

**SULIT**

NO. KAD PENGENALAN

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ANGKA GILIRAN

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**LEMBAGA PEPERIKSAAN  
KEMENTERIAN PELAJARAN MALAYSIA**

**SIJIL PELAJARAN MALAYSIA 2012**

**3472/1**

**ADDITIONAL MATHEMATICS**

**Kertas 1**

**Nov./Dis.**

**2 jam**

**Dua jam**

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. *Tulis nombor kad pengenalan dan angka giliran anda pada petak 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>		
Kod Pemeriksa:		
Soalan	Markah Penuh	Markah Diperoleh
1	2	
2	4	
3	3	
4	3	
5	3	
6	3	
7	3	
8	3	
9	3	
10	4	
11	3	
12	4	
13	4	
14	2	
15	2	
16	3	
17	3	
18	4	
19	4	
20	3	
21	3	
22	3	
23	4	
24	4	
25	3	
Jumlah	80	

Kertas soalan ini mengandungi 23 halaman bercetak dan 1 halaman tidak bercetak.

**[Lihat halaman sebelah**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CALCULUS  
KALKULUS

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

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

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

4 Area under a curve  
*Luas di bawah lengkung*

$$= \int_a^b y \, dx \text{ or (atau)}$$

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

5 Volume of revolution  
*Isi padu kisanan*

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

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

[Lihat halaman sebelah  
SULIT

**STATISTICS**  
**STATISTIK**

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

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

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

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

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

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

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

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

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

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

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

$$12 \quad \text{Mean / Min}, \quad \mu = np$$

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

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

**GEOMETRY**  
**GEOMETRI**

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

$$2 \quad \text{Midpoint / Titik tengah} \\ (x, y) = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

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*

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

$$5 \quad |\underline{r}| = \sqrt{x^2 + y^2}$$

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

**TRIGONOMETRY**  
**TRIGONOMETRI**

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

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

- 1 Diagram 1 shows the relation between set  $M$  and set  $N$ .  
*Rajah 1 menunjukkan hubungan antara set  $M$  dan set  $N$ .*

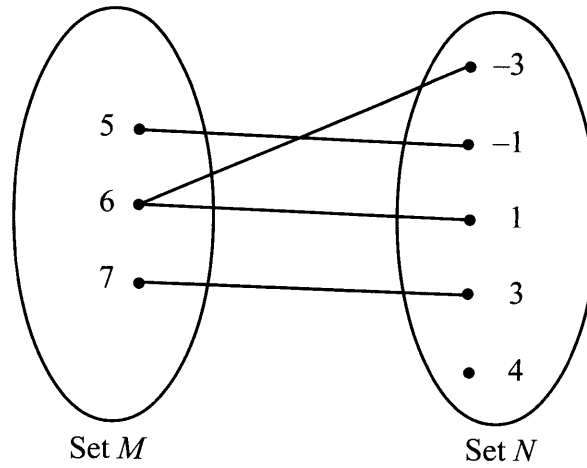


Diagram 1  
*Rajah 1*

State

*Nyatakan*

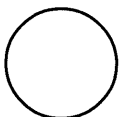
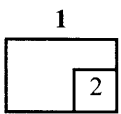
- (a) the object of  $-1$ ,  
*objek bagi  $-1$ ,*
- (b) the range of the relation.  
*julat hubungan itu.*

[2 marks]  
[2 markah]

Answer / *Jawapan:*

(a)

(b)



- 2 Given that  $f(x) = 3x + 4$  and  $fg(x) = 6x + 7$ , find  
Diberi  $f(x) = 3x + 4$  dan  $fg(x) = 6x + 7$ , cari

- (a)  $fg(4)$ ,  
(b)  $g(x)$ .

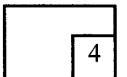
[4 marks]  
[4 markah]

Answer / Jawapan:

(a)

(b)

2



- 3 Given that  $f: x \rightarrow x + 5$ , find  
Diberi  $f: x \rightarrow x + 5$ , cari

- (a)  $f(3)$ ,  
(b) the value of  $k$  such that  $2f^{-1}(k) = f(3)$ .  
nilai  $k$  dengan keadaan  $2f^{-1}(k) = f(3)$ .

