

NAMA

KELAS

3472/1
 Matematik
 Tambahan
 Kertas 1
 November
 2 jam



**MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
 CAWANGAN NEGERI SEMBILAN DARUL KHUSUS**

**PROGRAM PENINGKATAN AKADEMIK TINGKATAN 5
 SEKOLAH-SEKOLAH NEGERI SEMBILAN 2022**

MATEMATIK TAMBAHAN

Kertas 1

Dua jam

**JANGAN BUKA KERTAS SOALAN INI
 SEHINGGA DIBERITAHU**

- 1 *Tulis nama dan kelas anda pada ruangan yang disediakan.*
- 2 *Kertas soalan ini adalah dalam dwibahasa.*
- 3 *Soalan dalam Bahasa Melayu mendahului soalan yang sepadan dalam Bahasa Inggeris.*
- 4 *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Inggeris atau Bahasa Melayu.*
- 5 *Calon dikehendaki membaca maklumat di halaman 24.*

Untuk Kegunaan Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	2	
	2	3	
	3	5	
	4	5	
	5	7	
	6	7	
	7	6	
	8	5	
	9	5	
	10	8	
	11	7	
	12	4	
B	13	8	
	14	8	
	15	8	
Jumlah		80	

Kertas soalan ini mengandungi 24 halaman bercetak.

[Lihat halaman sebelah

**RUMUS
FORMULAE**

- 1 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- 2 $a^m \times a^n = a^{m+n}$
- 3 $a^m \div a^n = a^{m-n}$
- 4 $(a^m)^n = a^{mn}$
- 5 $\log_a mn = \log_a m + \log_a n$
- 6 $\log_a \frac{m}{n} = \log_a m - \log_a n$
- 7 $\log_a m^n = n \log_a m$
- 8 $\log_a b = \frac{\log_c b}{\log_c a}$
- 9 $T_n = a + (n-1)d$
- 10 $S_n = \frac{n}{2}[2a + (n-1)d]$
- 11 $T_n = ar^{n-1}$
- 12 $S_n = \frac{a(r^n - 1)}{r - 1} = \frac{a(1 - r^n)}{1 - r}, (r \neq 1)$
- 13 $S_\infty = \frac{a}{1 - r}, |r| < 1$
- 14 $y = uv, \frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$
- 15 $y = \frac{u}{v}, \frac{dy}{dx} = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$
- 16 $\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$
- 17 Luas di bawah lengkung
Area under a curve
 $= \int_a^b y \, dx$ atau (or)
 $= \int_a^b x \, dy$
- 18 Isi padu janaan
Volume generated
 $= \int_a^b \pi y^2 \, dx$ atau (or)
 $= \int_a^b \pi x^2 \, dy$
- 19 $I = \frac{Q_1}{Q_0} \times 100$
- 20 $\bar{I} = \frac{\sum I_i w_i}{\sum w_i}$
- 21 ${}^n P_r = \frac{n!}{(n-r)!}$
- 22 ${}^n C_r = \frac{n!}{(n-r)!r!}$
- 23 $P(X=r) = {}^n C_r p^r q^{n-r}, p+q=1$
- 24 Min / Mean, $\mu = np$
- 25 $\sigma = \sqrt{npq}$
- 26 $z = \frac{x - \mu}{\sigma}$
- 27 Panjang lengkok, $s = j\theta$
Arc length, $s = r\theta$
- 28 Luas sektor, $L = \frac{1}{2} j^2 \theta$
Area of sector, $A = \frac{1}{2} r^2 \theta$
- 29 $\sin^2 A + \cos^2 A = 1$
 $\sin^2 A + \cos^2 A = 1$
- 30 $\sec^2 A = 1 + \tan^2 A$
 $\sec^2 A = 1 + \tan^2 A$
- 31 $\operatorname{cosec}^2 A = 1 + \cot^2 A$
 $\operatorname{cosec}^2 A = 1 + \cot^2 A$

