

NO. KAD PENGENALAN ANGKA GILIRAN

Nama:.....

Tingkatan:.....



JABATAN PELAJARAN NEGERI SELANGOR
MAJLIS PENGETUA SEKOLAH MENENGAH



**PROGRAM PENINGKATAN PRESTASI AKADEMIK
PERCUBAAN SIJIL PELAJARAN MALAYSIA 2011**

3472/1

ADDITIONAL MATHEMATICS

Kertas 1

September

2 jam

Dua Jam

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan nombor kad pengenalan, angka giliran, nama dan tingkatan 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 arahan di halaman belakang kertas soalan ini.*

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

Kertas ini mengandungi 18 halaman bercetak.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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 generated / Isi padu janaan

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

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

STATISTICS / STATISTIK

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$4 \quad \text{Area of triangle / Luas segi tiga} \\ = \frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)|$$

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

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

TRIGONOMETRY / TRIGONOMETRI

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

$\cos 2A = \cos^2 A - \sin^2 A$
$= 2 \cos^2 A - 1$
$= 1 - 2 \sin^2 A$</p> | <p>14 Area of triangle / <i>Luas segi tiga</i>
$= \frac{1}{2} ab \sin C$</p> |

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

- 1 The following information refers to set P and set Q .
Maklumat berikut adalah berkaitan dengan set P dan set Q .

Set $P = \{-1, -3, 1, 2, 4\}$ Set $Q = \{1, 4, 9, 16\}$
--

The relation between set P and set Q is defined by the set of ordered pairs
 $\{(-1, 1), (-3, 9), (1, 1), (2, 4), (4, 16)\}$.

*Hubungan antara set P and set Q ditakrifkan oleh set pasangan bertertib
 $\{(-1, 1), (-3, 9), (1, 1), (2, 4), (4, 16)\}$.*

- (a) State the type of relation.
Nyatakan jenis hubungan .
- (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)

- 2 Given the functions $g : x \rightarrow 2x - 7$ and $gh : x \rightarrow 3 - 8x$, find
Diberi fungsi $g : x \rightarrow 2x - 7$ dan $gh : x \rightarrow 3 - 8x$, cari

- (a) $h(x)$,
- (b) the value of x when $hg(x) = 9$. [4 marks]
nilai x apabila $hg(x) = 9$. [4 markah]

Answer / *Jawapan:*

(a)

(b)

- 3 Given the function $f : x \rightarrow |8 - 3x|$, find
Diberi fungsi $f : x \rightarrow |8 - 3x|$, cari

- (a) $f(3)$,
- (b) the values of x such that $f(x) = 2$.
nilai-nilai x dengan keadaan $f(x) = 2$.

[3 marks]

[3 markah]

Answer / *Jawapan:*

(a)

(b)

-
- 4 Solve the quadratic equation $2 - 5(x - 2) = 3x(x + 1)$. Give your answers correct to three decimal places. [3 marks]

Selesaikan persamaan kuadratik $2 - 5(x - 2) = 3x(x + 1)$. Berikan jawapan anda betul kepada tiga tempat perpuluhan. [3 markah]

Answer / *Jawapan:*

- 5 Diagram 5 shows the graph of a quadratic function $f(x) = -2(x+p)^2 - 5$, where p is a constant.

Rajah 5 menunjukkan graf fungsi kuadratik $f(x) = -2(x+p)^2 - 5$, dengan keadaan p ialah pemalar.

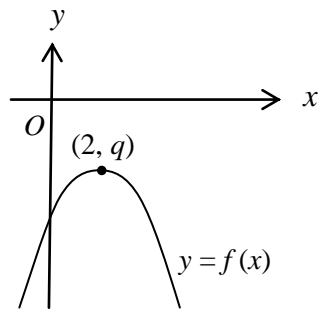


Diagram 5
Rajah 5

The curve $y = f(x)$ has the maximum point $(2, q)$, where q is a constant.

Lengkung $y = f(x)$ mempunyai titik maksimum $(2, q)$, dengan keadaan q ialah pemalar.

State

Nyatakan

- (a) the value of p ,
nilai p ,
- (b) the value of q .
nilai q .

[2 marks]
[2 markah]

Answer / Jawapan:

(a)

(b)

- 6 Find the range of the values of x for which $(3x-1)^2 \leq 6x+13$.

[3 marks]

Cari julat nilai x bagi $(3x-1)^2 \leq 6x+13$.

[3 markah]

Answer / Jawapan:

- 7 Solve the equation: [3 marks]
Selesaikan persamaan: [3 markah]

$$5^{2x-1} = \frac{1}{\sqrt{25^{7-x}}}$$

Answer / Jawapan:

-
- 8 Given that $\log_{16}x - \log_4 y = 1$, express x in terms of y . [3 marks]
Diberi $\log_{16}x - \log_4 y = 1$, ungkapkan x dalam sebutan y . [3 markah]

Answer / Jawapan:

-
- 9 In a geometric progression, the first term is 6 and the sum of the first two terms is 9. Find the sum to infinity of the progression. [3 marks]

Dalam suatu jantang geometri, sebutan pertama ialah 6 dan hasil tambah dua sebutan pertama ialah 9. Cari hasil tambah hingga sebutan ketakterhinggaan bagi jantang itu.

[3 markah]

Answer / Jawapan:

- 10 Diagram 10 shows three rectangular cards.
Rajah 10 menunjukkan tiga keping kad berbentuk segiempat tepat.

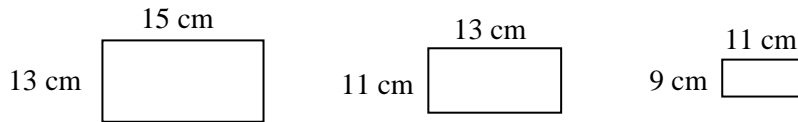


Diagram 10
Rajah 10

The perimeters of the cards form an arithmetic progression. The terms of the progression are in descending order.

Perimeter kad-kad itu membentuk suatu jangjang aritmetik. Sebutan jangjang itu adalah dalam turutan menurun.

- (a) Write the first three terms of the progression.

