

**SULIT**

3472/1

3472/1

Matematik Tambahan

Kertas 1

Sept 2007

2 jam

Nama : .....

Tingkatan: .....

**PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA  
SEKOLAH MENENGAH MALAYSIA (PKPSM) CAWANGAN MELAKA**

**PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA 2007**



**MATEMATIK TAMBAHAN**

Kertas 1

Dua Jam



**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

- This question paper consists of 25 questions*  
Kertas soalan ini mengandungi 25 soalan.
- Answer all questions.**  
Jawab semua soalan.
  - Give only one answer for each question**  
Bagi setiap soalan berikan SATU jawapan sahaja.
  - Write the answers clearly in the space provide in the question paper.**  
Jawapan hendaklah ditulis pada ruang yang disediakan dalam kertas soalan.
  - 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.
  - 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.
  - The diagram in the questions provided are not drawn to scale unless stated.**  
Rajah yang mengiringi soalan ini tidak dilukiskan mengikut skala kecuali dinyatakan.
  - The marks allocated for each question and sub-part of a question are shown in brackets.**  
Markah yang diperuntukkan bagi setiap soalan atau ceraihan soalan ditunjukkan dalam kurungan.
  - A list of formulae is provided on page 2 to 3**  
Satu senarai rumus disediakan di halaman 23 hingga 3
  - You may use a non-programmable scientific calculator.**  
Buku sifir matematik empat angka boleh digunakan.
  - 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	3	
3	3	
4	3	
5	3	
6	3	
7	3	
8	4	
9	3	
10	3	
11	3	
12	3	
13	3	
14	3	
15	3	
16	4	
17	3	
18	3	
19	4	
20	4	
21	3	
22	4	
23	4	
24	3	
25	3	
Jumlah	80	

Kertas soalan ini mengandungi 16 halaman bercetak

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

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

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

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

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

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

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

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

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

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

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

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

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

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

## CALCULUS (KALKULUS)

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

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

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

4 Area under a curve (Luas dibawah lengkung)

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

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

5 Volume generated (Isipadu Janaan)

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

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

## GEOMETRY

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

2 Midpoint (Titik Tengah)

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

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

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

5 A point dividing a segment of a line

Titik yang membahagi suatu tembereng garis

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

6 Area of triangle (Luas Segitiga)

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

## STATISTICS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

## TRIGONOMETRY

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

(Panjang lengkok)  $s = j\theta$

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

(Luas sektor  $L = \frac{1}{2}j^2\theta$ )

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

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

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

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

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

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

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

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

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

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

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

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

(Luas Segitiga)

Answer all questions.  
Jawab semua soalan

1 Diagram 1 shows the relation between set R and set S  
Rajah 1 menunjukkan hubungan antara unsur Set R dan Set S

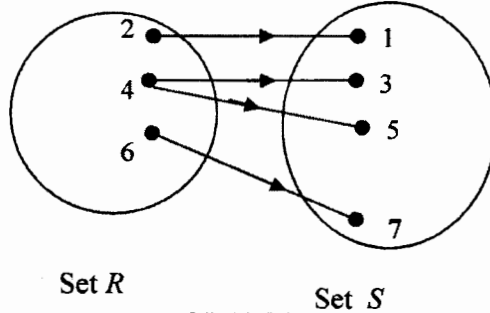
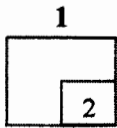


DIAGRAM 1  
RAJAH 1

State,  
Nyatakan,

- (a) the range of the relation,  
julat hubungan itu
- (b) the image of 4  
imej bagi 4

[ 2 marks ]  
[ 2 markah ]



Answer : (a) .....  
Jawapan :  
(b) .....

2 The function  $f$  is defined as  $f: x \rightarrow \frac{3x}{x-4}$ ,  $x \neq k$ .

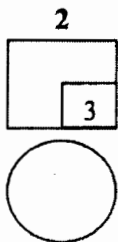
Fungsi  $f$  ditarifkan sebagai  $f: x \rightarrow \frac{3x}{x-4}$ ,  $x \neq k$ .

Find

Cari,

- (a) the value of  $k$ ,  
nilai  $k$
- (b) the value of  $m$  if  $f^{-1}(5 - m) = 2$ .  
nilai  $m$  jika  $f^{-1}(5 - m) = 2$ .

[ 3 marks ]  
[ 3 markah ]



Answer : (a) .....  
Jawapan :  
(b) .....

