

NAMA :

TINGKATAN :



JABATAN PELAJARAN NEGERI TERENGGANU

PEPERIKSAAN PERCUBAAN SPM 2010

ADDITIONAL MATHEMATICS

Kertas 1

Ogos 2010

2 jam

**JANGAN BUKA KERTAS SOALAN INI
SEHINGGA DIBERITAHU**

1. *Tulis Nama dan Tingkatan pada ruang 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 dalam bahasa Melayu.*
5. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

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

Disediakan oleh:
AKRAM NEGERI TERENGGANU

Dibiayai oleh:
KERAJAAN NEGERI TERENGGANU

TERENGGANU ANJUNG ILMU

Dicetak oleh:
Percetakan Yayasan Islam Terengganu Sdn. Bhd.
Tel: 609-666 8611/6652/8601 Faks: 609-666 0611/0063

Kertas soalan ini mengandungi 24 halaman bercetak

**[Lihat sebelah
SULIT**

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.

ALGEBRA

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

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

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

$$4. (a^m)^n = a^{m \cdot n}$$

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

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

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

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

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

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

$$11. T_n = ar^{n-1}$$

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

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

CALCULUS / KALKULUS

$$1. y = uv$$

$$\frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$$

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

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

$$4. \text{Area under a curve}$$

Luas di bawah lengkung

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

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

$$5. \text{Volume generated}$$

Isipadu janaan

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

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

STATISTICS / STATISTIK

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

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

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

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

5. $m = L + \left(\frac{\frac{1}{2}N - F}{f_m} \right) C$

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

7. $\bar{I} = \frac{\sum W_i I_i}{\sum W_i}$

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

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

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

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

12. Mean / Min = np

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

14. $Z = \frac{X - \mu}{\sigma}$

GEOMETRI (GEOMETRY)

1. Distance / Jarak

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

2. Midpoint / Titik tengah

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

3. A point dividing a segment of a line
Titik yang membahagi suatu tembereng garis

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

4. Area of triangle / Luas segi tiga

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

5. $|\mathbf{r}| = \sqrt{x^2 + y^2}$

6. $\hat{r} = \frac{x\mathbf{i} + y\mathbf{j}}{\sqrt{x^2 + y^2}}$

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SULIT

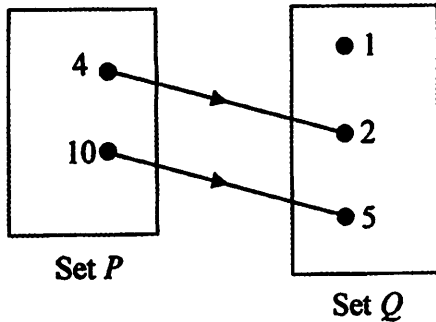
TRIGONOMETRY / TRIGONOMETRI

1. Arc length, $s = r\theta$
Panjang lengkok, $s = j\theta$
2. Area of sector $= \frac{1}{2} r^2\theta$
Luas sektor, $L = \frac{1}{2} j^2\theta$
3. $\sin^2 A + \cos^2 A = 1$
 $\sin^2 A + \text{kos}^2 A = 1$
4. $\sec^2 A = 1 + \tan^2 A$
 $\text{sek}^2 A = 1 + \tan^2 A$
5. $\text{cosec}^2 A = 1 + \cot^2 A$
 $\text{kosek}^2 A = 1 + \text{kot}^2 A$
6. $\sin 2A = 2 \sin A \cos A$
 $\sin 2A = 2 \sin A \text{kos} A$
7. $\cos 2A = \cos^2 A - \sin^2 A$
 $= 2 \cos^2 A - 1$
 $= 1 - 2 \sin^2 A$
 $\text{kos } 2A = \text{kos}^2 A - \sin^2 A$
 $= 2 \text{kos}^2 A - 1$
 $= 1 - 2 \sin^2 A$
8. $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$
 $\sin(A \pm B) = \sin A \text{kos} B \pm \text{kos} A \sin B$
9. $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$
 $\text{kos}(A \pm B) = \text{kos} A \text{kos} B \mp \sin A \sin B$
10. $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$
11. $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$
12. $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
13. $a^2 = b^2 + c^2 - 2bc \cos A$
 $a^2 = b^2 + c^2 - 2bc \text{kos} A$
14. Area of triangle / *Luas segi tiga*
 $= \frac{1}{2} ab \sin C$

Answer all questions.
 Jawab semua soalan.