Tulis tiga sebutan pertama jangjang itu.

- (b) Find the common difference of the progression.

Cari beza sepunya jangjang itu.

[2 marks]

[2 markah]

Answer / *Jawapan:*

(a)

(b)

- 11 The first three terms of a geometric progression are $x - 2$, $x + 4$, $5x + 2$.
Tiga sebutan pertama suatu jangjang geometri ialah $x - 2$, $x + 4$, $5x + 2$.

Find

Cari

- (a) the value of x ,
nilai x ,

- (b) the sum from the fourth term to the eighth term.
hasil tambah dari sebutan keempat hingga sebutan kelapan.

[4 marks]

[4 markah]

Answer / *Jawapan:*

(a)

(b)

- 12 Diagram 12 shows sector BOC with centre O and sector CXY with centre C .
Rajah 12 menunjukkan sektor BOC berpusat O dan sektor CXY berpusat C .

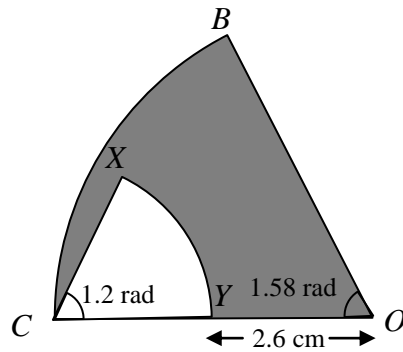


Diagram 12

Rajah 12

It is given that $\angle BOC = 1.58$ radians and the length of arc BC is 7.9 cm.
Diberi bahawa $\angle BOC = 1.58$ radian dan panjang lengkok BC ialah 7.9 cm.

Find

Cari

- (a) the length, in cm, of OC ,
panjang, dalam cm, bagi OC ,
- (b) the area, in cm^2 , of the shaded region. [4 marks]
luas, dalam cm^2 , kawasan berlorek. [4 markah]

Answer / *Jawapan:*

(a)

(b)

- 13 Given that $\underline{a} = 3\underline{i} - 11\underline{j}$ and $\underline{b} = p\underline{i} - 7\underline{j}$, find

Diberi $\underline{a} = 3\underline{i} - 11\underline{j}$ dan $\underline{b} = p\underline{i} - 7\underline{j}$, cari

- (a) $\underline{a} - 2\underline{b}$ in the form $x\underline{i} + y\underline{j}$,
 $\underline{a} - 2\underline{b}$ dalam bentuk $x\underline{i} + y\underline{j}$,
- (b) the values of p if $|\underline{a} - 2\underline{b}| = 5$.
 nilai-nilai p jika $|\underline{a} - 2\underline{b}| = 5$.

[4 marks]

[4 markah]

Answer / Jawapan:

(a)

(b)

- 14 Diagram 14 shows a triangle PQR .
 Rajah 14 menunjukkan segi tiga PQR .

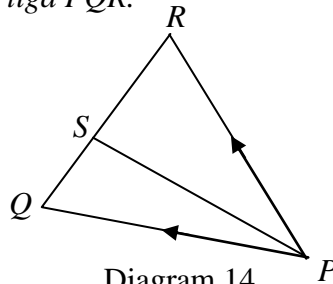


Diagram 14
 Rajah 14

Given $\overrightarrow{PQ} = 4\underline{a}$, $\overrightarrow{PR} = 6\underline{b}$ and point S lies on QR such that $QS : QR = 1 : 4$, express in terms of \underline{a} and \underline{b} .

Diberi $\overrightarrow{PQ} = 4\underline{a}$, $\overrightarrow{PR} = 6\underline{b}$ dan titik S terletak pada QR dengan keadaan $QS : QR = 1 : 4$, ungkapkan dalam sebutan \underline{a} dan \underline{b} .

- (a) \overrightarrow{RQ} , [4 marks]
- (b) \overrightarrow{SP} . [4 markah]

Answer / Jawapan:

(a)

(b)

- 15 Diagram 15 shows a straight line ABC .
Rajah 15 menunjukkan garis lurus ABC .

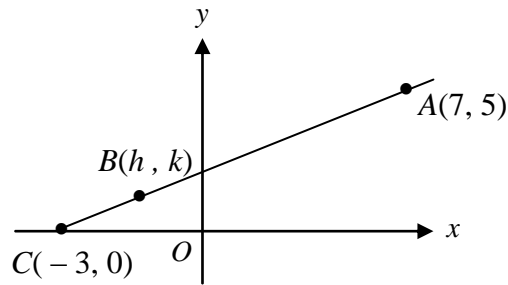


Diagram 15
Rajah 15

The point B lies on AC such that $AB : BC = 4 : 1$.
 Find the coordinates of B .

[2 marks]

*Titik B terletak di atas AC dengan keadaan $AB : BC = 4 : 1$.
 Cari koordinat B .*

[2 markah]

Answer / *Jawapan*:

- 16 It is given that $\sin \theta = k$, where θ is an acute angle.
Diberi bahawa $\sin \theta = k$, dengan keadaan θ ialah sudut tirus.

Find

Cari

(a) $\cos^2 \theta$.

(b) $\cos 2\theta$.

[3 marks]
 [3 markah]

Answer / *Jawapan*:

(a)

(b)

- 17 The variables x and y are related by the equation $y = kx^3$, where k is a constant. Diagram 16 shows the straight line graph obtained by plotting $\log_{10} y$ against $\log_{10} x$.

Pemboleh ubah x dan y dihubungkan oleh persamaan $y = kx^3$, dengan keadaan k adalah pemalar. Rajah 16 menunjukkan graf garis lurus yang diperolehi dengan memplotkan $\log_{10} y$ melawan $\log_{10} x$.

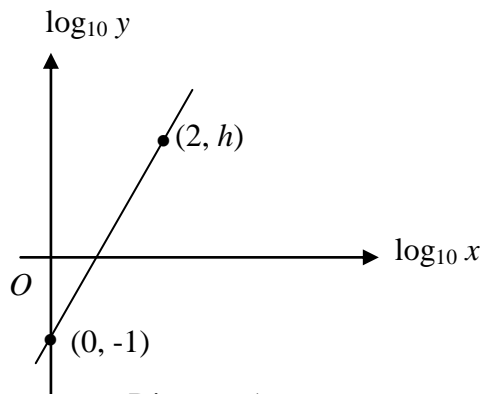


Diagram 16
Rajah 16

Find the value of

Cari nilai

(a) $\log_{10} k$,

(b) h .