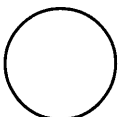
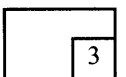
[3 marks]  
[3 markah]

Answer / Jawapan:

(a)

(b)

3



- 4 It is given that 3 and  $m + 4$  are the roots of the quadratic equation  $x^2 + (n - 1)x + 6 = 0$ , where  $m$  and  $n$  are constants.

Find the value of  $m$  and of  $n$ .

*Diberi bahawa 3 dan  $m + 4$  ialah punca-punca bagi persamaan kuadratik  $x^2 + (n - 1)x + 6 = 0$ , dengan keadaan  $m$  dan  $n$  ialah pemalar.*

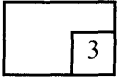
*Cari nilai  $m$  dan nilai  $n$ .*

[3 marks]

[3 markah]

Answer / Jawapan:

4



- 5 A quadratic equation  $x(x - 4) = h - 2k$ , where  $h$  and  $k$  are constants, has two equal roots.

Express  $h$  in terms of  $k$ .

*Persamaan kuadratik  $x(x - 4) = h - 2k$ , dengan keadaan  $h$  dan  $k$  ialah pemalar, mempunyai dua punca sama.*

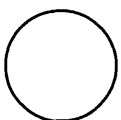
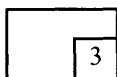
*Ungkapkan  $h$  dalam sebutan  $k$ .*

[3 marks]

[3 markah]

Answer / Jawapan:

5



- 6 Given that  $f(x) = -3x^2 + 2x + 13$ , find the range of values of  $x$  for  $f(x) \leq 5$ . [3 marks]  
*Diberi  $f(x) = -3x^2 + 2x + 13$ , cari julat nilai  $x$  untuk  $f(x) \leq 5$ . [3 markah]*

Answer / Jawapan:

6

3

- 7 Solve the equation:  
*Selesaikan persamaan:*

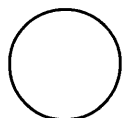
$$27(3^{2x+4}) = 1$$

[3 marks]  
[3 markah]

Answer / Jawapan:

7

3





8 Solve the equation:

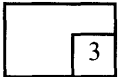
*Selesaikan persamaan:*

$$1 + \log_2(x - 2) = \log_2 x$$

[3 marks]  
[3 markah]

Answer / *Jawapan:*

8



9 The first three positive terms of a geometric progression are 2,  $p$  and 18.

Find the value of  $p$  and the common ratio of the progression.

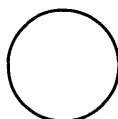
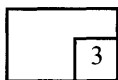
*Tiga sebutan pertama yang positif bagi suatu jangjang geometri ialah 2,  $p$  dan 18.*

*Cari nilai  $p$  dan nisbah sepunya bagi jangjang itu.*

[3 marks]  
[3 markah]

Answer / *Jawapan:*

9



- 10 It is given that 11,  $y + 4$  and  $3y - x$  are three consecutive terms of an arithmetic progression.

*Diberi bahawa 11,  $y + 4$  dan  $3y - x$  ialah tiga sebutan berturutan bagi suatu jangjang aritmetik.*

- (a) Express  $y$  in terms of  $x$ .  
*Ungkapkan  $y$  dalam sebutan  $x$ .*
- (b) Find the common difference if  $x = 8$ .  
*Cari beza sepunya jika  $x = 8$ .*

[4 marks]

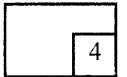
[4 markah]

Answer / Jawapan:

(a)

(b)

10



- 11 In a geometric progression, the first term is  $a$  and the common ratio is  $r$ .

Given that the third term of the progression exceeds the second term by  $12a$ , find the values of  $r$ .

*Dalam suatu jangjang geometri, sebutan pertama adalah  $a$  dan nisbah sepunya ialah  $r$ .*

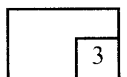
*Diberi sebutan ketiga jangjang itu melebihi sebutan kedua sebanyak  $12a$ , cari nilai-nilai  $r$ .*

[3 marks]

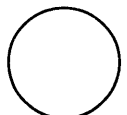
[3 markah]

Answer / Jawapan:

11



[Lihat halaman sebelah  
SULIT



12 The variables  $x$  and  $y$  are related by the equation  $\frac{p}{y} = 1 - \frac{q}{x^2}$ . Diagram 12 shows the straight line graph obtained by plotting  $\frac{1}{y}$  against  $\frac{1}{x^2}$ .