- 32 $\sin 2A = 2 \sin A \cos A$
 $\sin 2A = 2 \sin A \cos A$
- 33 $\cos 2A = \cos^2 A - \sin^2 A$
 $= 2 \cos^2 A - 1$
 $= 1 - 2 \sin^2 A$
 $\cos 2A = \cos^2 A - \sin^2 A$
 $= 2 \cos^2 A - 1$
 $= 1 - 2 \sin^2 A$
- 34 $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$
- 35 $\sin (A \pm B) = \sin A \cos B \pm \cos A \sin B$
 $\sin (A \pm B) = \sin A \cos B \pm \cos A \sin B$
- 36 $\cos (A \pm B) = \cos A \cos B \mp \sin A \sin B$
 $\cos (A \pm B) = \cos A \cos B \mp \sin A \sin B$
- 37 $\tan (A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$
- 38 $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
- 39 $a^2 = b^2 + c^2 - 2bc \cos A$
 $a^2 = b^2 + c^2 - 2bc \cos A$
- 40 Luas segi tiga / *Area of triangle*
 $= \frac{1}{2} ab \sin C$
- 41 Titik yang membahagi suatu tembereng garis
A point dividing a segment of a line
 $(x, y) = \left(\frac{nx_1 + mx_2}{m+n}, \frac{ny_1 + my_2}{m+n} \right)$
- 42 Luas segi tiga / *Area of triangle*
 $= \frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)|$
- 43 $|\mathbf{r}| = \sqrt{x^2 + y^2}$
- 44 $\hat{\mathbf{r}} = \frac{x\mathbf{i} + y\mathbf{j}}{\sqrt{x^2 + y^2}}$

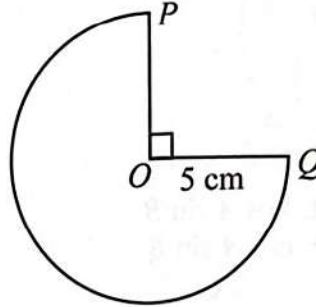
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Bahagian A

[64 markah]

Jawab semua soalan.

- 1 Rajah 1 menunjukkan sektor major POQ dengan pusat O . Jejari bulatan itu ialah 5 cm.
 Diagram 1 shows the major sector POQ with centre O . The radius of the circle is 5 cm.



Rajah 1

Diagram 1

Cari perimeter, dalam cm, bagi seluruh rajah dalam sebutan π .

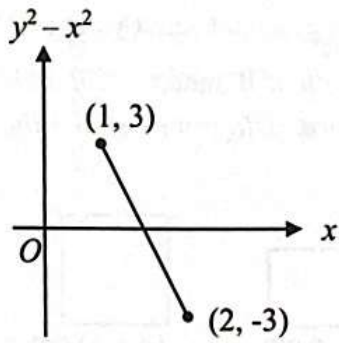
Find the perimeter, in cm, of the whole diagram in terms of π .

Jawapan / Answer :

[2 markah]

[2 marks]

- 2 Rajah 2 menunjukkan graf garis lurus $y^2 - x^2$ melawan x .
Diagram 2 shows a straight line graph $y^2 - x^2$ against x .



Rajah 2
Diagram 2

Ungkapkan y dalam sebutan x .

Express y in terms of x .

Jawapan / Answer :

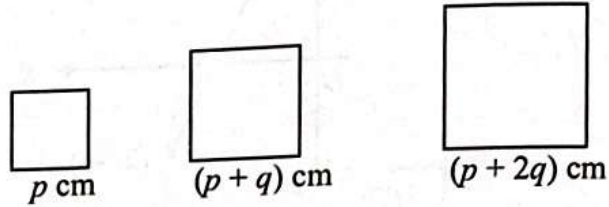
[3 markah]

[3 marks]

[Lihat halaman sebelah

- 3 Aini mempunyai seutas dawai dengan panjang W meter. Aini membahagikan dawai tersebut kepada beberapa bahagian. Setiap bahagian akan membentuk sebuah segi empat sama. Rajah 3 menunjukkan tiga segi empat sama yang pertama yang dibentuk oleh Aini.

Aini has a wire with the length of W meter. Aini divided the wire into several pieces. Each piece is to form a square. Diagram 3 shows the first three squares formed by Aini.