[3 marks]
[3 markah]

Answer / Jawapan:

(a)

(b)

- 18 Given that $\int_1^3 \frac{1}{2} f(x) dx = 4$ and $\int_1^3 [k - f(x)] dx = 5$, find the value of k .

[3 marks]

Diberi bahawa $\int_1^3 \frac{1}{2} f(x) dx = 4$ dan $\int_1^3 [k - f(x)] dx = 5$, cari nilai k .

[3 markah]

Answer / Jawapan:

- 19 The gradient function of a curve is $3 - 2x$. The curve passes through the points $(1, 5)$ and $(2, k)$.

Fungsi kecerunan suatu lengkung ialah $3 - 2x$. Lengkung ini melalui titik-titik $(1, 5)$ dan $(2, k)$.

Find

Cari

- (a) the equation of the curve,
persamaan lengkung itu,

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

[4 marks]

[4 markah]

Answer / Jawapan:

(a)

(b)

- 20 In a nuclear reactor, the area of a square metal sheet with sides x decreases at a rate of $5 \text{ cm}^2 \text{ s}^{-1}$ when it is cooled. Find the rate of change of x , in cm s^{-1} , at the instant when $x = 10 \text{ cm}$. [3 marks]

Dalam satu reaktor nuklear, luas sekeping logam dengan sisi x berkurang pada kadar $5 \text{ cm}^2 \text{ s}^{-1}$ bila ianya menyejuk. Cari kadar perubahan x , dalam cm s^{-1} pada ketika $x = 10 \text{ cm}$. [3 markah]

Answer / Jawapan:

- 21 Diagram 21 shows part of a curve $y = f(x)$ which passes through the point $(2, 5)$.
Rajah 21 menunjukkan sebahagian lengkung $y = f(x)$ yang melalui titik $(2, 5)$.

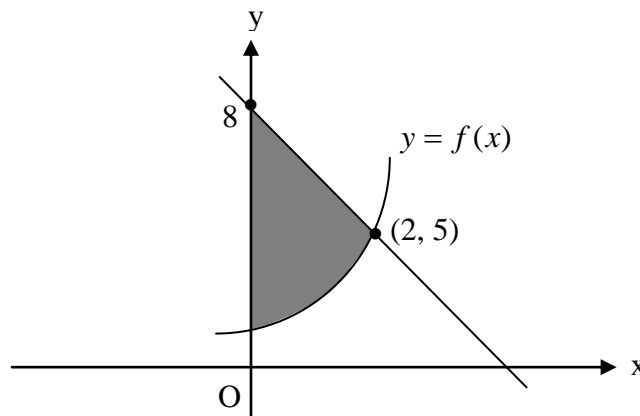


Diagram 21
Rajah 21

Given that $\int_0^2 f(x) dx = 4$, find the area of the shaded region. [2 marks]

Diberi $\int_0^2 f(x) dx = 4$, cari luas kawasan yang berlorek. [2 markah]

Answer / Jawapan:

- 22** 4 students are chosen to represent the school in the International Mathematical Olympiad. These students are chosen from 6 boys and 5 girls. Calculate the number of different ways the students can be chosen if

4 orang pelajar dipilih untuk mewakili sekolah ke Olympiad Matematik Kebangsaan. Pelajar ini dipilih daripada 6 orang lelaki dan 5 orang perempuan. Hitung bilangan cara yang berlainan pelajar ini boleh dipilih jika

- (a) there is no restriction.
tiada syarat dikenakan.
- (b) only one girl is chosen. [4 marks]
hanya seorang pelajar perempuan dipilih. [4 markah]

Answer / Jawapan:

(a)

(b)

- 23** In a class, the probability that a student can swim is 0.6. Three students are chosen at random. Find the probability that

Dalam satu kelas, kebarangkalian seorang pelajar boleh berenang ialah 0.6. Tiga orang pelajar dipilih secara rawak. Cari kebarangkalian bahawa

- (a) all of them can swim,
semua boleh berenang,
- (b) only one of them cannot swim. [4 marks]
hanya seorang daripada mereka tidak boleh berenang. [4 markah]

Answer / Jawapan:

(a)

(b)

- 24 A set of scores x_1, x_2, x_3, x_4 and x_5 has a mean of 6 and a standard deviation of 3. Each score is divided by 2 and then 5 is added to it. For the new set of scores, find

Suatu set skor x_1, x_2, x_3, x_4 dan x_5 mempunyai min 6 dan sisihan piawai 3. Setiap skor dibahagi dengan 2 dan kemudian ditambah dengan 5, cari

(a) the mean,
min,

(b) the variance.
varians.

[4 marks]
[4 markah]

Answer / Jawapan:

(a)

(b)

- 25 In a study, the life span of male elephants have a normal distribution with a mean μ and a standard deviation of 8 years.

Find

Dalam satu kajian, jangka hayat gajah jantan mempunyai taburan normal dengan min μ dan sisihan piawai 8 tahun.

Cari

(a) the z -score when the life span is 82 years and $\mu = 70$ years.
skor- z bila jangka hayat adalah 82 tahun dan $\mu = 70$ tahun.

(b) the value of μ , such that 64.8% of male the elephants have a life span of less than 75 years.

nilai μ , dengan keadaan 64.8% dari gajah jantan mempunyai jangka hayat kurang dari 75 tahun.

[4 marks]
[4 markah]

Answer / Jawapan:

(a)

(b)

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES

1. This question paper consists of 25 questions.
2. Answer **all** questions.
3. Write your answers in the spaces provided in this question paper.
4. Show your working. It may help you to get marks.
5. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
6. The diagrams in the questions provided are not drawn to scale unless stated.
7. The marks allocated for each question are shown in brackets.
8. A list of formulae is provided on pages 2 to 4.
9. Four-figure mathematical tables are allowed.
10. You may use a non-programmable scientific calculator.
11. Hand in this question paper to the invigilator at the end of the examination.