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3 The roots for quadratic equation  $x^2 - 10x + 7 - 3k = 0$  are  $\beta$  and  $4\beta$

Punca – punca bagi persamaan kuadratik  $x^2 - 10x + 7 - 3k = 0$  ialah  $\beta$  dan  $4\beta$

Find,  
Cari,

(a) the value of  $\beta$   
nilai  $\beta$

(b) the value of  $k$ .  
nilai  $k$

[ 3 marks ]  
[ 3 markah ]

Answer : (a) .....  
Jawapan : (b) .....

3  
3

4 Diagram 2 shows the graph of a quadratic function  $y = \frac{1}{2}(x - h)^2 + 1$ , where  $h$  is the constant. State,

Rajah 2 menunjukkan graf bagi fungsi  $y = \frac{1}{2}(x - h)^2 + 1$ , dengan keadaan  $h$  adalah pemalar. Nyatakan

(a) the value of  $h$ ,  
nilai  $h$

(b) the equation of axis of symmetry,  
persamaan paksi simetri,

(c) the coordinates of minimum point.  
koordinat titik minimum

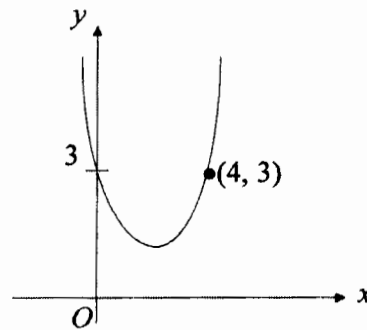
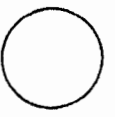


DIAGRAM 2  
RAJAH 2

[ 3 marks ]  
[ 3 markah ]

Answer : (a)  $h =$  .....  
Jawapan (b) .....  
(c) .....

4  
3



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6

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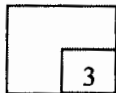
5 Find the value of  $a$  and of  $b$  where the solutions of quadratic inequality  $x^2 + ax > b$  are  $x > 2$  or  $x < -4$

Carikan nilai  $a$  dan nilai  $b$  dengan keadaan penyelesaian bagi ketaksamaan kuadratik  $x^2 + ax > b$  ialah  $x > 2$  atau  $x < -4$ .

[3 marks]

[3 markah]

5



Answer :  $a = \dots\dots\dots$

Jawapan

$b = \dots\dots\dots$

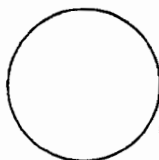
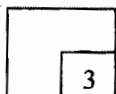
6 Solve the equation  $2^{x+4} - 2^{x+3} = 1$

[3 marks]

Selesaikan persamaan  $2^{x+4} - 2^{x+3} = 1$

[3 markah]

6



Answer :  $x = \dots\dots\dots$

Jawapan

**SULIT**

7

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7 Solve the equation  $\frac{1}{3} \log_x 8 + \frac{1}{2} \log_x 16 = 3$

Selesaikan persamaan  $\frac{1}{3} \log_x 8 + \frac{1}{2} \log_x 16 = 3$

[3 marks]

[3 markah]

Answer :  $x =$  .....  
Jawapan :

7

3
---

8 Given that  $\log_2 P + \log_4 q = 6$ , express  $P$  in terms of  $q$

Diberi  $\log_2 P + \log_4 q = 6$ , ungkapkan  $P$  dalam sebutan  $q$ .

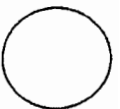
[4 marks]

[4 markah]

Answer :  $P =$  .....  
Jawapan :

8

4
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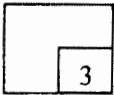
9 The 8<sup>th</sup> term of an arithmetic progression is twice of the 2<sup>nd</sup> term. The 11<sup>th</sup> terms is 18. Find the first term and the common difference

Dalam jangjang aritmetik, sebutan kelapan ialah dua kali sebutan kedua . Sebutan kesebelas ialah 18. Carikan sebutan pertama, dan beza sepunya

[3 marks]

[3 markah]

9



Answer : (a) .....

Jawapan

(b) .....

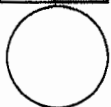
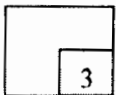
10 In a geometric progression, the sum of the first three terms is 0.973 times of its sum to infinity. Find the common ratio of the progression.

