3)$.
Hitungkan nilai bagi $k(3)$.

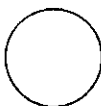
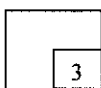
- (b) State the value of x where function k is not defined.

Nyatakan nilai bagi x di mana fungsi k tidak tertakrif.

[3 marks]

[3 markah]

2



Answer/ Jawapan : (a)

(b)

3 Diagram 2 shows the function f that maps set A to set B and the function g that maps set B to set C .

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Rajah 2 menunjukkan fungsi f memetakan set A kepada set B dan fungsi g memetakan set B kepada set C .

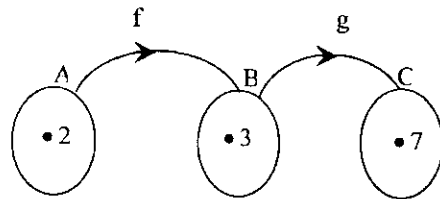


Diagram 2
Rajah 2

Given $f(x) = mx + 1$ and $gf(x) = 2x + n$. Find the values of m and n .

Diberi $f(x) = mx + 1$ dan $gf(x) = 2x + n$. Carikan nilai bagi m dan n .

[3 marks]

[3 markah]

3
3

Answer/ Jawapan : $m = \dots\dots\dots$
 $n = \dots\dots\dots$



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4 Form the quadratic equation which has the roots -5 and $\frac{1}{4}$.

Give your answer in the form $ax^2 + bx + c = 0$, where a, b and c are constants.

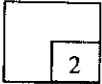
Bentukkan persamaan kuadrat yang mempunyai punca- punca -5 and $\frac{1}{4}$. Berikan jawapan anda dalam bentuk $ax^2 + bx + c = 0$, di mana a, b dan c adalah pemalar.

[2 marks]

[2 markah]

Answer / Jawapan:

4



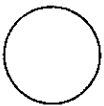
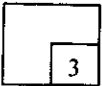
5 Find the range of x for which $(x + 3)(x - 4) < -6$.

Cari julat x bagi $(x + 3)(x - 4) < -6$.

[3 marks]

[3 markah]

5



Answer/ Jawapan :

6 Diagram 3 shows the graph $y = -4 - (x - k)^2$, where k is a constant.
Rajah 2 menunjukkan graf $y = -4 - (x - k)^2$, dengan keadaan k adalah pemalar.

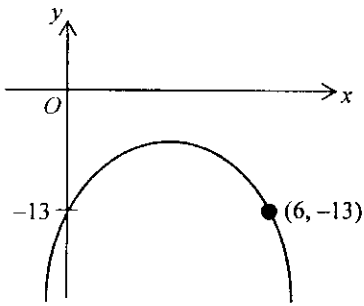


Diagram 3
Rajah 3

Find

Carikan

- (a) the value of k ,
nilai bagi k ,
- (b) the equation of the axis symmetry,
persamaan paksi simetri,
- (c) the coordinates of the maximum point.
koordinat titik maksimum.

[3 marks]

[3 markah]

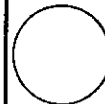
6

3

Answer/ Jawapan : (a).....

(b).....

(c).....



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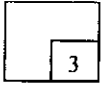
7 Given that $3^{2x}(9^{x-1}) = 1$, find the value of x .

Diberi $3^{2x}(9^{x-1}) = 1$, carikan nilai x .

[3 marks]

[3 markah]

7



Answer/ Jawapan :

8 Given that $\log_3 x = r$ and $\log_3 y = t$, express $\log_9 \left(\frac{x^2}{27y} \right)$ in terms of r and t .

Diberi $\log_3 x = r$ dan $\log_3 y = t$, ungkapkan $\log_9 \left(\frac{x^2}{27y} \right)$ dalam sebutan r dan t .

[4 marks]

[4 markah]

8



Answer/ Jawapan :

9 The first three terms of an arithmetic progression are h , $2h - 2$ and $2h + 1$.
Find the value of h .

Tiga sebutan pertama suatu janjang arithmetik adalah h , $2h - 2$ and $2h + 1$.

Carikan nilai bagi h .

[2 marks]

[2 markah]

9

9
2

Answer/ Jawapan :

10 The sum of the first five terms of a geometric progression is $7\frac{22}{27}$ and the common ratio is $\frac{2}{3}$. Find the first term.

Hasil tambah lima sebutan pertama suatu janjang geometri ialah $7\frac{22}{27}$ dan nisbah

sepunyaanya adalah $\frac{2}{3}$. Carikan nilai sebutan pertama.

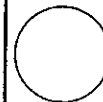
[3 marks]

[3 markah]

10

10
3

Answer/ Jawapan:



11 Given the arithmetic progression 5, 8, 11, ..., find the term that has a value of 131.

Diberi jangjang arithmetic 5, 8, 11, ..., carikan sebutan ke berapakah nilainya sama dengan 131.