MAKLUMAT UNTUK CALON

1. *Kertas soalan ini mengandungi 25 soalan.*
2. *Jawab **semua** soalan.*
3. *Jawapan anda hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.*
4. *Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.*
5. *Jika anda hendak menukar jawapan, batalkan dengan kemas jawapan yang telah dibuat. Kemudian tulis jawapan yang baharu.*
6. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
7. *Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan.*
8. *Satu senarai rumus disediakan di halaman 2 hingga 4.*
9. *Buku sifir matematik empat angka dibenarkan.*
10. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*
11. *Serahkan kertas soalan ini kepada pengawas peperiksaan pada akhir peperiksaan.*



JABATAN PELAJARAN NEGERI SELANGOR
MAJLIS PENGETUA SEKOLAH MENENGAH



**PROGRAM PENINGKATAN PRESTASI AKADEMIK
PERCUBAAN SIJIL PELAJARAN MALAYSIA 2011**

3472/2

ADDITIONAL MATHEMATICS

**Kertas 2
September**

$2\frac{1}{2}$ jam

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*
3. *Calon dikehendaki membaca arahan di halaman belakang kertas soalan ini.*

Kertas soalan ini mengandungi 20 halaman bercetak.

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HALAMAN KOSONG

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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 generated / *Isipadu janaan*

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

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

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, $\mu = np$

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

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

GEOMETRY / GEOMETRI

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

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

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

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

TRIGONOMETRY / TRIGONOMETRI

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

2 Area of sector, $A = \frac{1}{2} r^2 \theta$
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 segitiga*
 $= \frac{1}{2} ab \sin C$

**KEBARANGKALIAN Hujung ATAS $O(z)$
BAGI TABURAN NORMAL $N(0,1)$**

z	0	1	2	3	4	5	6	7	8	9	1 2 3	4 5 6	7 8 9	
											TOLAK			
0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641	4 8 12	16 20 24	28 32 36	
0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247	4 8 12	16 20 24	28 32 36	
0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859	4 8 12	15 19 23	27 31 35	
0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483	4 7 11	15 19 22	26 30 34	
0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121	4 7 11	14 18 22	25 29 32	
0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776	3 7 10	14 17 20	24 27 31	
0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451	3 7 10	13 16 19	23 26 29	
0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148	3 6 9	12 15 18	21 24 27	
0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867	3 5 8	11 14 16	19 22 25	
0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611	3 5 8	10 13 15	18 20 23	
1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379	2 5 7	9 12 14	16 19 21	
1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170	2 4 6	8 10 12	14 16 18	
1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985	2 4 6	7 9 11	13 15 17	
1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823	2 3 5	6 8 10	11 13 14	
1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681	1 3 4	6 7 8	10 11 13	
1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559	1 2 4	5 6 7	8 10 11	
1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455	1 2 3	4 5 6	7 8 9	
1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367	1 2 3	4 4 5	6 7 8	
1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294	1 1 2	3 4 4	5 6 6	
1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233	1 1 2	2 3 4	4 5 5	
2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183	0 1 1	2 2 3	3 4 4	
2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143	0 1 1	2 2 2	3 3 4	
2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110	0 1 1	1 2 2	2 3 3	
2.3	.0107	.0104	.0102		.02990	.02964	.02939	.02914			0 1 1	1 1 2	2 2 2	
									.02889	.02866	.02842	3 5 8	10 13 15	18 20 23
2.4	.02820	.02798	.02776	.02755	.02734						2 5 7	9 12 14	16 18 21	
						.02714	.02695	.02676	.02657	.02639	2 4 6	8 11 13	15 17 19	
											2 4 6	7 9 11	13 15 17	
2.5	.02621	.02604	.02587	.02570	.02554	.02539	.02523	.02508	.02494	.02480	2 3 5	6 8 9	11 12 14	
2.6	.02466	.02453	.02440	.02427	.02415	.02402	.02391	.02379	.02368	.02357	1 2 3	5 6 7	8 9 10	
2.7	.02347	.02336	.02326	.02317	.02307	.02298	.02289	.02280	.02272	.02264	1 2 3	4 5 6	7 8 9	
2.8	.02256	.02248	.02240	.02233	.02226	.02219	.02212	.02205	.02199	.02193	1 1 2	3 4 4	5 6 6	
2.9	.02187	.02181	.02175	.02169	.02164	.02159	.02154	.02149	.02144	.02139	0 1 1	2 2 3	3 4 4	
3.0	.02135	.02131	.02126	.02122	.02118	.02114	.02111	.02107	.02104	.02100	0 1 1	2 2 2	3 3 4	
3.1	.03968	.03935	.03904								3 6 9	13 16 19	22 25 28	
				.03874	.03845	.03816	.03789				3 6 8	11 14 17	20 22 25	
								.03762	.03736	.03711	2 5 7	10 12 15	17 20 22	
3.2	.03687	.03664	.03641	.03619	.03598						2 4 7	9 11 13	15 18 20	
						.03577	.03557	.03538	.03519	.03501	2 4 6	8 9 11	13 15 17	
3.3	.03483	.03466	.03450	.03434	.03419						2 3 5	6 8 10	11 13 14	
						.03404	.03390	.03376	.03362	.03349	1 3 4	5 7 8	9 10 12	
3.4	.03337	.03325	.03313	.03302	.03291	.03280	.03270	.03260	.03251	.03242	1 2 3	4 5 6	7 8 9	
3.5	.03233	.03224	.03216	.03208	.03200	.03193	.03185	.03178	.03172	.03165	1 1 2	3 4 4	5 6 7	
3.6	.03159	.03153	.03147	.03142	.03136	.03131	.03126	.03121	.03117	.03112	0 1 1	2 2 3	3 4 5	
3.7	.04108	.04104	.04100	.04096	.04092	.04088	.04085	.04082	.04078	.04075				
3.8	.04072	.04069	.04067	.04064	.04062	.04059	.04057	.04054	.04052	.04050				
3.9	.04048	.04046	.04044	.04042	.04041	.04039	.04037	.04036	.04034	.04033				

Section A
Bahagian A

[40 marks]

[40 markah]

Answer **all** questions.