Diberi hasil tambah tiga sebutan pertama bagi suatu jangjang geometri ialah 0.973 kali hasil tambah sebutan-sebutan jangjang itu hingga ketakterhinggaan. Carikan nisbah sepunya jangjang geometri tersebut.

[3 marks]

[3 markah]

10



Answer : .....

Jawapan :



- 11 **Diagram 3 shows a straight line graph of  $\log_2 y$  against  $\log_2 x$ .**  
 Rajah 3 menunjukkan graf garis lurus  $\log_2 y$  melawan  $\log_2 x$ .

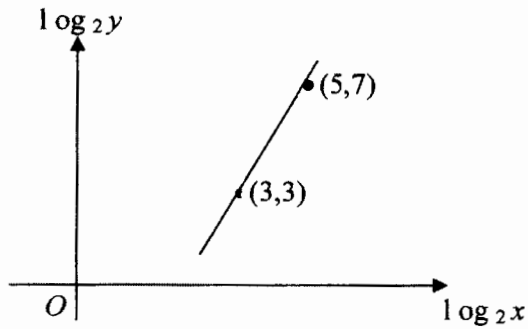


DIAGRAM 3  
RAJAH 3

**Express  $y$  in terms of  $x$**   
 Ungkapkan  $y$  dalam sebutan  $x$

[3 marks]  
[3 markah]

Answer : .....  
Jawapan

11

3
---

- 12 **Given that the area of triangle of  $A(2p,1)$ ,  $B(2,5)$  and  $C(-p,3)$  is 14 units.**  
**Find the possible values of  $p$ .**

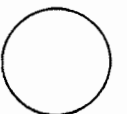
Diberi bahawa luas segitiga  $A(2p,1)$ ,  $B(2,5)$  dan  $C(-p,3)$  ialah 14 units. Carikan nilai - nilai yang mungkin bagi  $p$

[3 marks]  
[3markah]

Answer : .....

12

3
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13

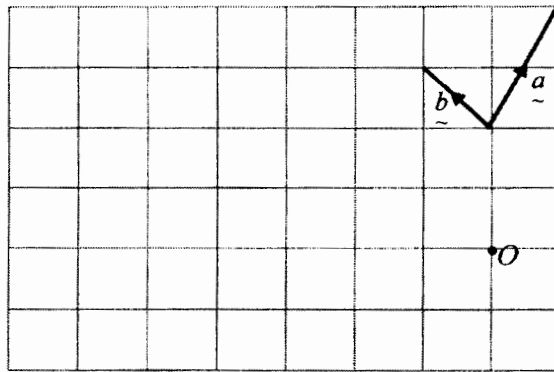


DIAGRAM 4  
RAJAH 4

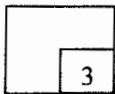
Diagram 4 shows the vector  $\underline{a}$  and  $\underline{b}$ . On the square-grid, draw and label clearly a line with direction that represents the vector  $\vec{OP} = 3\underline{b} - 2\underline{a}$  [3 marks]

Rajah 4 menunjukkan vektor  $\underline{a}$  dan  $\underline{b}$ . Dalam grid segiempatsama sisi, lukis dan labelkan satu garis berarah untuk mewakili vektor

$$\vec{OP} = 3\underline{b} - 2\underline{a}$$

[3 markah]

13



14 Given  $\vec{OA} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$ ,  $\vec{OB} = \begin{pmatrix} 12 \\ 9 \end{pmatrix}$  and  $C$  is a point lies on the straight line of  $AB$  with  $5AC = 2AB$ . Find

Diberi  $\vec{OA} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$ ,  $\vec{OB} = \begin{pmatrix} 12 \\ 9 \end{pmatrix}$  dan  $C$  merupakan satu titik yang terletak di garis lurus  $AB$  dengan  $5AC = 2AB$ . Cari

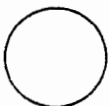
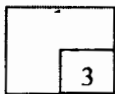
a)  $\vec{AB}$

b)  $|\vec{OC}|$

[3 marks]

[3 markah]

14



Answer: .....  
Jawapan

15 The mean of 5 integers,  $x$ ,  $2x - 4$ ,  $x + 3$ ,  $x + 5$  and  $2x - 6$  is 8. Find

Min bagi senarai integer  $x$ ,  $2x - 4$ ,  $x + 3$ ,  $x + 5$  dan  $2x - 6$  ialah 8. Cari

a) the value of  $x$   
nilai bagi  $x$

b) the variance.  
varian

[ 3 marks ]  
[ 3 markah ]

Answer : .....  
Jawapan :

15

3
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16 Solve the equation  $6 \sin^2 x = \sqrt{2} \sin 45^\circ - \sin x$  for  $0^\circ \leq x \leq 360^\circ$

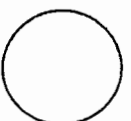
Selesaikan persamaan  $6 \sin^2 x = \sqrt{2} \sin 45^\circ - \sin x$  untuk  $0^\circ \leq x \leq 360^\circ$ .

[ 4 marks ]  
[ 4 markah ]

Answer : .....  
Jawapan :

16

4
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- 17 **Diagram 5 shows a quadrant  $OZ X$  with centre  $O$  and a radius of 9 cm.**  
Rajah 5 menunjukkan sebuah sukuan bulatan  $OZ X$  dengan pusat  $O$  dan jejari 9 cm.

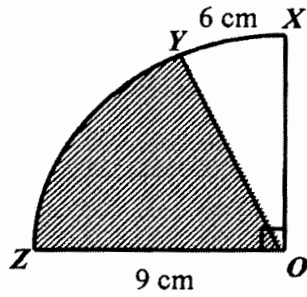
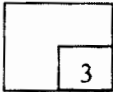


DIAGRAM 5  
RAJAH 5

- If the length of the arc  $XY$  is 6cm, find the area of the shaded region.**  
Jika panjang lengkok  $XY$  ialah 6 cm, cari luas rantau berlorek.

[3 marks]  
[3 markah]

17



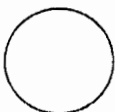
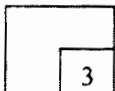
Answer : (a).....  
Jawapan

- 18 It is given that  $y = \frac{3}{u^2}$ , where  $u = 2x + 1$ . Find  $\frac{dy}{dx}$  in terms of  $x$ .

Diberi bahawa  $y = \frac{3}{u^2}$ , dimana  $u = 2x + 1$ . Cari  $\frac{dy}{dx}$  dalam sebutan  $x$ .

[3 marks]  
[3 markah]

18



Answer :  $\frac{dy}{dx} = \dots\dots\dots$   
Jawapan

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19 Given that the gradient of curve  $y = x^2 - kx + 5$  at point  $A(-1, 9)$  is  $-5$ . Find

Diberi fungsi kecerunan suatu lengkung  $y = x^2 - kx + 5$  pada titik  $A(-1, 9)$  ialah  $-5$ . Cari

(a) the value of  $k$   
nilai  $k$

(b) the approximate change in  $y$  as  $x$  increases from 2 to 2.05  
perubahan kecil bagi  $y$  apabila  $x$  menokok daripada 2 kepada 2.05.

[4 marks]  
[4 markah]

Answer : (a)  $k = \dots\dots\dots$   
Jawapan

(b)  $\dots\dots\dots$

19

4
---

20 (a) Given that  $\int_1^4 g(x) dx = 8$ , find  $\int_4^1 2g(x) dx$ .

Diberi  $\int_1^4 g(x) dx = 8$ , cari  $\int_4^1 2g(x) dx$ .

(b) Given that  $\int (1 + 3x)^5 dx = k(1 + 3x)^n + c$ , Find the value of  $k$  and  $n$ .

Diberi  $\int_1^4 g(x) dx = 8$ , cari  $\int_4^1 2g(x) dx$  .carikan nilai  $k$  dan  $n$ .

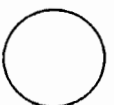
[4 marks]  
[4 markah]

Answer : (a)  $\dots\dots\dots$   
Jawapan

(b)  $\dots\dots\dots$

20

4
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21 **Diagram 6 shows six cards of different digits.**

Rajah 6 menunjukkan enam keping kad dengan digit-digit yang berlainan

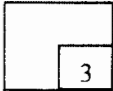


DIAGRAM 6  
RAJAH 6

- a) **Find the number of possible arrangements, in a row, of all the cards,**  
Cari bilangan susunan yang mungkin bagi semua kad dalam satu baris,
- b) **Find the number of these arrangements in which the digits 5 and 8 are side by side.**  
Cari bilangan susunan bagi susunan tersebut di mana digit 5 dan 8 adalah sebelah menyebelah.

[3marks]  
[ 3 markah ]

21



Answer (a) .....  
Jawapan  
(b) .....