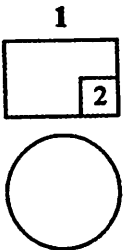
For
 Examiner's
 Use

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



- (a) State the range of the relation.
 Nyatakan julat hubungan itu.
- (b) Using the function notation, write a relation between set P and set Q .
 Dengan menggunakan tatatanda fungsi, tulis satu hubungan antara set P dan set Q .
 [2 marks]
 [2 markah]

Answer / Jawapan : (a)
 (b)



[Lihat sebelah
 SULIT

For
Examiner's
Use

- 2 Diagram 2 shows the functions f and g .
Rajah 2 menunjukkan fungsi f dan g .

$f: x \rightarrow 2x + 1$ $g: x \rightarrow 3x - 2$
--

Diagram 2 / *Rajah 2*

Find / *Cari*

- (a) $f^{-1}(5)$,
(b) $gf^{-1}(5)$.

[3 marks]
[3 markah]

2

	3
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Answer / *Jawapan* : (a) $f^{-1}(5) = \dots\dots\dots$

(b) $gf^{-1}(5) = \dots\dots\dots$

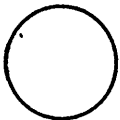
- 3 Write the equation $(3x + 1)(x - 1) = x(x + 2)$ in general form.
Tulis persamaan $(3x + 1)(x - 1) = x(x + 2)$ dalam bentuk am.

[2 marks]
[2 markah]

3

	2
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Answer / *Jawapan* : $\dots\dots\dots$



4 Find the range of values of p if the quadratic equation $18x^2 + 12x + 7 = p$ has two different roots. [3 marks]

Cari julat nilai p jika persamaan kuadratik $18x^2 + 12x + 7 = p$ mempunyai dua punca berbeza. [3 markah]

For
Examiner's
Use

Answer / Jawapan :

4

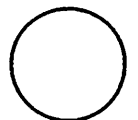
3

5 Solve the quadratic inequality $x^2 - 2x < 3$. [3 marks]
Selesaikan ketaksamaan kuadratik $x^2 - 2x < 3$. [3 markah]

Answer / Jawapan :

5

3



[Lihat sebelah
SULIT

For
Examiner's
Use

- 6 Diagram 6 shows a quadratic function graph $f(x) = h - 2(x + k)^2$ where h and k are constants.

Rajah 6 menunjukkan graf fungsi kuadratik $f(x) = h - 2(x + k)^2$ dengan keadaan h dan k adalah pemalar.

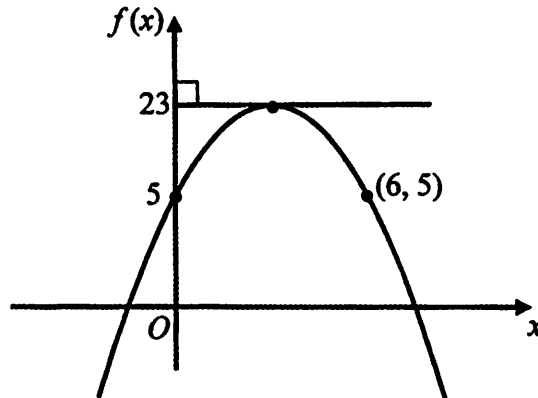


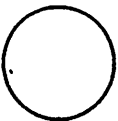
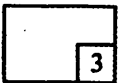
Diagram 6 / Rajah 6

Determine / Tentukan

- the value of h ,
nilai h ,
- the value of k ,
nilai k ,
- the new equation when the curve is reflected through x -axis.
persamaan baru apabila lengkung itu dipantul pada paksi- x .