[2 marks]

[2 markah]

11



Answer/ Jawapan :

12 Given a geometric progression $3, \frac{3}{5}, \frac{3}{25}, \frac{3}{125}, \dots$

Diberi suatu jangjang geometri $3, \frac{3}{5}, \frac{3}{25}, \frac{3}{125}, \dots$

Find

Cari

(a) the common ratio

nisbah sepunya

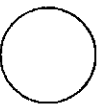
(b) the sum to infinity of the progression.

hasil tambah ketakterhinggaan jangjang tersebut.

[4 marks]

[4 markah]

12



Answer/ Jawapan : (a)

(b)

- 13 Given that the variables x and y are related by the equation $y = 10^{2x-2}$.
 Diberi pembolehubah x and y dihubungkan oleh persamaan $y = 10^{2x-2}$.

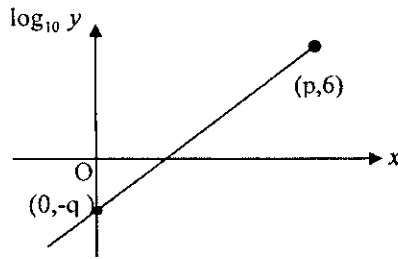


Diagram 4
Rajah 4

Find the value of p and q .
 Hitungkan nilai p dan q .

[3 marks]
 [3 markah]

Answer/ Jawapan: $p=.....q=.....$

13

3

- 14 Find the equation of the straight line which is parallel to $\frac{x}{3} + \frac{y}{4} = 1$ and passes through the midpoint of $A(-2,3)$ and $B(6,9)$.

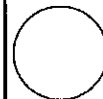
Cari persamaan garis lurus yang selari dengan $\frac{x}{3} + \frac{y}{4} = 1$ dan melalui titik tengah $A(-2,3)$ dan $B(6,9)$.

[3 marks]
 [3 markah]

14

3

Answer/ Jawapan :



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- 15 The point A is $(4, -3)$ and the point B is $(1, -2)$. The point P moves such that $PA : PB = 3 : 2$. Find the equation of the locus of P .
 Titik A ialah $(4, -3)$ dan titik B ialah $(1, -2)$. Satu titik P bergerak dengan keadaan supaya $PA : PB = 3 : 2$. Cari persamaan lokus P .

[3 marks]

[3 markah]

15

3

Answer/ Jawapan :

- 16 Diagram 5 shows vectors \vec{OP} and \vec{OQ} drawn on a cartesian plane.
 Rajah 5 menunjukkan vektor \vec{OP} and \vec{OQ} pada satah cartesian.

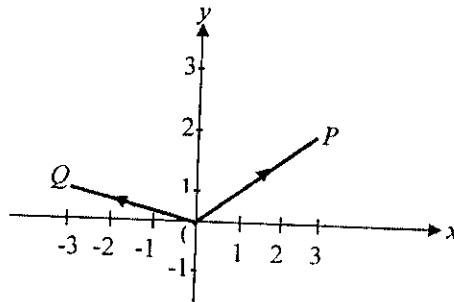
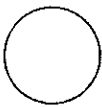


Diagram 5
Rajah 5

- (a) Express \vec{OP} in the form $\begin{pmatrix} x \\ y \end{pmatrix}$.
 Ungkapkan \vec{OP} dalam bentuk $\begin{pmatrix} x \\ y \end{pmatrix}$.
- (b) Find the unit vector in the direction of \vec{PQ} .
 Cari vektor unit dalam arah \vec{PQ} .

16

4



Answer/ Jawapan : (a)
 (b)

17 The points A, B and C are collinear. It is given that $\vec{OA} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}, \vec{OB} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$ and

$\vec{OC} = \begin{pmatrix} k \\ 4 \end{pmatrix}$. Find the value of k .

Titik- titik A, B dan C adalah segaris. Diberi $\vec{OA} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}, \vec{OB} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$ dan $\vec{OC} = \begin{pmatrix} k \\ 4 \end{pmatrix}$.

Carikan nilai k .

[4 marks]

[4 markah]

17

4

Answer/ Jawapan:

18 Solve the equation $8 \cos^2 x + 2 \sin x - 5 = 0$ for $0^\circ \leq \theta \leq 360^\circ$.

Selesaikan persamaan $8 \cos^2 x + 2 \sin x - 5 = 0$ bagi $0^\circ \leq \theta \leq 360^\circ$.

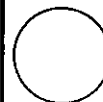
[4 marks]

[4 markah]

18

4

Answer/ Jawapan:



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19 Diagram 6 shows a circle with centre O .

Rajah 6 menunjukkan suatu bulatan berpusat O .

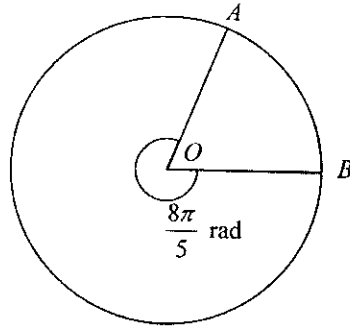


Diagram 6

Rajah 6

Given that the length of the minor arc AB is 12.57 cm, find the length, in cm, of the radius. (use $\pi = 3.142$)

Diberi panjang lengkok minor AB ialah 12.57 cm, cari panjang, dalam cm, jejari bulatan itu.