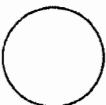
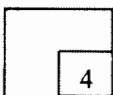
22 **5 students are chosen from a class of 9 male students and 12 female students to represent the school in a Mathematics competition. Calculate**

5 orang pelajar dipilih daripada sebuah kelas yang terdiri daripada 9 orang pelajar lelaki dan 12 orang pelajar perempuan untuk mewakili sekolah dalam suatu pertandingan Matematik. Kirakan

- a) **the number of ways that the five students can be chosen,**  
bilangan cara di mana lima orang pelajar boleh dipilih,
- b) **the number of ways that the five students can be chosen if exactly 3 of the representatives must be female students,**  
bilangan cara lima orang pelajar boleh dipilih jika tepat 3 orang wakil tersebut mestilah pelajar perempuan,
- c) **the number of ways of choosing the students if the representatives must be at least 2 males and not less than a female.**  
bilangan cara boleh memilih pelajar tersebut jika sekurang-kurang 2 orang lelaki dan tidak kurang daripada seorang perempuan dipilih.

[4 marks]  
[ 4 markah ]

22



Answer : a) .....  
Jawapan b) .....  
c) .....

- 23 In SMK Wawasan there are 15 form five prefects. 7 of them are boys and the rest are girls. Two of them are chosen to represent the school in a competition.  
 Di SMK Wawasan ada 15 orang pengawas tingkatan lima. 7 orang daripadanya lelaki dan selebihnya perempuan. Dua orang pengawas akan dipilih untuk mewakili sekolah dalam suatu pertandingan.

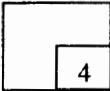
**Find the probability that**

Cari kebarangkalian bahawa

- (a) both are girls  
kedua-duanya pengawas perempuan dipilih  
 (b) one boy and one girl are chosen  
seorang lelaki dan seorang perempuan dipilih

[4 marks]  
[ 4 markah ]

Answer : (a) .....  
 Jawapan: (b) .....

23  


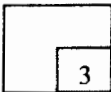
24. In a certain trial, the probability of success is  $p$ . An experiment consists of  $n$  such trials. When the experiment was repeated a large number of times, the mean number of success was found to be  $M$  and the standard deviation  $\sigma$ .

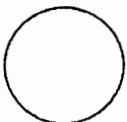
Calculate the value of  $p$  if  $M = 600$  and  $\sigma = 10$ .

Dalam suatu cubaan tertentu, kebarangkalian kejayaan ialah  $p$ . Suatu eksperimen mengandungi  $n$  cubaan. Apabila eksperimen itu diulangi dengan bilangan yang cukup besar, min bilangan kejayaan ialah  $M$  dan sisihan piawai ialah  $\sigma$ . Hitungkan nilai  $p$  jika  $M = 600$  dan  $\sigma = 10$ .

[3 marks]  
[3 markah]

Answer :  $p =$ .....  
 Jawapan

24  




For  
examiner's  
use only

**25 Diagram 7 shows a standard normal distribution graph.**

Rajah 7 menunjukkan suatu graf taburan normal piawai.

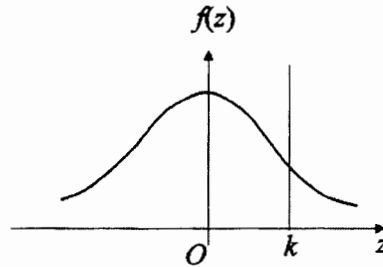


DIAGRAM 7  
Rajah 7

**(a) If  $P(0 < z < k) = 0.3023$ , find the value of  $k$ .**

jika  $P(0 < z < k) = 0.3023$ , carikan nilai  $k$ .

**(b)  $X$  is a continuous random variable which is normally distributed with a mean of  $\mu$  and a standard deviation of 2. Find the value of  $\mu$  when the value of  $X = 61.7$  is correspond to the value of  $k$ .**

$X$  ialah pembolehubah rawak selanjur yang bertabur secara normal dengan min  $\mu$  dan sisihan piawai 2. Carikan nilai  $\mu$  apabila nilai  $X = 61.7$  adalah sepadan dengan nilai  $k$ .

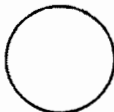
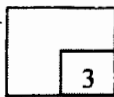
[3 marks]  
[ 3 markah ]

Answer : (a)  $k = \dots\dots\dots$

Jawapan

(b)  $\mu = \dots\dots\dots$

25



**END OF THE QUESTION PAPER**