[3 marks]
[3 markah]

6



Answer / Jawapan : (a) $h = \dots\dots\dots$

(b) $k = \dots\dots\dots$

(c) $\dots\dots\dots$

- 7 A point R moves from two fixed points $P(1, 0)$ and $Q(-2, 3)$ such that $RP : RQ = 1 : 2$.
Find the equation of the locus of R .

[3 marks]

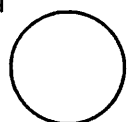
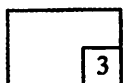
For
Examiner's
Use

Suatu titik R bergerak dari dua titik tetap $P(1, 0)$ dan $Q(-2, 3)$ dengan keadaan
 $RP : RQ = 1 : 2$. Cari persamaan lokus bagi R .

[3 markah]

Answer / Jawapan :

7

[Lihat sebelah
SULIT

For
Examiner's
Use

- 8 Diagram 8 shows a piece of wire which formed a sector OPQ , with centre O . The length of the wire is 200 cm.

*Rajah 8 menunjukkan seutas dawai yang membentuk sebuah sektor OPQ , berpusat O .
Panjang dawai itu ialah 200 cm.*

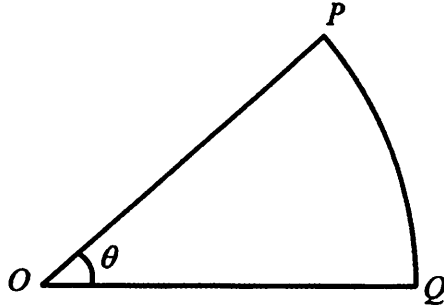


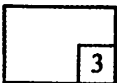
Diagram 8 / Rajah 8

Given that the arc length PQ is 60 cm, find the value of θ in radians.

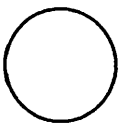
Diberi panjang lengkok PQ ialah 60 cm, cari nilai θ dalam radian.

[3 marks]
[3 markah]

8



Answer / Jawapan : $\theta = \dots\dots\dots$



9 The first three terms of an arithmetic progression are p , $2p - 2$ and $2p + 1$.
Tiga sebutan pertama suatu jangjang aritmetik ialah p , $2p - 2$ dan $2p + 1$.

Find / Cari

- (a) the value of p ,
nilai p ,
- (b) the sum of the next 12 terms.
hasil tambah 12 sebutan berikutnya.

[4 marks]
 [4 markah]

For
 Examiner's
 Use

Answer / Jawapan : (a) $p = \dots\dots\dots$
 (b) $\dots\dots\dots$

9

	4
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10 The first three terms of a geometric progression are 27, 18, 12.
 Find the sum to infinity of the geometric progression.

[3 marks]

Tiga sebutan pertama suatu jangjang geometri ialah 27, 18, 12.

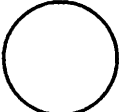
Cari hasil tambah hingga sebutan ketakterhinggaan bagi jangjang itu.

[3 markah]

Answer / Jawapan : $\dots\dots\dots$

10

	3
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For
Examiner's
Use

11 Solve the equation $2 \times 4^{x-1} = 16^{2x}$.

[4 marks]

Selesaikan persamaan $2 \times 4^{x-1} = 16^{2x}$.

[4 markah]

11

	4
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Answer / Jawapan :

12 Given that $\log_3 m = p$, express in terms of p

Diberi bahawa $\log_3 m = p$, ungkapkan dalam sebutan p

(a) $\log_3 m^3$,

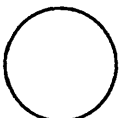
(b) $\log_9 m$.