[3 marks]

[3 markah]

19



Answer/ Jawapan :

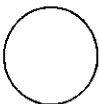
20 Given that $f(x) = \frac{(2x-1)^3}{x-1}$, find $f'(x)$.

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

[3 marks]

[3 markah]

20



Answer/ Jawapan:

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21 Given that $p = 2x - 5$ and $y = \frac{-2}{p^2}$, find the value of $\frac{dy}{dx}$ when $x = 2$.

Diberi $p = 2x - 5$ dan $y = \frac{-2}{p^2}$, carikan nilai $\frac{dy}{dx}$ apabila $x = 2$.

[3 marks]

[3 markah]

21



Answer/ Jawapan :

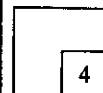
22 Given that $\int_1^3 g(x) dx = 5$. Find the value of k if $\int_1^3 -2g(x) - kx dx = -18$.

Diberi $\int_1^3 g(x) dx = 5$. Carikan nilai k jika $\int_1^3 -2g(x) - kx dx = -18$.

[4 marks]

[4 markah]

22



Answer/ Jawapan : $k =$



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23

Given six digits 1, 3, 4, 5, 6 and 8. A digit number is to be formed using four of these digits. Find

Diberi enam digit 1, 3, 4, 5, 6 dan 8. Suatu nombor empat digit hendak dibentuk dengan menggunakan empat daripada digit tersebut. Cari

- (a) the number of different four -digit numbers that can be formed,
bilangan nombor empat digit yang berlainan yang dapat dibentuk
- (b) the number of different four-digit odd numbers which are greater than 6000.
bilangan nombor empat digit yang ganjil dan berlainan yang melebihi 6000.

[4 marks]

[4 markah]

23



Answer / Jawapan: (a)

(b)

24

Given two bags *P* and *Q*, each contains blue and red marbles. Bag *P* contains 3 blue marbles and 4 red marbles. Bag *Q* contains 3 blue marbles and 5 red marbles. A bag is chosen at random and a marble is picked from it. Find the probability that

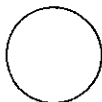
Diberi dua beg, masing- masing mengandungi guli berwarna biru dan merah. Beg P mengandungi 3 biji guli biru dan 4 biji guli merah. Bag Q mengandungi 3 biji guli biru dan 5 biji guli merah. Sebuah beg dipilih secara rawak dan sebiji guli akan dikeluarkan dari beg tersebut. Carikan kebarangkalian bahawa

- (a) a red marble from bag *Q* is chosen.
sebiji guli merah dari beg Q dipilih.
- (b) the marble is blue.
guli tersebut berwarna biru.

[3 marks]

[3 markah]

24

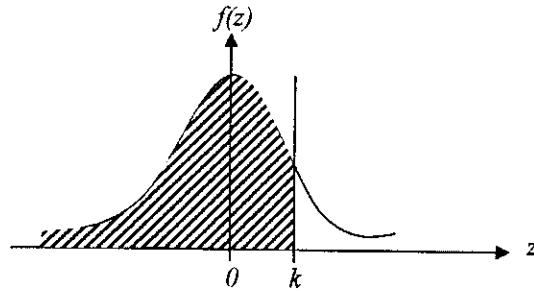


Answer/Jawapan : (a)

(b)

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use only

- 25 Diagram 7 shows a standard normal distribution graph.
Rajah 7 menunjukkan graf taburan normal piawai.



Given the probability represented by the area of the shaded region is 0.7019.
Diberi kebarangkalian yang diwakili oleh luas kawasan berlorek ialah 0.7019.

- (a) Find the value of k .
Carikan nilai k .
- (b) X is a random variable of a normal distribution with a mean of 45 and a variance of 25. Find the value of X when the Z-score is k .
 X ialah pemboleh ubah rawak suatu taburan normal dengan min 45 dan varians 25. Cari nilai X jika skor-Z ialah k .

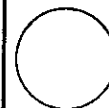
25

4

[4 marks]

[4 markah]

Answer/Jawapan : (a)
(b)



END OF QUESTION PAPER

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. Give only **one** answer for each question.
Bagi setiap soalan berikan satu jawapan sahaja.
4. Write your answers clearly in the spaces provided in the question paper.
Jawapan hendaklah ditulis dengan jelas dalam ruang yang disediakan dalam kertas soalan.
5. 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.
6. If you wish to change your answer, cross out the work that you have done. Then write down the new answer.
Sekiranya anda hendak menukar jawapan, batalkan kerja mengira yang telah dibuat. Kemudian tulis jawapan yang baru.
7. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
8. The marks allocated for each question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan.
9. A list of formulae is provided on pages 2 to 3.
Satu senarai rumus disediakan di halaman 2 hingga 3.
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.
Kertas soalan ini hendaklah diserahkan di akhir peperiksaan.