Jawab semua soalan.

- 1 Solve the simultaneous equations $3x - y = 2$ and $x^2 + 2y^2 - xy = 4$.

Give the answers correct to three decimal places.

[5 marks]

Selesaikan persamaan serentak $3x - y = 2$ dan $x^2 + 2y^2 - xy = 4$.

Beri jawapan betul kepada tiga tempat perpuluhan.

[5 markah]

- 2 Diagram 2 shows the graph of a quadratic function $y = f(x)$.

Rajah 2 menunjukkan suatu graf fungsi kuadratik $y = f(x)$.

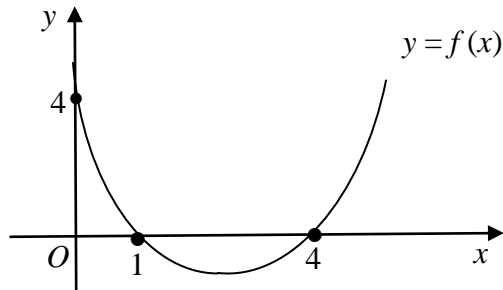


Diagram 2

Rajah 2

- (a) Express equation of $f(x)$ in general form.

[2 marks]

Ungkapkan persamaan $f(x)$ dalam bentuk am.

[2 markah]

- (b) Find

Cari

- (i) the minimum point of the function by using the method of completing the square,
titik minimum fungsi tersebut dengan menggunakan kaedah penyempurnaan kuasa dua,

- (ii) the range of values of p such that $f(x) = p$ does not have real roots.

julat nilai p dengan keadaan $f(x) = p$ tidak mempunyai punca nyata.

[4 marks]

[4 markah]

- 3 The curve $y = px^3 + qx^2 + r$, where p , q and r are constants, has a gradient function $6x(x - 1)$ and passes through the point $(2, 9)$.

Lengkung $y = px^3 + qx^2 + r$, dengan keadaan p , q dan r ialah pemalar, mempunyai suatu fungsi kecerunan $6x(x - 1)$ dan melalui titik $(2, 9)$.

Find
Cari

- (a) the value of p , of q and of r , [5 marks]
nilai p , nilai q dan nilai r , [5 markah]
- (b) the turning points of the curve. [3 marks]
titik-titik pusingan lengkung itu. [3 markah]
- 4 (a) Sketch the graph of $y = -\sin \frac{3}{2}x$ for $0 \leq x \leq 2\pi$. [4 marks]

Lakar graf bagi $y = -\sin \frac{3}{2}x$ untuk $0 \leq x \leq 2\pi$. [4 markah]

- (b) Hence, using the same axes, sketch a suitable straight line to find the number of solutions for the equation $4\pi \sin \frac{3}{2}x + 3x = 0$ for $0 \leq x \leq 2\pi$.

State the number of solutions. [3 marks]

Seterusnya, dengan menggunakan paksi yang sama, lakar satu garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan

$$4\pi \sin \frac{3}{2}x + 3x = 0 \text{ untuk } 0 \leq x \leq 2\pi.$$

Nyatakan bilangan penyelesaian itu. [3 markah]

5. Diagram 5 shows a triangle OAB . The straight line OM intersects the straight line BL at N .
Rajah 5 menunjukkan sebuah segi tiga OAB . Garis lurus OM bersilang dengan garis lurus BL di N .

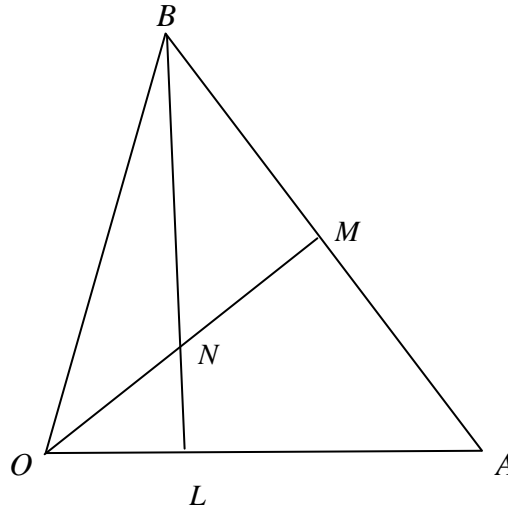


Diagram 5
Rajah 5

It is given that $OA = 3OL$, $AB = 2AM$, $\overrightarrow{OA} = 12\underline{x}$ and $\overrightarrow{OB} = 8\underline{y}$.

Diberi bahawa $OA = 3OL$, $AB = 2AM$, $\overrightarrow{OA} = 12\underline{x}$ dan $\overrightarrow{OB} = 8\underline{y}$.

- (a) Express in terms of \underline{x} and/or \underline{y} :

Ungkapkan dalam sebutan \underline{x} dan/atau \underline{y} :

(i) \overrightarrow{BL} ,

[3 marks]

(ii) \overrightarrow{OM} .

[3 markah]

- (b) It is given that $\overrightarrow{ON} = h\overrightarrow{OM}$ and $\overrightarrow{ON} = \overrightarrow{OL} + k\overrightarrow{LB}$, where h and k are constants.

Find the value of h and of k .

[5 marks]

Diberi $\overrightarrow{ON} = h\overrightarrow{OM}$ dan $\overrightarrow{ON} = \overrightarrow{OL} + k\overrightarrow{LB}$, dengan keadaan h dan k ialah pemalar.

Cari nilai h dan nilai k .

[5 markah]

- 6 Diagram 6 shows the arrangement of the first three of an infinite series of circles. The first circle has a circumference of 50 cm. The circumference of each subsequent circle is half of the circumference of its previous one.

[Circumference of circle = $2\pi r$, Area of circle = πr^2]

Rajah 6 menunjukkan susunan tiga bulatan pertama bagi satu siri bulatan yang tak terhingga. Bulatan pertama mempunyai lilitan bulatan berukuran 50 cm. Lilitan bulatan yang berikutnya adalah setengah lilitan bulatan sebelumnya.