[3 marks]

[3 markah]

12

	3
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Answer / Jawapan : (a)

(b)

13 Given that $5 \log_k 6 - \log_k 96 = 4$, find the value of k .

[3 marks]

Diberi bahawa $5 \log_k 6 - \log_k 96 = 4$, cari nilai k .

[3 markah]

For
Examiner's
Use

Answer / Jawapan : $k = \dots\dots\dots$

13

3

14 A set of eight scores $x_1, x_2, x_3, \dots\dots\dots x_8$ has mean 7 and standard deviation 2.

Satu set yang terdiri daripada lapan skor $x_1, x_2, x_3, \dots\dots\dots x_8$ mempunyai min 7 dan sisihan piawai 2.

Find / Cari

- (a) Σx ,
- (b) Σx^2 .

[3 marks]

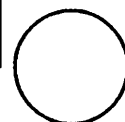
[3 markah]

Answer / Jawapan : (a) $\Sigma x = \dots\dots\dots$

(b) $\Sigma x^2 = \dots\dots\dots$

14

3



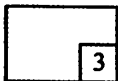
For
Examiner's
Use

- 15 Find the coordinates of the point on the curve $y = (3x - 1)^2$ such that the normal gradient to the curve at that point is $\frac{1}{6}$. [3 marks]

Cari koordinat titik pada lengkung $y = (3x - 1)^2$ dengan keadaan kecerunan normal

lingkung pada titik itu ialah $\frac{1}{6}$. [3 markah]

15

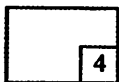


Answer / Jawapan :

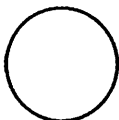
- 16 Given that $f(x) = \frac{4x^2}{3x-2}$, evaluate $f'(2)$. [4 marks]

Diberi bahawa $f(x) = \frac{4x^2}{3x-2}$, nilaikan $f'(2)$. [4 markah]

16



Answer / Jawapan : $f'(2) = \dots\dots\dots$



- 17 Diagram 17 shows the shaded region bounded by the curve $y = x^2 + 2$, the straight line $y = k$ and the y -axis.

Rajah 17 menunjukkan rantau berlorek yang dibatasi oleh lengkung $y = x^2 + 2$, garis lurus $y = k$ dan paksi- y .

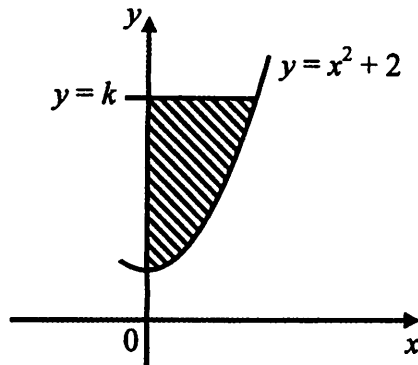


Diagram 17 / Rajah 17

When the shaded region is rotated through 360° about the y -axis, the volume generated is $\frac{25}{2}\pi$ unit³. Find the value of k .

Apabila rantau berlorek dikisar melalui 360° pada paksi- y , isipadu yang dijanakan ialah $\frac{25}{2}\pi$ unit³. Cari nilai k .

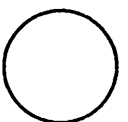
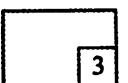
[3 marks]

[3 markah]

Answer / Jawapan : $k = \dots\dots\dots$

For
Examiner's
Use

17



For
Examiner's
Use

18 Given that $\int_2^6 f(x) dx = 24$, find

Diberi $\int_2^6 f(x) dx = 24$, cari

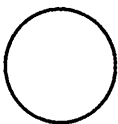
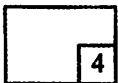
(a) $\int_2^6 2f(x) dx$

(b) the value of k where $\int_2^6 [f(x) - k] dx = 28$.

nilai k dengan keadaan $\int_2^6 [f(x) - k] dx = 28$.