Pembolehubah  $x$  dan  $y$  dihubungkan oleh persamaan  $\frac{p}{y} = 1 - \frac{q}{x^2}$ . Rajah 12 menunjukkan graf garis lurus yang diperoleh dengan memplot  $\frac{1}{y}$  melawan  $\frac{1}{x^2}$ .

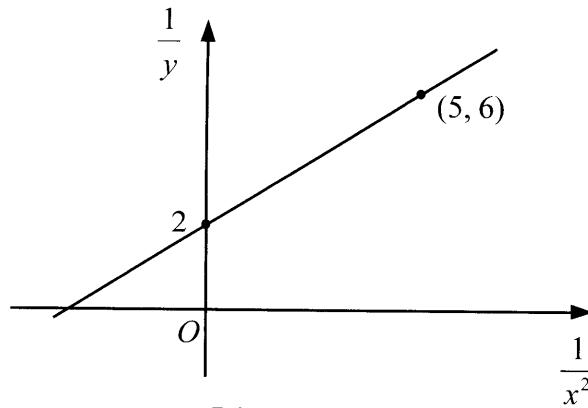


Diagram 12  
Rajah 12

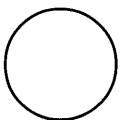
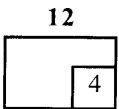
Find the value of  
Cari nilai

- (a)  $p$ ,
- (b)  $q$ .

[4 marks]  
[4 markah]

Answer / Jawapan:

- (a)
  
  
  
  
  
  
  
  
  
  
- (b)



13 Diagram 13 shows a straight line  $AB$ .

*Rajah 13 menunjukkan suatu garis lurus  $AB$ .*

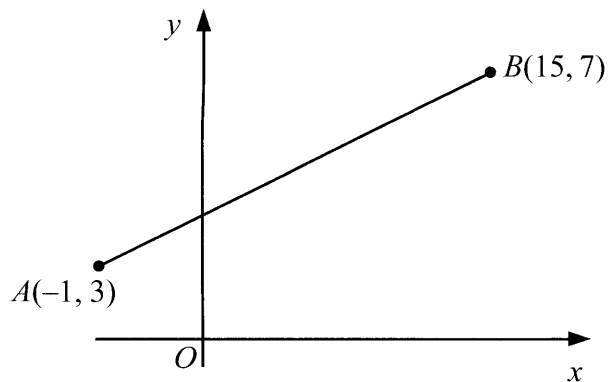


Diagram 13  
*Rajah 13*

Find

*Cari*

- (a) the midpoint of  $AB$ ,  
*titik tengah  $AB$ ,*
- (b) the equation of the perpendicular bisector of  $AB$ .  
*persamaan pembahagi dua sama seranjang  $AB$ .*

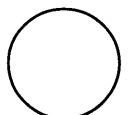
[4 marks]

[4 markah]

Answer / *Jawapan:*

(a)

(b)



14 Diagram 14 shows a straight line  $PQ$  with the equation  $\frac{x}{10} + \frac{y}{2k} = 1$ .

Rajah 14 menunjukkan satu garis lurus  $PQ$  yang mempunyai persamaan  $\frac{x}{10} + \frac{y}{2k} = 1$ .

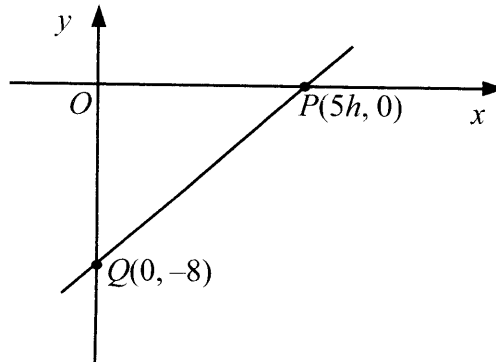


Diagram 14  
Rajah 14

Determine the value of  
*Tentukan nilai*

- (a)  $h$ ,
- (b)  $k$ .

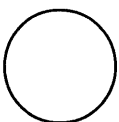
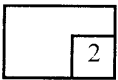
[2 marks]  
[2 markah]

Answer / *Jawapan*:

(a)

(b)

14



- 15 Diagram 15 shows the vectors  $\vec{OA}$ ,  $\vec{OB}$  and  $\vec{OP}$  drawn on a grid of equal squares with sides of 1 unit.

