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SULIT

3472/1
Matematik Tambahan
Kertas 1
Sept 2008
2 jam

Nama : .....

Tingkatan: .....

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA

SEKOLAH MENENGAH MALAYSIA (PKPSM) CAWANGAN MELAKA

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA 2008

MATEMATIK TAMBAHAN
Kertas 1
Dua Jam

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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 the answers clearly in the space provide in the question paper.***
   Jawapan hendaklah ditulis pada 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 diagram in the questions provided are not drawn to scale unless stated.***
   Rajah yang mengiringi soalan ini tidak dilukiskan mengikut skala kecuali dinyatakan.

8. ***The marks allocated for each question and sub-part of a question are shown in brackets.***
   Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.

9. ***A list of formulae is provided on page* 2 to 3**
   Satu senarai rumus disediakan di halaman 23 hingga 3

10. ***You may use a non-programmable scientific calculator.***
    Buku sifir matematik empat angka boleh digunakan.

11 ***This question paper must be handed in at the end of the examination.***
   Kertas soalan ini hendaklah diserahkan pada akhirpeperiksaan .

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

Kertas soalan ini mengandungi 18 halaman bercetak

[Lihat sebelah
SULIT

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The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.
Rumus-rumus berikut boleh digunakan untuk membantu anda menjawab soalan. . Simbol-simbol yang diberi adalah yang biasa digunakan.

ALGEBRA

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

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

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

4 $(a^m)^n = a^{nm}$

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

6 $\log_a \dfrac{m}{n} = \log_a m - \log_a n$

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

8 $\log_a b = \dfrac{\log_c b}{\log_c a}$

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

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

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

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

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

CALCULUS(*KALKULUS*)

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

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

3 $\dfrac{dy}{dx} = \dfrac{dy}{du} \times \dfrac{du}{dx}$

4 Area under a curve (*Luas dibawah lengkung)*

$= \displaystyle\int_a^b y \, dx$ or

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

5 Volume generated (*Isipadu Janaan)*

$= \displaystyle\int_a^b \pi y^2 \, dx$ or

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

GEOMETRY

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

2 Midpoint (*Titik Tengah*)

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

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

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

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

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

6 Area of triangle (*Luas Segitiga*)

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

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STATISTICS

1 $\bar{x} = \dfrac{\sum x}{N}$

2 $\bar{x} = \dfrac{\sum fx}{\sum f}$

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

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

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

6 $I = \dfrac{Q_1}{Q_0} \times 100$

7 $\bar{I} = \dfrac{\sum w_1 I_1}{\sum w_1}$

8 ${}^nP_r = \dfrac{n!}{(n-r)!}$

9 ${}^nC_r = \dfrac{n!}{(n-r)!r!}$

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

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

12 Mean $\mu = np$

13 $\sigma = \sqrt{npq}$

14 $z = \dfrac{x - \mu}{\sigma}$

TRIGONOMETRY

1 Arc length, $s = r\theta$
(*Panjang lengkok*) $s = j\ \theta$

2 Area of sector , $L = \dfrac{1}{2}r^2\theta$
(*Luas sektor* $L = \dfrac{1}{2}j^2\theta$)

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

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

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

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

7 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2\cos^2 A - 1$
$= 1 - 2\sin^2 A$

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

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

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

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

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

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

14 Area of triangle $= \dfrac{1}{2}ab\sin C$
(*Luas Segitiga*)

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

1. In diagram 1 set B shows the images of the elements of set A.
Dalam rajah 1, set B menunjukkan imej-imej bagi unsur-unsur dalam set A.