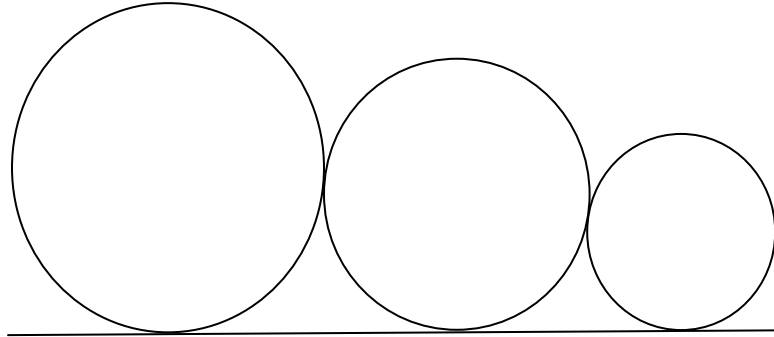


Diagram 6
Rajah 6

- (a) Show that the areas of the circles form a geometric progression and state the common ratio.

Tunjukkan bahawa luas bulatan- bulatan itu membentuk satu jantang geometri dan nyatakan nisbah sepunya jantang itu.

[4 marks]

[4 markah]

- (b) Find the sum to infinity of the areas, in cm^2 , of the circles, in terms of π . [2 marks]

Cari hasil tambah hingga sebutan ketakterhinggaan bagi luas, dalam cm^2 , semua bulatan, dalam sebutan π .

[2 markah]

Section B
Bahagian B

[40 marks]

[40 markah]

Answer any **four** questions from this section.

Jawab mana-mana empat soalan daripada bahagian ini.

- 7 Diagram 7 shows the straight line PQ and the straight line $y = 2$ intersecting the curve $y^2 = x - 2$ at point Q .

Rajah 7 menunjukkan garis lurus PQ dan garis lurus $y = 2$ yang menyilang lengkung $y^2 = x - 2$ pada titik Q .

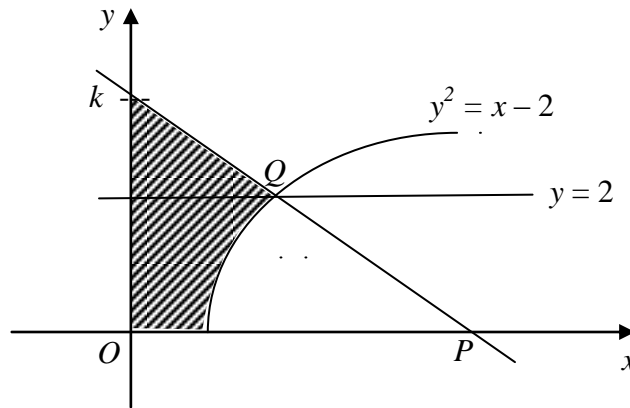


Diagram 7

Rajah 7

It is given that the area of the shaded region is $12\frac{2}{3}$ unit².

Diberi bahawa luas rantau berlorek ialah $12\frac{2}{3}$ unit².

- (a) Find the value of k . [6 marks]

Cari nilai k . [6 markah]

- (b) The region enclosed by the curve, the straight line $y = 2$, the x -axis and the y -axis, is revolved through 360° about the y -axis.

Find the volume of revolution, in terms of π . [4 marks]

Rantau yang dibatasi oleh lengkung itu, garis lurus $y = 2$, paksi- x dan paksi- y , dikisarkan melalui 360° pada paksi- y .

Cari isipadu kisanan, dalam sebutan π . [4 markah]

- 8** Table 8 shows the values of two variables, x and y obtained from an experiment. The variables x and y are related by the equation $y = hk^x$, where h and k are constants.

Jadual 8 menunjukkan nilai-nilai bagi dua pemboleh ubah, x dan y , yang diperolehi daripada satu eksperimen. Pemboleh ubah x dan y dihubungkan oleh persamaan $y = hk^x$ dengan keadaan h dan k ialah pemalar.

x	1	2	4	6	8	10
y	6.92	9.8	19.4	37.4	74.0	144.4

Table 8
Jadual 8

- (a) Plot $\log_{10} y$ against x , using a scale of 1 cm to 1 unit on the x -axis and 10 cm to 1 unit on the $\log_{10} y$ -axis.

Hence, draw the line of best fit. [5 marks]

Plot $\log_{10} y$ melawan x dengan menggunakan skala 1 cm kepada 1 unit pada paksi- x dan 10 cm kepada 1 unit pada paksi- $\log_{10} y$.

Seterusnya, lukis garis lurus penyuaian terbaik. [5 markah]

- (b) Use the graph in **8(a)** to find the value of
*Gunakan graf di **8(a)** untuk mencari nilai*

(i) h ,

(ii) k ,

(iii) x when $y = 50$.

x apabila $y = 50$.

[5 marks]

[5 markah]

- 9 Diagram 9 shows a trapezium $ABCD$. The line AB is perpendicular to the line AD . It is given that the equation of AB is $3y - x - 6 = 0$.

Rajah 9 menunjukkan sebuah trapezium $ABCD$. Garis AB berserenjang dengan garis AD . Diberi bahawa persamaan AB ialah $3y - x - 6 = 0$.