Rajah 15 menunjukkan vektor  $\vec{OA}$ ,  $\vec{OB}$  dan  $\vec{OP}$  dilukis pada grid segi empat sama yang sama besar bersisi 1 unit.

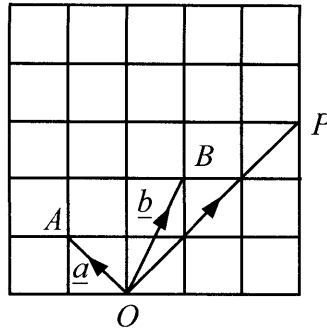


Diagram 15  
Rajah 15

Determine

Tentukan

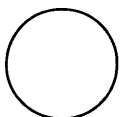
- (a)  $|\vec{OP}|$ ,  
 (b)  $\vec{OP}$  in terms of  $\underline{a}$  and  $\underline{b}$ .  
 $\vec{OP}$  dalam sebutan  $\underline{a}$  dan  $\underline{b}$ .

[2 marks]  
[2 markah]

Answer / Jawapan:

(a)

(b)



16 The following information refers to the vectors  $\underline{a}$  and  $\underline{b}$ .

Maklumat berikut adalah berkaitan dengan vektor  $\underline{a}$  dan  $\underline{b}$ .

$$\underline{a} = \begin{pmatrix} 6 \\ m-4 \end{pmatrix}, \quad \underline{b} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$$

It is given that  $\underline{a} = k\underline{b}$ , where  $\underline{a}$  is parallel to  $\underline{b}$  and  $k$  is a constant.

Diberi bahawa  $\underline{a} = k\underline{b}$ , dengan keadaan  $\underline{a}$  selari dengan  $\underline{b}$  dan  $k$  ialah pemalar.

Find the value of

Cari nilai

(a)  $k$ ,

(b)  $m$ .

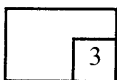
[3 marks]  
[3 markah]

Answer / Jawapan:

(a)

(b)

16



17 Solve the equation  $\tan^2 \theta - 3 \tan \theta + 2 = 0$  for  $0 \leq \theta \leq 360^\circ$ .

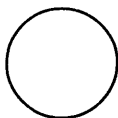
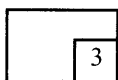
[3 marks]

Selesaikan persamaan  $\tan^2 \theta - 3 \tan \theta + 2 = 0$  untuk  $0 \leq \theta \leq 360^\circ$ .

[3 markah]

Answer / Jawapan:

17



18 Diagram 18 shows sectors  $OAB$  and  $ODC$  with centre  $O$ .

Rajah 18 menunjukkan sektor  $OAB$  dan sektor  $ODC$  dengan pusat  $O$ .

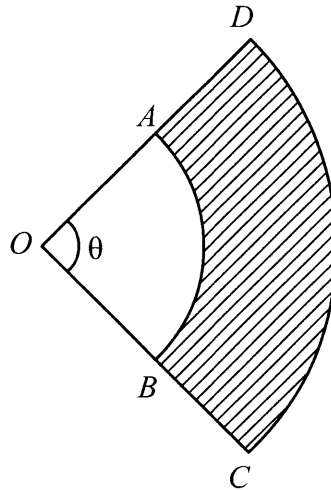


Diagram 18  
Rajah 18

It is given that  $OA = 4$  cm, the ratio of  $OA : OD = 2 : 3$  and the area of the shaded region is  $11.25$  cm<sup>2</sup>.

Find

Diberi bahawa  $OA = 4$  cm, nisbah  $OA : OD = 2 : 3$  dan luas kawasan berlorek ialah  $11.25$  cm<sup>2</sup>.

Cari

- (a) the length, in cm, of  $OD$ ,  
panjang, dalam cm,  $OD$ ,
- (b)  $\theta$ , in radians.  
 $\theta$ , dalam radian.

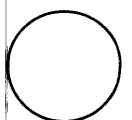
[4 marks]

[4 markah]

Answer / Jawapan:

(a)

(b)





19 Given the function  $h(x) = kx^3 - 4x^2 + 5x$ , find

*Diberi fungsi  $h(x) = kx^3 - 4x^2 + 5x$ , cari*

(a)  $h'(x)$ ,

(b) the value of  $k$  if  $h''(1) = 4$ .

*nilai  $k$  jika  $h''(1) = 4$ .*

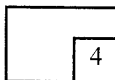
[4 marks]  
[4 markah]

Answer / Jawapan:

(a)

(b)

19



20 The gradient of the tangent to the curve  $y = x^2(2 + px)$  at  $x = -2$  is 7.

Find the value of  $p$ .

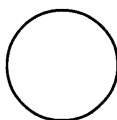
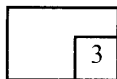
*Kecerunan tangen kepada lengkung  $y = x^2(2 + px)$  di  $x = -2$  ialah 7.*

*Cari nilai  $p$ .*

[3 marks]  
[3 markah]

Answer / Jawapan:

20



21 Given that  $\int_2^7 f(x)dx = 10$ , find

Diberi bahawa  $\int_2^7 f(x)dx = 10$ , cari

(a) the value of  $\int_7^2 f(x)dx$ ,

nilai  $\int_7^2 f(x)dx$ ,

(b) the value of  $k$  if  $\int_2^7 [f(x) - k]dx = 25$ .

nilai  $k$  jika  $\int_2^7 [f(x) - k]dx = 25$ .

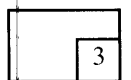
[3 marks]  
[3 markah]

Answer / Jawapan:

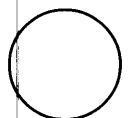
(a)

(b)

21



[Lihat halaman sebelah  
SULIT



- 22 The mass of a group of 6 students has a mean of 40 kg and a standard deviation of 3 kg.

*Jisim satu kumpulan 6 orang pelajar mempunyai min 40 kg dan sisihan piawai 3 kg.*

Find

*Cari*

- (a) the sum of the mass of the students,  
*hasil tambah jisim pelajar-pelajar itu,*
- (b) the sum of the squares of the mass of the students.  
*hasil tambah kuasa dua jisim pelajar-pelajar itu.*

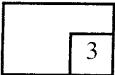
[3 marks]  
[3 markah]

Answer / *Jawapan:*

(a)

(b)

22



- 23 There are 10 different coloured marbles in the box.

*Dalam sebuah kotak terdapat 10 biji guli yang berlainan warna.*

Find

*Cari*

- (a) the number of ways 3 marbles can be chosen from the box,  
*bilangan cara 3 biji guli boleh dipilih dari kotak itu,*
- (b) the number of ways at least 8 marbles can be chosen from the box.  
*bilangan cara sekurang-kurangnya 8 biji guli boleh dipilih dari kotak itu.*

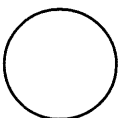
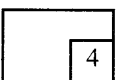
[4 marks]  
[4 markah]

Answer / *Jawapan:*

(a)

(b)

23



- 24 A box contains 20 chocolates. 5 of the chocolates are black chocolates flavour and the other 15 are white chocolates flavour. Two chocolates are taken at random from the box.

Find the probability that

*Sebuah kotak mengandungi 20 biji coklat. 5 daripadanya adalah perisa coklat hitam manakala 15 lagi itu adalah perisa coklat putih. Dua biji coklat diambil secara rawak dari kotak itu.*

*Cari kebarangkalian bahawa*

- (a) both chocolates are black chocolates,  
*kedua-dua biji coklat adalah coklat hitam,*
- (b) the chocolates taken are of different flavour.  
*coklat yang diambil mempunyai perisa yang berlainan.*

[4 marks]  
[4 markah]

Answer / Jawapan:

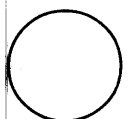
(a)

(b)

24

	4

[Lihat halaman sebelah  
SULIT



- 25 In a test, 60% of the students has passed. A sample of 8 students is chosen at random.

Find the probability that more than 6 students from the sample passed the test.

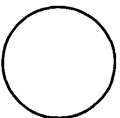
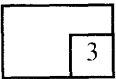
*Dalam suatu ujian, 60% daripada pelajar telah lulus. Satu sampel yang terdiri daripada 8 pelajar dipilih secara rawak.*

*Cari kebarangkalian bahawa lebih daripada 6 pelajar daripada sampel itu lulus ujian tersebut.*

[3 marks]  
[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 5.  
*Satu senarai rumus disediakan di halaman 3 hingga 5.*
9. A booklet of four-figure mathematical tables is provided.  
*Sebuah buku sifir matematik empat angka disediakan.*
10. You may use a scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik.*
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.*