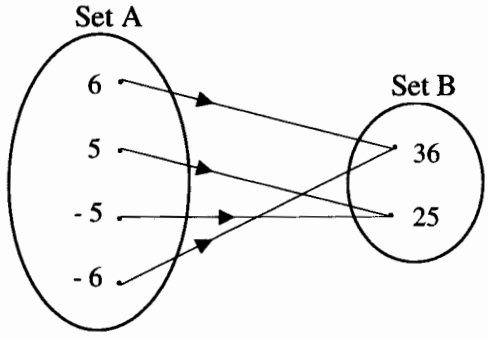

Diagram 1
Rajah 1

a) State the type of relation between set A and set B.
Nyatakan jenis hubungan antara set A dan set B.

b) Write a relation between set A and set B by using the function notation.
Tuliskan hubungan antara set A dan set B menggunakan tatatanda fungsi.

[2 marks]
[2 markah]

1 [2]

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

(b) .....

2. Given the function $f : x \rightarrow 4x - 3$, find
Diberi fungsi $f : x \rightarrow 4x - 3$ *, cari*

a) the image of 2
Imej bagi 2

b) the object of - 5
Objek bagi - 5

[2 marks]
[2 markah]

2 [2]

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

(b) .....

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3. Given that $g : x \to 3x - 2$ and $h : x \to 6x - 1$. Find $gh^{-1}(x)$.
Diberi $g : x \to 3x - 2$ dan $h : x \to 6x - 1$. *Cari* $gh^{-1}(x)$.

[3 marks]
[3 markah]

Answer/ *Jawapan*: .....

3

3

4. The roots of the quadratic equation $2x^2 - x - q = 0$ are the same as the roots of the quadratic equation $3x^2 + px + 2 = 0$. Find the value of p and of q.
Punca-punca bagi persamaan kuadratik $2x^2 - x - q = 0$ *adalah sama dengan punca-punca bagi persamaan kuadratik* $3x^2 + px + 2 = 0$. *Cari nilai p dan nilai q.*

[4 marks]
[4 markah]

Answer/*Jawapan*: p = ...

q = ...

4

4

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5

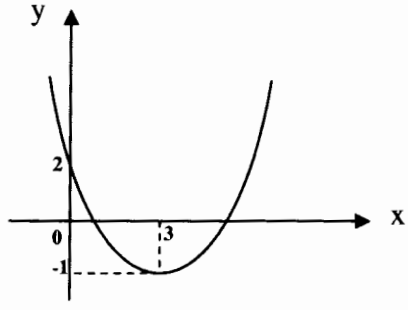

Diagram 2
Rajah 2

Diagram 2 shows the graph of the function $y = f(x)$, where $f(x) = a(x-b)^2 + c$. Find the values of a, b and c.
Rajah 2 menunjukkan graf bagi fungsi $y = f(x)$, di mana $f(x) = a(x-b)^2 + c$. Cari nilai a, b and c.

[3 marks]
[3 markah]

Answer/*Jawapan*: a =.....

c = ...

b =.....

5

3

6 Find the range of values of x for which $x(x-8) > x-20$
Cari julat bagi nilai x apabila $x(x-8) > x-20$

[3 marks]
[3 markah]

6

3

Answer/ *Jawapan*: x = ...

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7 Given that $\log_{10} xy^2 = 1$ and $\log_{10} x^2 y = -1$, find the values of x and y.

Diberi $\log_{10} xy^2 = 1$ *dan* $\log_{10} x^2 y = -1$, *cari nilai* x *dan* y.

[4 marks]
[4 markah]

Answer /*Jawapan*: x = ...

y =.....

7

4

8 Solve the equation $9^{\log_3 x} = 7$.

Selesaikan persamaan $9^{\log_3 x} = 7$.

[3 marks]
[3 markah]

Answer /*Jawapan* : = ...

8

3

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9. The first and second terms of a geometric progression are *9* and *3* respectively. Find the sum to infinity of the geometric progression.
Sebutan pertama dan sebutan kedua bagi suatu janjang geometri masing-masing ialah 9 dan 3 Cari hasil tambah hingga ketakterhinggaan bagi janjang geometri tersebut.

[2 marks]
[2 markah]

9 | 2

Answer/*Jawapan*: .....

10. Find the number of terms of the arithmetic progression 9, 12 , 15, … , 30.
Cari bilangan sebutan bagi janjang arithmatik 9, 12 , 15, … , 30.

[3 marks]
[3 markah]

10 | 3

Answer /*Jawapan*: .....

11 Given the geometric progression *27, 9, 3, …* . Find the sum of all the terms from the fifth term to the eighth term.
Diberi janjang geometri 27, 9, 3, … . Cari hasil tambah bagi semua sebutan dari sebutan kelima hingga sebutan kelapan.

[3 marks]
[3 markah]

11 | 3

Answer/*Jawapan*: .....

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12 Diagram 3 shows a straight line graph of $\frac{y}{x}$ against x. Given that $y = 6x - x^2$, calculate the value of k and of h.

Rajah 3 menunjukkan garis lurus bagi graf $\frac{y}{x}$ *melawan* x. *Diberi* $y = 6x - x^2$, *kira nilai* k *dan nilai* h.

[3 marks]
[3 markah]

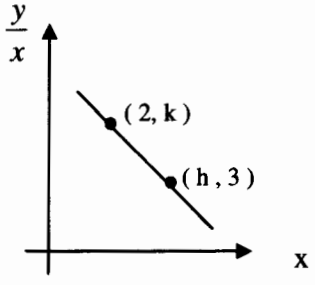

Diagram 3
Rajah 3

Answer/*Jawapan*: k=.....

h=.....

12

3

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13 Given $B(4,6)$ divides the line segment joining the points $A(3\ ,5)$ and C internally in the ratio $AB : AC = 1 : 3$. Find the coordinates of C.

Diberi titik B(4,6) membahagikan dalam garis lurus yang menyambungkan A(3,5) dan C mengikut nisbah AB : AC = 1 : 3. Cari koordinat C.

[3 marks]
[3 markah]

Answer/Jawapan: .....

13

3

14

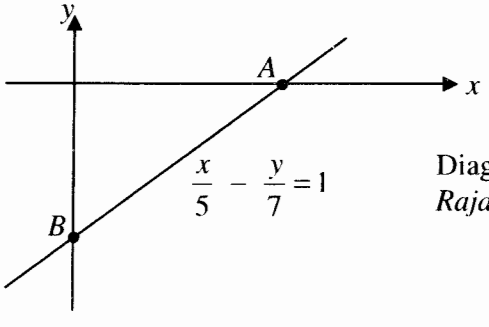

Diagram 4
Rajah 4

Diagram 4 shows a straight line AB of equation $\frac{x}{5} - \frac{y}{7} = 1$. The point A lies on the x-axis and the point B lies on the y-axis. Find the equation of the straight line perpendicular to AB and passing through the point A.

Rajah 4 menunjukkan garis lurus AB dengan persamaan $\frac{x}{5} - \frac{y}{7} = 1$. *Titik A terletak pada paksi x dan B pada paksi y. Cari persamaan garis lurus yang berserenjang dengan AB dan melalui titik A.*

[3 marks]
[3 marks]

14

3

Answer/*Jawapan:* .....

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15 Given that $\mathbf{u} = \begin{pmatrix} -3 \\ 5 \end{pmatrix}$ *and* $2\mathbf{u} - \mathbf{v} = \begin{pmatrix} 6 \\ 12 \end{pmatrix}$

Find

i) $\mathbf{v}$ [1 mark]

ii) the unit vector in the direction of $\mathbf{v}$ [2 marks]

Diberi $\mathbf{u} = \begin{pmatrix} -3 \\ 5 \end{pmatrix}$ dan $2\mathbf{u} - \mathbf{v} = \begin{pmatrix} 6 \\ 12 \end{pmatrix}$,

Cari

i) $\mathbf{v}$ *[1 markah]*

ii) vektor unit dalam arah $\mathbf{v}$ *[2 markah]*

Answer/*Jawapan*: .....

15

3

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16 Diagram 5 shows a parallelogram ABCD and BED is a straight line.

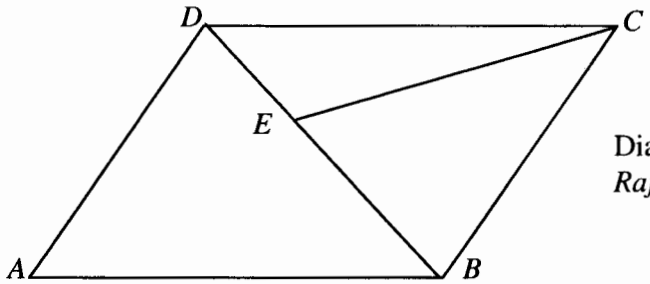

Diagram 5
Rajah 5

Given that $\overrightarrow{AB} = 10\mathbf{p}$, $\overrightarrow{BC} = 6\mathbf{q}$ *and* $\overrightarrow{BE} = 3\overrightarrow{ED}$. Express in terms of $\boldsymbol{p}$ and $\boldsymbol{q}$.

a) $\overrightarrow{BD}$

b) $\overrightarrow{EC}$

Rajah 5 menunjukkan segiempat selari ABCD dan BED adalah satu garis lurus. Diberi $\overrightarrow{AB} = 10\mathbf{p}$, $\overrightarrow{BC} = 6\mathbf{q}$ *and* $\overrightarrow{BE} = 3\overrightarrow{ED}$, *ungkapkan dalam sebutan* $\boldsymbol{p}$ *dan* $\boldsymbol{q}$,

a) $\overrightarrow{BD}$

b) $\overrightarrow{EC}$

[4 marks]

[4 markah]

16

4

Answer /*Jawapan*: *a)*.....

b).....

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17. Solve the equation $\cos 2\theta = 2 - 3\sin\theta$ for $0^\circ \le \theta \le 360^\circ$.
Selesaikan persamaan kos $2\theta = 2 - 3\sin\theta$ *untuk* $0^\circ \le \theta \le 360^\circ$.

[4 marks]
[4 markah]

Answer/*Jawapan*: .....

17 | 4

18

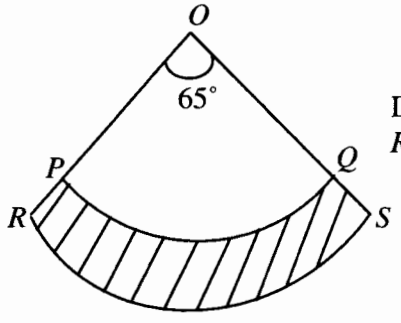

Diagram 6
Rajah 6

Diagram 6 shows two sectors *OPQ* and *ORS* with a common centre *O*.
Given that $OQ = 4$ cm, $QS = 2$ cm and $\angle POQ = 65^\circ$, find the area of the shaded region *PQSR* in terms of π.
Rajah 6 menunjukkan dua sektor OPQ dan ORS, mempunyai pusat sepunya di O.
Diberi $OQ = 4$ *cm,* $QS = 2$ *cm dan* $\angle POQ = 65^\circ$, *cari luas kawasan berlorek PQRS dalam sebutan* π.

[4 marks]
[4 markah]

Answer/*Jawapan*: .....

18 | 4

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19 Evaluate $\lim_{x \to 4}\left(\frac{x^2-16}{x-4}\right)$.

Nilaikan $\underset{x \to 4}{had}\left(\frac{x^2-16}{x-4}\right)$

[2 marks]
[2 *markah*]

Answer/*Jawapan*: .....

19

2

20 Given that $y = 3x^2 - 5x + 7$, if x increases by 0.02 at the instant when $x = 3$, find the approximate change in y.

Diberi $y = 3x^2 - 5x + 7$. *Jika* x *bertambah sebanyak 0.02 apabila nilai* $x = 3$, *cari perubahan hampir yang sepadan bagi* y.

[3 marks]
[3 *markah*]

Answer/*Jawapan*: .....

20

3

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21 Given that $\int_1^8 f(x)dx = 8$. Find the value of

a) $\int_1^8 \frac{1}{4} f(x)dx$

b) The constant c, if $\int_1^4 f(x)dx + \int_4^8 [f(x) + cx]dx = 24$

Diberi $\int_1^8 f(x)dx = 8$. *Cari nilai bagi*

a) $\int_1^8 \frac{1}{4} f(x)dx$

b) pemalar c jika $\int_1^4 f(x)dx + \int_4^8 [f(x) + cx]dx = 24$

[4 marks]
[*4 markah*]

Answer/*Jawapan* (a) .....

(b).....

21

4

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22

Time (hour) *Masa (jam)*	5 – 14	15 – 24	25 – 34	35 – 44	45 – 54
Number of pupils *Bilangan murid*	5	7	19	17	7

Table 1

Jadual 1

Table 1 shows the time distribution, in hour, taken by a group of pupils to complete their projects.

Find the median, in hour, of the distribution. [3 *marks*]

Jadual 1 menunjukkan taburan masa, dalam jam, yang digunakan oleh sekumpulan pelajar untuk melengkapkan projek mereka.

Carikan median, dalam jam, bagi taburan itu. [3 *markah*]

22

3

Answer/*Jawapan*: .....

23

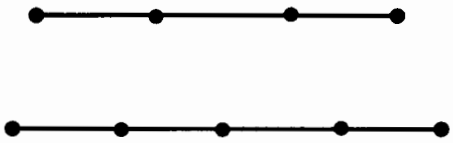

Diagram 7
Rajah 7

Diagram 7 shows two straight lines. One of the lines has 4 points and the other line has 5 points. Find the number of triangles that can be formed by joining any 3 points.
Rajah 7 menunjukkan dua garis lurus. Satu daripada garis itu mempunyai 4 titik dan garis yang satu lagi mempunyai 5 titik. Cari bilangan segitiga yang dapat dibentuk dengan menyambungkan mana-mana tiga titik.

[4 marks]
[4 markah]

23

4

Answer/ *Jawapan*: .....

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24.

Team	Number of students	
	male	female
A	24	16
B	12	18

Table 2

Table 2 shows the number of male and female students in team A and team B in a Science and Mathematics Club. A fair dice is tossed. If a number which is a multiple of three is obtained, a student from team A will be chosen to represent the club in an inter-club competition. Otherwise, a student from team B will be chosen. Calculate the probability that

a) a female student from team A is chosen
b) a male student from team B is chosen

Pasukan	*Bilangan pelajar*	
	Lelaki	*perempuan*
A	*24*	*16*
B	*12*	*18*

Jadual 2

Jadual 2 menunjukkan bilangan pelajar lelaki dan perempuani pasukan A dan pasukan B dalam Kelab Sains dan Matematik. Sebuah dadu adil dilambung, jika nombor gandaan 3 diperolehi, maka seorang pelajar daripada pasukan A akan dipilih untuk mewakili kelab dalam suatu pertandingan antara kelab. Sebaliknya seorang pelajar dari pasukan B akan dipilih. Kirakan kebarangkalian untuk :

a) seorang pelajar perempuan dari pasukan A dipilih
b) seorang pelajar lelaki dari pasukan B dipilih.

[4 marks]
[4 markah]

Answer/*Jawapan* : *a)*.....

b).....

24

4

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25 It is found that the height of the students in a school are normally distributed with a mea of 165 cm and a standard deviation of 15 cm. If 6% of the students in that school ha height more than h cm, find the value of h.

Ketinggian pelajar di sebuah sekolah didapati bertabur secara normal dengan nilai m 165 cm dan sisihan piawai 15 cm. Jika terdapat 6% daripada pelajar sekolah i mempunyai ketinggian melebihi h cm, carikan nilai h.

[4 marks

[4 markah

25

4

Answer/*Jawapan*: h = ...

END OF THE QUESTION PAPER

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