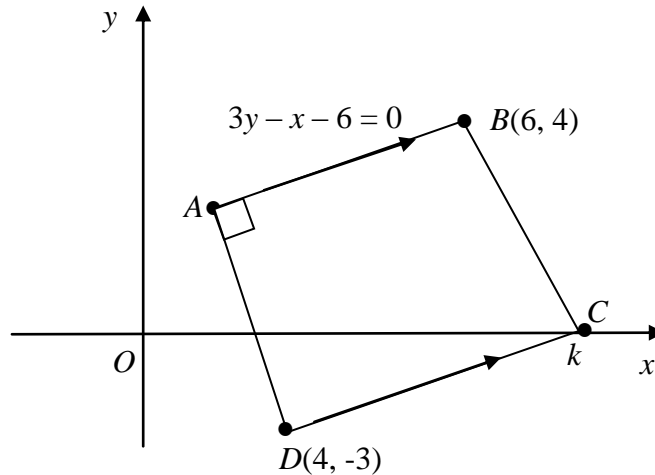


Diagram 9
Rajah 9

- (a) Find
Cari
- the value of k ,
nilai k , [2 marks]
[2 markah]
 - the equation of the straight line CD .
persamaan garis lurus CD . [2 marks]
[2 markah]
- (b) The straight line CD is extended to a point E such that $CD : DE = 3 : 2$.
Garis lurus CD dipanjangkan ke titik E dengan keadaan $CD : DE = 3 : 2$.
- Find
Cari
- the coordinates of E ,
koordinat E , [2 marks]
[2 markah]
 - the area, in cm^2 , of triangle ODE .
luas, dalam cm^2 , luas segi tiga ODE . [2 marks]
[2 markah]
- (c) A point $P(x, y)$ moves such that $PB = PD$.
Find the equation of the locus of P . [2 marks]
- Suatu titik $P(x, y)$ bergerak dengan keadaan $PB = PD$.
Cari persamaan lokus P . [2 markah]

- 10 Diagram 10 shows a circle ABC with centre O . BM and AMC are straight lines.

Rajah 10 menunjukkan sebuah bulatan ABC berpusat O . BM dan AMC adalah garis lurus.

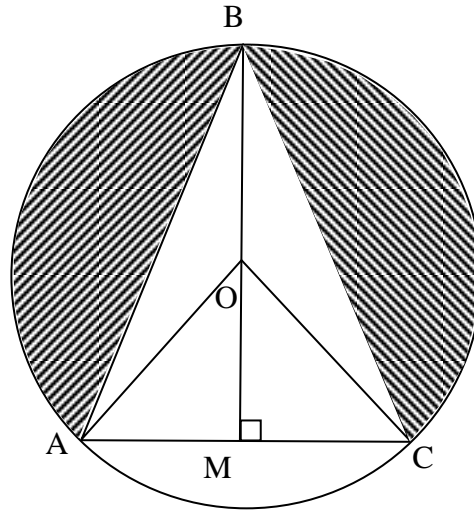


Diagram 10
Rajah 10

It is given $\angle ABC = \frac{1}{4}\pi$ radians, $BM = 10.24$ cm and area of sector OAC is 9π cm².

Diberi bahawa $\angle ABC = \frac{1}{4}\pi$ radian, $BM = 10.24$ dan luas sektor OAC ialah 9π cm².

Calculate

Hitung

[Use / Guna $\pi = 3.142$]

- (a) the radius, in cm, of the circle, [3 marks]
jejari, dalam cm, bulatan itu, [3 markah]
- (b) the perimeter, in cm, of sector OAC , [3 marks]
perimeter, dalam cm, sektor OAC , [3 markah]
- (c) the area, in cm², of the shaded region. [4 marks]
luas, dalam cm², kawasan berlorek. [4 markah]

- 11 (a) In a survey carried out in a school, 2 out of 5 teachers own laptops.

Dalam satu tinjauan yang dijalankan di sebuah sekolah, didapati 2 daripada 5 orang guru memiliki komputer riba.

- (i) If 6 teachers are chosen at random from the school, calculate the probability that at most 2 teachers do not own a laptop.

6 orang guru dipilih secara rawak daripada sekolah itu. Hitung kebarangkalian bahawa selebih-lebihnya dua orang guru tidak memiliki komputer riba.

- (ii) There are 120 teachers in the school. Calculate the mean and standard deviation of the number of teachers that own laptops.

Terdapat 120 orang guru di sekolah itu. Hitung min dan sisihan piawai bilangan guru yang memiliki komputer riba.

[5 marks]

[5 markah]

- (b) The time taken by a worker to travel from his house to the workplace has a normal distribution with a mean 30 minutes and a variance of 81 minutes.

Masa perjalanan yang diambil oleh seorang pekerja dari rumah ke tempat kerja adalah mengikut taburan normal dengan min 30 minit dan varians 81 minit.

- (i) Find the probability that a worker chosen at random travels more than 50 minutes.

Cari kebarangkalian bahawa seorang pekerja kilang yang dipilih secara rawak mengambil masa perjalanan lebih daripada 50 minit.

- (ii) If 70% of the time taken is less than t minutes, find the value of t .

Jika 70% daripada masa perjalanan adalah kurang daripada t minit, cari nilai t .

[5 marks]

[5 markah]

Section C
Bahagian C

[20 marks]

[20 markah]

Answer any **two** questions from this section.

Jawab mana-mana **dua** soalan daripada bahagian ini.

- 12** Diagram 12 shows a trapezium $ABCD$. AB is parallel to DC .
Rajah 12 menunjukkan sebuah trapezium $ABCD$. AB adalah selari dengan DC .

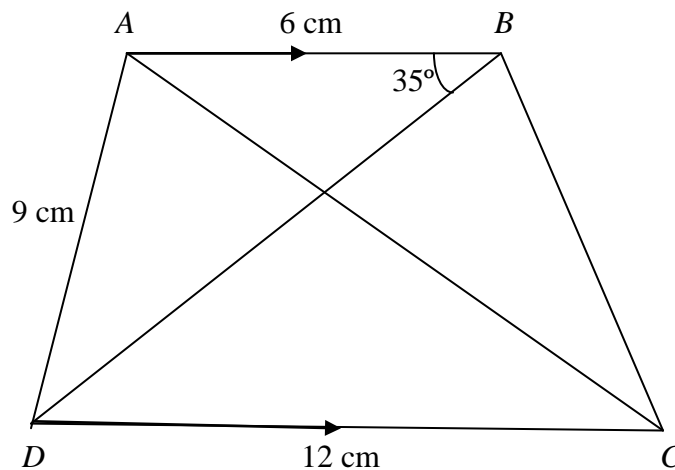


Diagram 12
Rajah 12

Find

Cari

- (a) $\angle ADB$,

[2 marks]

[2 markah]

- (b) the length, in cm, of AC ,
panjang, dalam cm, bagi AC ,

[3 marks]

[3 markah]

- (c) the length, in cm, of BD ,
panjang, dalam cm, bagi BD ,

[3 marks]

[3 markah]

- (d) the area, in cm^2 , of triangle BCD .
luas, dalam cm^2 , bagi segi tiga BCD .