[4 marks]
[4 markah]

18



Answer / Jawapan : (a)

(b) $k =$

19 Solve the trigonometric equation $\cos 2x + \cos x = -1$ for $0^\circ \leq x \leq 180^\circ$.

[3 marks]

For
Examiner's
Use

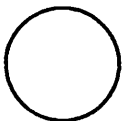
Selesaikan persamaan trigonometri $\cos 2x + \cos x = -1$ untuk $0^\circ \leq x \leq 180^\circ$.

[3 markah]

Answer / Jawapan :

19

3



[Lihat sebelah
SULIT

For
Examiner's
Use

20 The variables x and y are related by the equation $y = \frac{2}{x}(3 - x^2)$.

A straight line graph is obtained by plotting xy against x^2 , as shown in Diagram 20.

Pembolehubah x dan y dihubungkan oleh persamaan $y = \frac{2}{x}(3 - x^2)$.

Graf garis lurus diperoleh dengan memplotkan xy melawan x^2 , seperti ditunjukkan dalam Rajah 20.

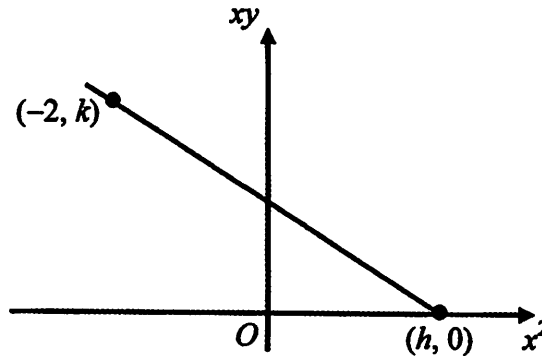
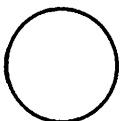
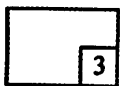


Diagram 20 / Rajah 20

Find the value of h and of k .
Cari nilai h dan nilai k .

[3 marks]
[3 markah]

20



Answer / Jawapan : $h = \dots\dots\dots$

$k = \dots\dots\dots$

21 Diagram 21 shows two vectors, \vec{OA} and \vec{BO} .
 Rajah 21 menunjukkan dua vektor, \vec{OA} dan \vec{BO} .

For
Examiner's
Use

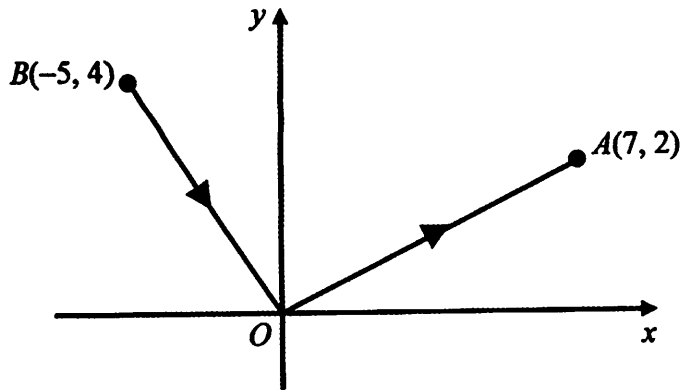


Diagram 21 / Rajah 21

(a) \vec{OA} in the form $\begin{pmatrix} x \\ y \end{pmatrix}$,
 \vec{OA} dalam bentuk $\begin{pmatrix} x \\ y \end{pmatrix}$,

(b) \vec{BA} in the form $xi + yj$.
 \vec{BA} dalam bentuk $xi + yj$.

[3 marks]
 [3 markah]

Answer / Jawapan : (a) $\vec{OA} = \dots\dots\dots$

(b) $\vec{BA} = \dots\dots\dots$

21

	3
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[Lihat sebelah
SULIT

For
Examiner's
Use

- 22 Kafi, Yujing and Husna will sit for Chemistry paper in an examination. The probabilities that Kafi, Yujing and Husna will get distinction for the paper are $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{2}{5}$ respectively.
- Kafi, Yujing dan Husna akan menduduki kertas Kimia dalam suatu peperiksaan. Kebarangkalian bahawa Kafi, Yujing dan Husna akan mendapat cemerlang untuk kertas itu adalah masing-masing $\frac{1}{3}$, $\frac{1}{4}$ dan $\frac{2}{5}$.*

Find the probability that

Cari kebarangkalian bahawa

- (a) all of them will get distinction,
kesemua mereka mendapat cemerlang,
- (b) only one of them will get distinction.
hanya seorang daripada mereka mendapat cemerlang.

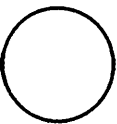
[4 marks]
[4 markah]

22



Answer / Jawapan : (a)

(b)



- 23 A Physics project team from SMK Megat Panji Alam consists of 7 students. The team will be chosen from a group of 8 boys and 4 girls. Calculate the number of ways the team can be formed if

For
Examiner's
Use

Satu pasukan projek Fizik dari SMK Megat Panji Alam terdiri daripada 7 orang pelajar.

Pasukan itu akan dipilih daripada sekumpulan 8 pelajar lelaki dan 4 perempuan.

Hitung bilangan cara yang berlainan pasukan itu boleh dibentuk jika

- (a) there is no restriction,

tiada syarat dikenakan,

- (b) the team consists of not more than 2 girls.

pasukan itu diwakili tidak lebih daripada 2 pelajar perempuan.

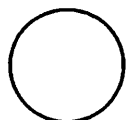
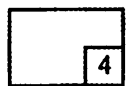
[4 marks]

[4 markah]

Answer / Jawapan : (a)

(b)

23



[Lihat sebelah
SULIT

For
Examiner's
Use

24 Diagram 24 shows six cards of different letters.

Rajah 24 menunjukkan enam keping kad dengan huruf yang berlainan.



Diagram 24 / Rajah 24

If four letters are to be chosen, find

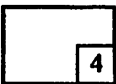
Jika empat huruf hendak dipilih, cari

- (a) the number of possible arrangements, in a row, of the cards,
bilangan cara susunan yang mungkin, dalam satu baris, bagi kad-kad itu,
- (b) the number of these arrangements in which it ends with a vowel.
bilangan cara susunan itu dengan keadaan ia berakhir dengan huruf vokal.

[4 marks]

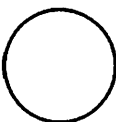
[4 markah]

24



Answer / Jawapan : (a)

(b)



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

*For
Examiner's
Use*

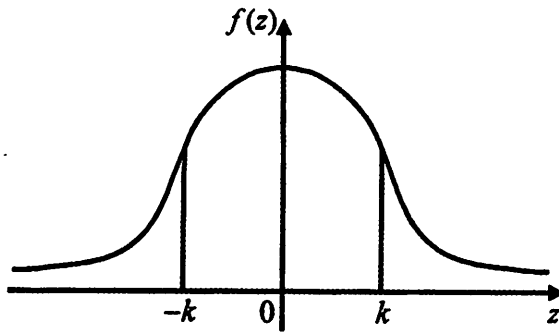


Diagram 25 / *Rajah 25*

If $P(-k < z < k) = 0.646$, find

Jika $P(-k < z < k) = 0.646$, cari

- (a) $P(z > k)$,
- (b) the value of k .
nilai bagi k .

[3 marks]
 [3 markah]

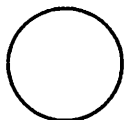
Answer/Jawapan : (a) $P(z > k) = \dots\dots\dots$

(b) $k = \dots\dots\dots$

25

	3
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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. Ia boleh membantu anda untuk mendapatkan markah.
5. If you wish to change your answer, cross out the answer work 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 2 to 4.
Satu senarai rumus disediakan di halaman 2 hingga 4.
9. Graph paper and a booklet of four-figure mathematical tables are provided.
Kertas graf dan 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.