Rajah 3
Diagram 3

- a) Nyatakan sama ada perimeter segi empat sama merupakan satu jangjang aritmetik atau jangjang geometri. Justifikasi jawapan anda. [3 markah]
State whether the perimeter of the squares is an arithmetic progression or a geometric progression. Justify your answer. [3 marks]
- b) Jika Aini dapat membentuk tepat 10 segi empat sama, ungkapkan W dalam sebutan p dan q . [2 markah]
If Aini managed to form exactly 10 squares, express W in terms of p and q . [2 marks]

Jawapan/ Answer:

- 4 Diberi bahawa persamaan suatu lengkung ialah $f(x) = x^2(2x + 1)^3$ dan fungsi kecerunannya ialah $px(qx + 1)(2x + 1)^2$. Cari nilai p dan nilai q . [5 markah]

It is given that the equation of the curve is $f(x) = x^2(2x + 1)^3$ and its gradient function is $px(qx + 1)(2x + 1)^2$. Find the value of p and of q . [5 marks]

Jawapan/ Answer:



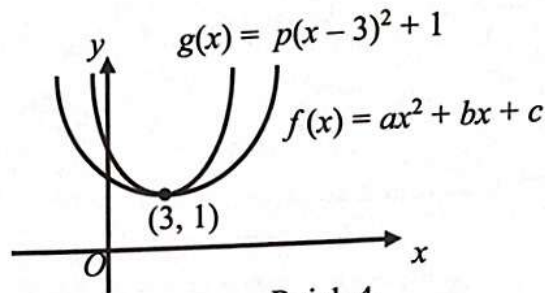
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- 5 a) Cari punca-punca bagi persamaan kuadratik $x^2 - kx + 4 = 0$ dalam sebutan k .
Find the roots of quadratic equations $x^2 - kx + 4 = 0$ in terms of k .

[2 markah]
[2 marks]

- b) Rajah 4 menunjukkan dua graf fungsi kuadratik $f(x) = ax^2 + bx + c$ dan $g(x) = p(x - 3)^2 + 1$.

Diagram 4 shows the graph of two quadratic functions $f(x) = ax^2 + bx + c$ and $g(x) = p(x - 3)^2 + 1$.



Rajah 4
Diagram 4

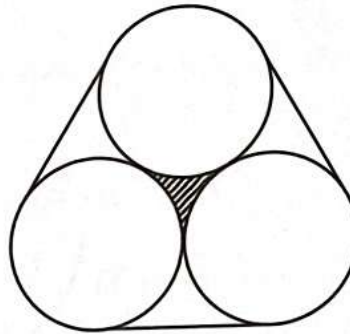
- i) Nyatakan julat a dalam sebutan p .
State the range of a in terms of p .
- [1 markah]
[1 mark]
- ii) Tulis fungsi kuadratik $g(x)$ yang baharu, jika graf fungsi kuadratik $g(x)$ bergerak 5 unit ke kiri.
Write the new quadratic function of $g(x)$, if the graph of $g(x)$ moves 5 unit to the left.
- [1 markah]
[1 mark]
- c) Diberi bahawa suatu garis lurus $y = mx - 3$ menyilang lengkung $y = x^2 - 3x + m$ pada dua titik yang berlainan. Cari julat bagi nilai m .
Given that a straight line $y = mx - 3$ intersects the curve $y = x^2 - 3x + m$ at two different points. Find the range of values of m .
- [3 markah]
[3 marks]

Jawapan/ Answer:



[Lihat halaman sebelah

- 6 Rajah 5 menunjukkan keratan rentas tiga bekas silinder, masing-masing berjari 3 cm, diikat dengan getah yang diregangkan. [Gunakan $\pi=3.142$]
Diagram 5 shows the cross-section of three cylindrical containers, each of radius 3 cm, held together by a stretched elastic band. [Use $\pi=3.142$]



Rajah 5
 Diagram 5

Cari
 Find

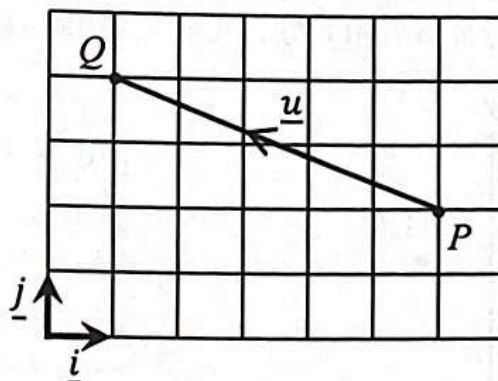
- a) luas kawasan berlorek,
the shaded area,
 b) panjang getah yang diregangkan.
the stretched length of the band.

[3 markah]
 [3 marks]
 [4 markah]
 [4 marks]

Jawapan / Answer :

- 7 a) Rajah 6 menunjukkan vektor unit \underline{u} dalam arah PQ .

Diagram 6 shows the unit vector \underline{u} in the direction of PQ .



Rajah 6
Diagram 6

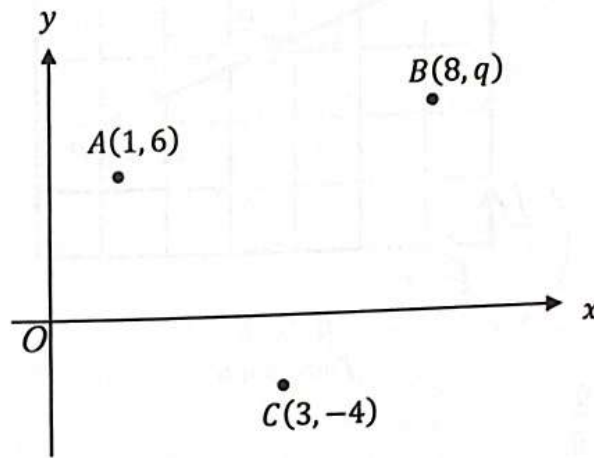
- i) Cari vektor unit, \underline{u} . [2 markah]
Find unit vector, \underline{u} . [2 marks]
- ii) Nyatakan bilangan maksimum vektor unit, \underline{u} yang terdapat dalam garis PQ . [1 markah]
State the maximum number of unit vector, \underline{u} that would fit inside the line PQ . [1 marks]
- b) Diberi $\underline{a} = 3\underline{i} - 4\underline{j}$ dan $\underline{b} = -2\underline{i} + \underline{j}$. Jika $\overline{JH} = 2\underline{a} + \underline{b}$, $|\overline{JH}| = 2|\overline{KL}|$ dan \overline{KL} ialah dalam arah bertentangan dengan \overline{JH} , cari vektor \overline{KL} , dalam sebutan \underline{i} dan \underline{j} . [3 markah]
Given $\underline{a} = 3\underline{i} - 4\underline{j}$ and $\underline{b} = -2\underline{i} + \underline{j}$. If $\overline{JH} = 2\underline{a} + \underline{b}$, $|\overline{JH}| = 2|\overline{KL}|$ and \overline{KL} is in the opposite direction of \overline{JH} , find vector \overline{KL} , in terms of \underline{i} and \underline{j} . [3 marks]

Jawapan / Answer :

[Lihat halaman sebelah

SULIT

- 8 Rajah 7 menunjukkan kedudukan 3 orang pemain dalam satu pasukan yang sama dalam satu permainan video *Valorie*. Kedudukan awal setiap pemain ialah $A(1, 6)$, $B(8, q)$ dan $C(3, -4)$. *Diagram 7 shows the positions of 3 players in the same team in the video game Valorie. The initial position of every player is $A(1, 6)$, $B(8, q)$ and $C(3, -4)$.*



Rajah 7
Diagram 7

- a) Kedudukan awal ketiga-tiga pemain membentuk suatu segi tiga. Cari nilai q jika luas segi tiga yang terbentuk ialah 36 unit^2 . [3 markah]
The initial positions of the three players form a triangle. Find the value of q if the area of triangle formed is 36 unit^2 . [3 marks]
- b) Satu senjata tersembunyi berada pada pembahagi dua sama serenjang bagi garis yang menghubungkan antara B dan C . Cari persamaan yang menunjukkan lokasi yang mungkin bagi senjata itu. [2 markah]
One hidden weapon is located at the perpendicular bisector of the line joining B and C . Find the equation that describes the possible location of the weapon. [2 marks]

Jawapan / Answer :

- 9 Diberi $\int_1^3 f(x)dx = p$, $\int_3^5 3f(x)dx = q$ dan $\int_1^3 g(x)dx = r$, dengan keadaan p , q dan r adalah pemalar.

Given $\int_1^3 f(x)dx = p$, $\int_3^5 3f(x)dx = q$ and $\int_1^3 g(x)dx = r$, such that p , q and r are constants.

Ungkapkan

Express

- a) $\int_1^5 f(x)dx$, dalam sebutan p dan/ atau q . [2 markah]
 $\int_1^5 f(x)dx$, in terms of p and/ or q .

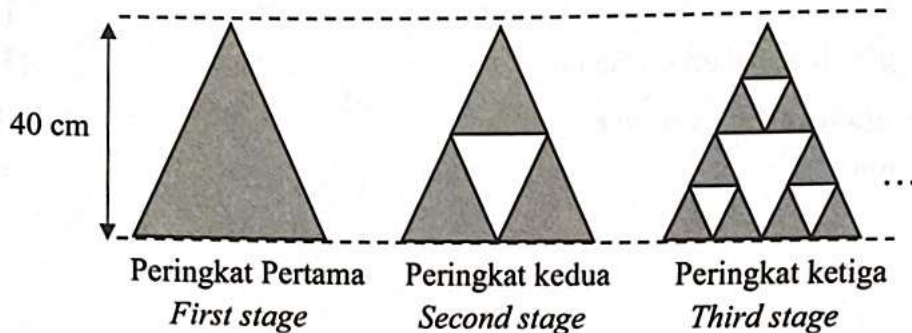
- b) $\int_1^3 [2r^2x - g(x)]dx$, dalam sebutan r . [2 marks]
 $\int_1^3 [2r^2x - g(x)]dx$, in terms of r . [3 markah]
 [3 marks]

Jawapan / Answer :

[Lihat halaman sebelah

- 10 a) Ryan menggunakan kad segi tiga berwarna yang berlainan saiz untuk mengkaji pola Segi Tiga *Sierpinski*. Rajah 8 menunjukkan pola Segi Tiga *Sierpinski*, tinggi segi tiga peringkat kedua ialah setengah daripada tinggi segi tiga peringkat pertama. Ryan mula dengan segi tiga peringkat pertama yang mempunyai tinggi 40 cm.

Ryan uses coloured triangular cards of different sizes to investigate the pattern of the Sierpinski's Triangle. Diagram 8 shows the pattern of the Sierpinski's Triangle, the height of the second stage triangle is half of the height of the triangle in the first stage. Ryan starts the first stage triangle with 40 cm.



Rajah 8
Diagram 8

Cari
Find

- i) tinggi segi tiga yang digunakan pada peringkat ketujuh. [2 markah]
height of the triangle used in the seventh stage. [2 marks]
- ii) bilangan segi tiga yang digunakan pada peringkat terakhir, jika tinggi segi tiga peringkat tersebut ialah $\frac{5}{64}$ cm. [3 markah]
number of triangles used at the last stage, if the height of the triangle at this stage is $\frac{5}{64}$ cm. [3 marks]
- b) Diberi a ialah sebutan pertama dan r ialah nisbah sepunya bagi suatu jangjang geometri. Jika $|r| > 1$, tunjukkan bahawa hasil tambah n sebutan pertama bagi jangjang itu ialah
Given a is the first term and r is the common ratio of a geometric progression. If $|r| > 1$, show that the sum of the first n terms of the progression is

$$S_n = \frac{a(r^n - 1)}{r - 1}$$

[3 markah]
[3 marks]

Jawapan / Answer :

[Lihat halaman sebelah

- 11 a) Selesaikan persamaan
Solve the equation

[3 markah]

[3 marks]

$$\frac{{}^{2n}P_n}{(2n-2)!} = \frac{10n}{n!}$$

- b) Puan Sashitta menyusun 8 biji manik untuk menjadi satu gelang tangan. Berapakah gelang tangan yang berbeza yang boleh dibentuk jika 3 daripada manik itu adalah sama warna?
Puan Sashitta arranges 8 beads to form a bracelet. How many different bracelets can she form if 3 of the beads are of the same colour?

[2 markah]

[2 marks]

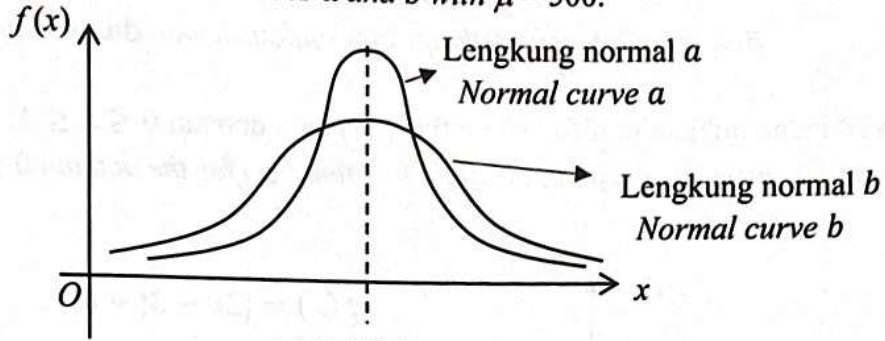
- c) Haris mempunyai 5 helai baju, 7 pasang seluar panjang dan 4 pasang kasut. Berapakah cara Haris boleh memilih dua daripada setiap item untuk dibawa bersama semasa bercuti?
Haris owns 5 shirts, 7 pairs of pants and 4 pairs of shoes. In how many ways can Haris choose two of each item to pack for a vacation?

[2 markah]

[2 marks]

Jawapan / Answer :

- 12 a) Rajah 9 menunjukkan dua lengkung normal a dan b dengan nilai $\mu = 500$.
Diagram 9 shows two normal curves a and b with $\mu = 500$.



Rajah 9
 Diagram 9

Jika varians bagi suatu data X dan data Y ialah masing-masing 1200 dan 3600, tentukan lengkung yang sesuai mewakili data X dan data Y . [2 markah]

If variance of data X and data Y are 1200 and 3600 respectively, determine the appropriate curve representing the X data and Y data. [2 marks]

- b) Sebuah balang mengandungi 4 biji guli warna hijau, 7 biji guli warna merah dan 9 biji guli warna putih. 3 biji guli diambil secara rawak satu demi satu dari balang itu tanpa dikembalikan. Nyatakan sama ada taburan kebarangkalian ini merupakan taburan binomial atau bukan. Jelaskan. [2 markah]

A jar contains 4 green marbles, 7 red marbles and 9 white marbles. 3 marbles are taken at random one after another without replacement. State whether this probability distribution is a binomial distribution or not. Explain. [2 marks]

Jawapan / Answer :

a)

Data X :	
Data Y :	

b)

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SULIT

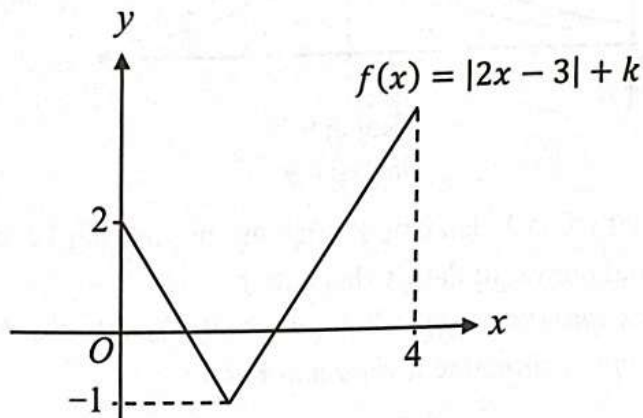
Bahagian B

[16 markah]

Bahagian ini mengandungi tiga soalan. Jawab dua soalan.

- 13 Rajah 10 menunjukkan graf fungsi mutlak $f(x)$ bagi domain $0 \leq x \leq 4$.

Diagram 10 shows the graph of absolute function $f(x)$ for the domain $0 \leq x \leq 4$.

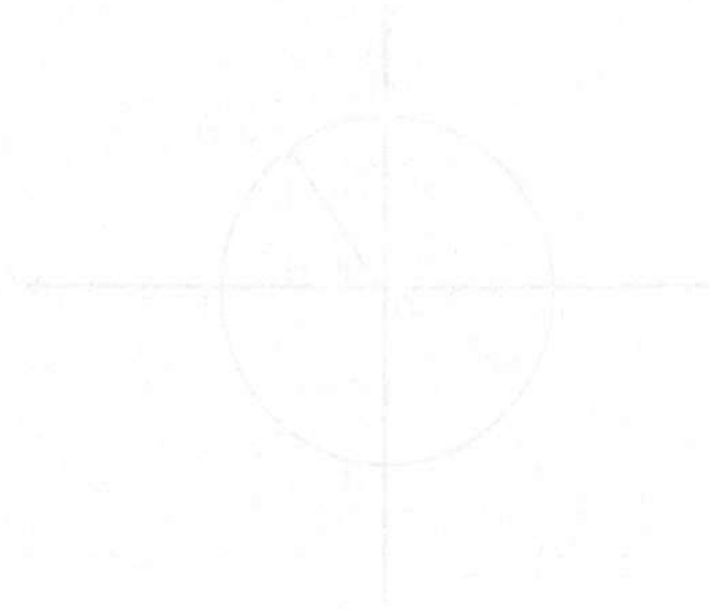


Rajah 10
Diagram 10

- a) Nyatakan nilai k . [1 markah]
State the value of k . [1 mark]
- b) Cari pintasan- x bagi graf tersebut. [3 markah]
Find the x -intercepts of the graph. [3 marks]
- c) Cari domain bagi $f(x) \leq 1$. [2 markah]
Find the domain of $f(x) \leq 1$. [2 marks]
- d) Cari nilai x yang dipetakan kepada diri sendiri dalam domain yang diberi. [2 markah]
Find the value of x that is mapped onto itself in the given domain. [2 mark]

Jawapan / Answer :

Jawapan / Answer :



$\theta = \cos^{-1} \left(\frac{x}{r} \right)$

$\theta = \cos^{-1} \left(\frac{-3}{5} \right)$

[Marking 2]
[Marking 1]

[Marking 1]
[Marking 1]

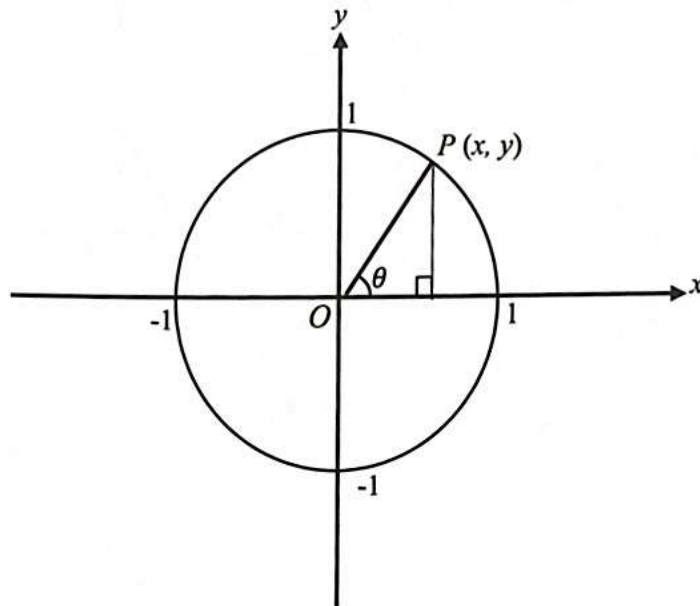
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SULIT

- 14 a) Diberi $\cos x = \frac{1}{m}$, dengan keadaan $0 \leq x \leq \frac{\pi}{2}$, ungkapkan $\tan 2x$ dalam sebutan m .
 Given that $\cos x = \frac{1}{m}$, such that $0 \leq x \leq \frac{\pi}{2}$, express $\tan 2x$ in terms of m .

[3 markah]

[3 marks]

- b) Rajah 11 menunjukkan titik $P(x,y)$ di atas suatu bulatan unit.
 Diagram 11 shows a point $P(x,y)$ on a unit circle.



Rajah 11
 Diagram 11

Diberi bahawa $x = \cos \theta$ dan $y = \sin \theta$.
 Given that $x = \cos \theta$ and $y = \sin \theta$.

- i) Terbitkan satu identiti asas yang melibatkan $\cos \theta$ dan $\sin \theta$. [2 markah]
 Derive a basic identity involving $\cos \theta$ and $\sin \theta$. [2 marks]
- ii) Seterusnya, selesaikan persamaan trigonometri $2 \cos^2 \theta - 5 = 7 \sin \theta$ bagi $0^\circ \leq \theta \leq 360^\circ$. [3 markah]
 Hence, solve the trigonometric equation $2 \cos^2 \theta - 5 = 7 \sin \theta$ for $0^\circ \leq \theta \leq 360^\circ$. [3 marks]

Jawapan / Answer :

[Lihat halaman sebelah

SULIT

- 15 a) Diberi $\log_{12} 3 = k$, ungkapkan $\log_{\sqrt{3}} 8$ dalam sebutan k . [4 markah]
Given that $\log_{12} 3 = k$, express $\log_{\sqrt{3}} 8$ in terms of k . [4 marks]

- b) Sekumpulan saintis di Bandar Hawkin menjumpai satu organisma ganjil yang membiak mengikut persamaan $\ln\left(\frac{x}{e^2}\right) = t - 3 \ln x$ dengan keadaan x ialah bilangan sel terhasil dan t ialah masa pembiakan dalam jam. Setelah 10 jam, ungkapkan bilangan sel yang terhasil dalam sebutan e . [4 markah]

A group of scientists in Hawkin City discovered an odd organism that reproduces following the equation $\ln\left(\frac{x}{e^2}\right) = t - 3 \ln x$ such that x is the number of resulting cells and t is the reproductive time in hours. After 10 hours, express the number of resulting cells in terms of e . [4 marks]

Jawapan / Answer :

**THE UPPER TAIL PROBABILITY $Q(z)$ FOR THE NORMAL DISTRIBUTION $N(0, 1)$
KEBARANGKALIAN HUJUNG ATAS $Q(z)$ BAGI TABURAN NORMAL $N(0, 1)$**

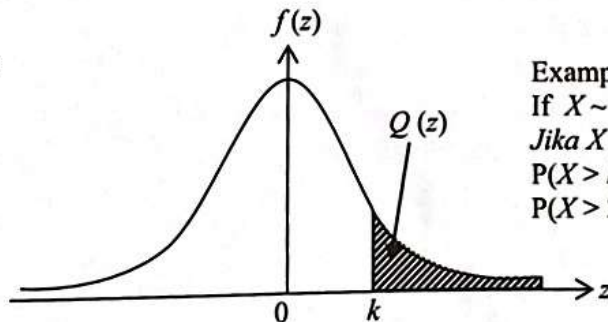
z										Minus / Tolak									
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641	4	8	12	16	20	24	28	32	36
0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247	4	8	12	16	20	24	28	32	36
0.2	.4207	.4168	.4219	.4090	.4052	.4013	.3974	.3936	.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	15	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								0	1	1	1	1	2	2	2	2
			.02990	.02964	.02939	.02914					3	5	8	10	13	15	18	20	23
								.02889	.02866	.02842	2	5	7	9	12	14	16	16	21
2.4	.02820	.02798	.02776	.02755	.02734						2	4	6	8	11	13	15	17	19
						.02714	.02695	.02676	.02657	.02639	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	9	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

For negative z use relation:
Bagi z negatif guna hubungan:

$$Q(z) = 1 - Q(-z) = P(-z)$$

$$f(z) = \frac{1}{\sqrt{2\pi}} \exp\left(-\frac{1}{2}z^2\right)$$

$$Q(z) = \int_k^{\infty} f(z) dz$$



Example / Contoh:
If $X \sim N(0, 1)$, then
Jika $X \sim N(0, 1)$, maka
 $P(X > k) = Q(k)$
 $P(X > 2.1) = Q(2.1) = 0.0179$

MAKLUMAT UNTUK CALON
INFORMATION FOR CANDIDATES

1. Kertas soalan ini mengandungi dua bahagian: **Bahagian A** dan **Bahagian B**.
*This question paper consists of two sections: **Section A** and **Section B**.*
2. Jawab **semua** soalan dalam **Bahagian A** dan mana-mana **dua** soalan daripada **Bahagian B**.
*Answer **all** questions in **Section A** and **any two** questions from **Section B**.*
3. Tulis jawapan anda pada ruang yang disediakan dalam kertas soalan.
Write your answers in the spaces provided in this question paper.
4. Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.
Show your working. It may help you to get marks.
5. Sekiranya anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.
If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
6. Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
The diagrams in the questions provided are not drawn to scale unless stated.
7. Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan.
The marks allocated for each question are shown in brackets.
8. Satu senarai rumus disediakan di halaman 2 dan 3.
A list of formulae is provided on page 2 and 3.
9. Jadual Kebarangkalian Hujung Atas $Q(z)$ Bagi Taburan Normal $N(0, 1)$ disediakan di halaman 23.
The Upper Tail Probability $Q(z)$ For the Normal Distribution $N(0, 1)$ Table is provided on page 23.
10. Anda dibenarkan menggunakan kalkulator saintifik.
You may use a scientific calculator.
11. Serahkan kertas soalan ini kepada pengawas peperiksaan pada akhir peperiksaan.
Hand in this question paper to the invigilator at the end of the examination.