[2 marks]

[2 markah]

- 13 Table 13 shows the price indices and percentages of four items, P , Q , R and S , used in the production of a type of 'popia'.

Jadual 13 menunjukkan indeks harga dan peratus bagi empat barangan, P , Q , R dan S , yang digunakan dalam penghasilan sejenis kuih 'popia'.

Item	Price (RM) in the year <i>Harga (RM) pada tahun</i>	Price (RM) in the year <i>Harga (RM) pada tahun</i>	Price index for the year 2010 based on the year 2008	Percentage (%)
	2008	2010		
P	168	x	125	25
Q	150	125	120	m
R	105	100	105	n
S	90	99	y	40

Table 13
Jadual 13

- (a) Find the value of x and of y . [3 marks]
Cari nilai x dan nilai y . [3 markah]
- (b) The composite index of the 'popia' in the year 2010 based on the year 2008 is 115.
Indeks gubahan bagi 'popia' tersebut pada tahun 2010 berdasarkan tahun 2008 ialah 115.
Find the value of m and of n . [5 marks]
Cari nilai m dan nilai n . [5 markah]
- (c) The composite index for the production cost of the 'popia' is expected to increase by 20% from the year 2010 to the year 2012.
Indeks gubahan bagi kos penghasilan 'popia' tersebut dijangka meningkat 20% dari tahun 2010 ke tahun 2012.

Calculate the composite index for the production cost of the 'popia' in the year 2012 based on the year 2008.

Hitung indeks gubahan bagi kos penghasilan 'popia' tersebut pada tahun 2012 berdasarkan tahun 2008.

[2 marks]
[2 markah]

- 14** A bakery plans to bake x number of chocolate cakes and y number of layer cakes in a day. The production of the cakes is based on the following constraints:

Sebuah kedai roti membuat perancangan untuk membuat x biji kek coklat dan y biji kek lapis dalam satu hari.

Penghasilan kek tersebut adalah berdasarkan kekangan berikut:

- I : The number of chocolate cakes is at least 200 but does not exceed 500.
Bilangan kek coklat adalah sekurang-kurangnya 200 biji tetapi tidak melebihi 500 biji.
- II : The total number of both cakes does not exceed 700.
Jumlah kedua-dua jenis kek tidak melebihi 700 biji.
- III : The number of chocolate cakes exceeds twice the number of layer cakes for at most 200.
Bilangan kek coklat melebihi 2 kali ganda bilangan kek lapis selebih-lebihnya 200 biji.
- (a) Write three inequalities, other than $x \geq 0$ and $y \geq 0$, which satisfy all the above constraints. [3 marks]
Tulisk tiga ketaksamaan, selain $x \geq 0$ dan $y \geq 0$ yang memenuhi semua kekangan di atas. [3 markah]
- (b) Using a scale of 2 cm to 100 cakes for both axes, construct and shade the region R which satisfies all the above constraints. [3 marks]
Dengan menggunakan skala 2 cm kepada 100 biji kek pada kedua-dua paksi, bina dan lorek rantau R yang memenuhi semua kekangan di atas. [3 markah]
- (c) Using the graph constructed in **14(b)**, find
*Dengan menggunakan graf yang dibina di **14(b)**, cari*
- (i) the maximum number of layer cakes that can be baked if the bakery wants to bake 250 chocolate cakes,
bilangan maksimum kek lapis yang boleh dibuat jika kedai roti itu ingin membuat 250 kek coklat,
- (ii) the maximum profit per day if the profit for each chocolate cake is RM 0.80 and the profit for each layer cake is RM0.60.
keuntungan maksimum sehari jika keuntungan sebiji kek coklat ialah RM 0.80 dan keuntungan sebiji kek lapis ialah RM 0.60.

[4 marks]

[4 markah]

- 15** A particle moves in a straight line and passes through a fixed point O . The velocity of the particle, $v \text{ cm s}^{-1}$, is given by $v = 2t^2 - t - 6$, where t is the time, in seconds, after leaving O .

Suatu zarah bergerak di sepanjang suatu garis lurus melalui satu titik tetap O . Halaju zarah itu, $v \text{ cm s}^{-1}$, diberi oleh $v = 2t^2 - t - 6$, dengan keadaan t ialah masa dalam saat selepas melalui O .

[Assume motion to the right is positive.]

[Anggapkan gerakan ke arah kanan sebagai positif.]

Find

Cari

- (a) the initial velocity, in cm s^{-1} , of the particle, [1 mark]
halaju awal, dalam cm s^{-1} , zarah itu, [1 markah]
- (b) the minimum velocity, in cm s^{-1} , of the particle, [3 marks]
halaju minimum zarah itu, dalam cm s^{-1} , bagi zarah itu, [3 markah]
- (c) the range of values of t during which the particle moves to the right, [2 marks]
julat nilai t ketika zarah itu bergerak ke kanan, [2 markah]
- (d) the total distance, in cm, travelled by the particle in the first 4 seconds. [4 marks]
jumlah jarak, dalam cm, yang dilalui oleh zarah itu dalam 4 saat pertama. [4 markah]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of three sections: **Section A**, **Section B** and **Section C**.
*Kertas soalan ini mengandungi tiga bahagian: **Bahagian A**, **Bahagian B** dan **Bahagian C**.*
2. Answer **all** questions in **Section A**, any **four** questions from **Section B** and any **two** questions from **Section C**.
*Jawab **semua** soalan dalam **Bahagian A**, mana-mana **empat** soalan daripada **Bahagian B** dan mana-mana **dua** soalan daripada **Bahagian C**.*
3. 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.
4. The diagrams in the questions are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
5. The diagrams in the question provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan
6. 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.
7. A list of formulae and normal distribution table are provided on pages 3 to 6
Satu senarai rumus dan jadual kebarangkalian taburan normal disediakan di halaman 3 hingga 6.
8. You may use a scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik.