



PENTAKSIRAN DIAGNOSTIK AKADEMIK SEKOLAH BERASRAMA PENUH 2023

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA MATEMATIK TAMBAHAN

3472/1

Kertas 1

Oktober 2023

2 jam

Dua jam

JANGAN BUKA KERTAS PEPERIKSAAN INI SEHINGGA DIBERITAHU

1. Tulis **nama dan tingkatan** anda pada ruang yang disediakan.
2. Kertas peperiksaan ini mengandungi **dua bahagian: Bahagian A dan Bahagian B.**
3. Jawapan hendaklah ditulis pada ruang jawapan yang disediakan di dalam kertas peperiksaan ini.
4. Kertas peperiksaan ini adalah dalam dwibahasa.
5. Jawapan boleh ditulis dalam bahasa Melayu atau bahasa Inggeris.
6. Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
7. Kerja mengira **mesti** ditunjukkan.
8. Jadual Kebarangkalian Hujung Atas $Q(z)$ bagi Taburan Normal $N(0,1)$ disediakan di halaman 4.

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

Kertas peperiksaan ini mengandungi 33 halaman bercetak.

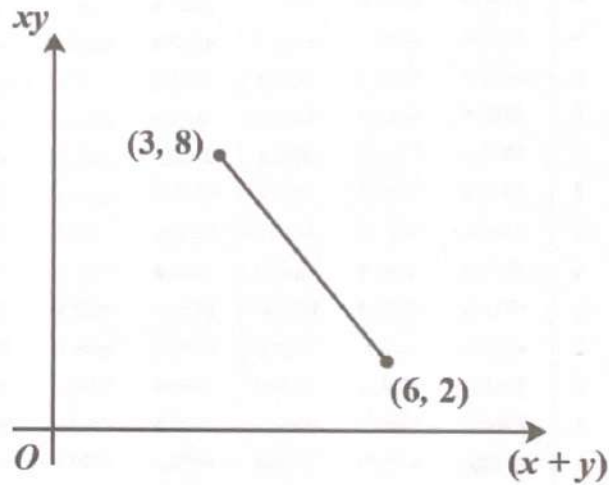
Bahagian A

[64 markah]

Jawab semua soalan.

- 1 Rajah 1 menunjukkan graf garis lurus yang diperoleh dengan memplot xy melawan $(x+y)$

Diagram 1 shows the straight line graph obtained by plotting xy against $(x+y)$



Rajah 1
Diagram 1

Ungkapkan y dalam sebutan x .

Express y in terms of x .

[4 markah]

[4 marks]

Jawapan / Answer :

- 2 Diberi bahawa persamaan kuadratik $(p+1)x^2 + 2qx + 3 = 0$ dengan keadaan p dan q ialah pemalar, mempunyai dua punca nyata dan sama.
 Ungkapkan p dalam sebutan q .

Given that the quadratic equation $(p+1)x^2 + 2qx + 3 = 0$ such that p and q are constants, has two real and equal roots.

Express p in terms of q .

[2 markah]

[2 marks]

Jawapan / Answer :

- 3 (a) Diberi persamaan kuadratik $mx^2 + (m-2)x + 3m + 2 = 0$, dengan m ialah integer bukan sifar. Cari nilai m dengan keadaan satu punca adalah salingan punca yang satu lagi.

Given that the quadratic equation $mx^2 + (m-2)x + 3m + 2 = 0$, where m is a non-zero integer. Find the value of m such that one of the root is the reciprocal of the other root.

[2 markah]

[2 marks]

- (b) Graf fungsi kuadratik $f(x) = -x^2 + 2px - 5p$, di mana p ialah pemalar, mempunyai nilai maksimum 6.

The graph quadratic function $f(x) = -x^2 + 2px - 5p$, where p is a constant, has a maximum value of 6.

- (i) Dengan menggunakan kaedah penyempurnaan kuasa dua, cari nilai-nilai yang mungkin bagi p .

By using the method of completing the square, find possible values of p .

- (ii) Graf $y = g(x)$ ialah pantulan graf $y = f(x)$ pada paksi- x . Dengan menggunakan nilai p yang positif dari 3(b)(i), tulis fungsi $g(x)$.

The graph of $y = g(x)$ is the reflection of $y = f(x)$ about the x -axis. By using the positive value of p from 3(b)(i), write the function of $g(x)$.

[4 markah]

[4 marks]

Jawapan / Answer :

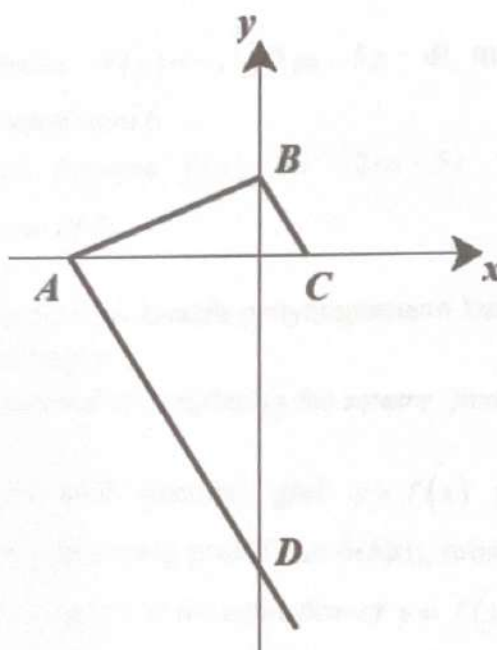
Jawapan / Answer :



- 4 (a) Penyelesaian secara lukisan berskala **tidak** diterima.
*Solution by scale drawing is **not** accepted.*

Rajah 2(a) menunjukkan tiga garis lurus. Garis lurus BC berserenjang dengan garis lurus AB dan selari dengan garis lurus AD .

Diagram 2(a) shows three straight lines. The straight line BC is perpendicular to the straight line AB and parallel to the straight line AD .



Rajah 2(a)
 Diagram 2(a)

Diberi koordinat bagi titik B dan C masing masing ialah $(0, 6)$ dan $(3, 0)$. Cari koordinat A dan D .

Given the coordinates of points B and C are $(0, 6)$ and $(3, 0)$ respectively. Find the coordinates of A and of D .

[3 markah]

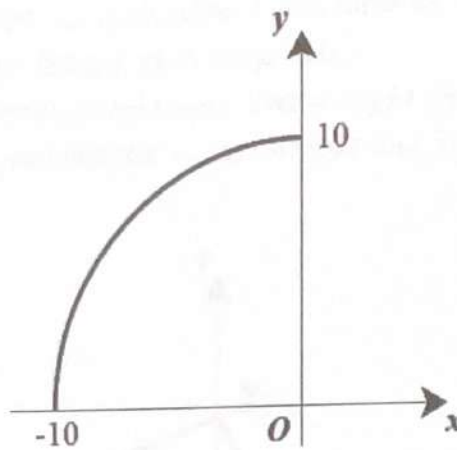
[3 marks]

Jawapan / Answer :

Jawapan / Answer :



- (b) Rajah 2(b) menunjukkan sebahagian daripada lokus P .
Diagram 2(b) shows part of the locus P .



Rajah 2(b)
Diagram 2(b)

Cari persamaan lokus P .

Find the equation of the locus P .

[2 markah]

[2 marks]

Jawapan / Answer :

- 5 (a) Pasangan bertertib di bawah mewakili fungsi $h(x)$.
The following ordered pairs represents the function $h(x)$.

$$\{(-4, 3), (-3, 2), (-2, 1), (1, 2), (k+1, 3)\}$$

- (i) Cari nilai k .
Find the value of k .
- (ii) Dengan menggunakan tatatanda fungsi, tuliskan $h(x)$ dalam sebutan x .
Using the function notation, write the function $h(x)$ in terms of x .

[2 markah]

[2 marks]

- (b) Di beri $f(x) = (x-3)^2 + 1$, $x \geq m$ supaya f^{-1} wujud.
Given that $f(x) = (x-3)^2 + 1$, $x \geq m$ such that f^{-1} exists.

- (i) Tentukan nilai m .
Determine the value of m .
- (ii) Cari julat bagi $f(x)$.
Find the range of values of $f(x)$.

[2 markah]

[2 marks]

Jawapan / Answer :

6 Diberi $\overline{PQ} = \begin{pmatrix} 5 \\ 7 \end{pmatrix}$, $\overline{OQ} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$ dan $\overline{RS} = \begin{pmatrix} k \\ 5 \end{pmatrix}$.

Cari

Given $\overline{PQ} = \begin{pmatrix} 5 \\ 7 \end{pmatrix}$, $\overline{OQ} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$ and $\overline{RS} = \begin{pmatrix} k \\ 5 \end{pmatrix}$.

Find

- (a) koordinat P ,
the coordinate of P ,

[2 markah]

[2 marks]

- (b) vektor unit dalam arah $\overline{OP}$,
the unit vector in the direction of $\overline{OP}$,

[2 markah]

[2 marks]

- (c) nilai k jika $\overline{RS}$ adalah selari dengan $\overline{PQ}$.
the value of k if $\overline{RS}$ parallel to $\overline{PQ}$.

[2 markah]

[2 marks]

Jawapan / Answer :

Jawapan / Answer :

1. (a) The first step in the process of the formation of a new country is the identification of a geographical area that is suitable for the purpose.

(b) The second step is the identification of a suitable geographical area that is suitable for the purpose. This is followed by the identification of a suitable geographical area that is suitable for the purpose.

(c) The third step is the identification of a suitable geographical area that is suitable for the purpose. This is followed by the identification of a suitable geographical area that is suitable for the purpose.

(d) The fourth step is the identification of a suitable geographical area that is suitable for the purpose. This is followed by the identification of a suitable geographical area that is suitable for the purpose.

(e) The fifth step is the identification of a suitable geographical area that is suitable for the purpose. This is followed by the identification of a suitable geographical area that is suitable for the purpose.

(f) The sixth step is the identification of a suitable geographical area that is suitable for the purpose. This is followed by the identification of a suitable geographical area that is suitable for the purpose.

(g) The seventh step is the identification of a suitable geographical area that is suitable for the purpose. This is followed by the identification of a suitable geographical area that is suitable for the purpose.

(h) The eighth step is the identification of a suitable geographical area that is suitable for the purpose. This is followed by the identification of a suitable geographical area that is suitable for the purpose.

(i) The ninth step is the identification of a suitable geographical area that is suitable for the purpose. This is followed by the identification of a suitable geographical area that is suitable for the purpose.

- 7 Syarikat Biz mengadakan jualan besar-besaran sempena karnival jualan 9/9. Semua telefon pintar yang dijual diberikan diskaun jualan sebanyak 15 %. Harga, D selepas diskaun jualan diberikan oleh fungsi $D(p) = 0.85p$, dimana p ialah harga asal telefon pintar tersebut.

Intan bercadang membeli telefon pintar dari Syarikat Biz. Oleh kerana beliau terpilih menjadi pelanggan ke 100 000 syarikat tersebut, beliau layak mendapat kupon RM20 bagi telefon pintar yang dibelinya. Harga, K selepas diskaun kupon diberikan oleh $K(p) = p - 20$, dimana p ialah harga asal telefon pintar tersebut.

The Biz Company are promoting a big sale in conjunction with the 9/9 sales carnival. All smartphones sold are given a sales discount of 15%. The price, D after the sales discount is given by the function $D(p) = 0.85p$, where p is the original price of the smartphone.

Intan plans to buy a smartphone from Biz Company. Since she was selected as the company's 100 000th customer, she is eligible for a RM 20 coupon for the smartphone purchased. The price, K after the coupon discount is given by the function $K(p) = p - 20$, where p is the original price of the smartphone.

- (a) Intan boleh menggunakan kedua-dua potongan harga. Tuliskan fungsi gubahan berdasarkan situasi berikut:

Intan may use both price discount. Write a composite function based on the following situations:

- (i) Situasi 1 - Menggunakan diskaun jualan diikuti kupon
Situation 1 - Taking the sale discount first then taking the coupon.
- (ii) Situasi 2 - Menggunakan kupon diikuti diskaun harga.
Situation 2 - Taking the coupon first then taking the sale discount

[3 markah]

[3 marks]

- (b) Seterusnya, kira harga yang paling murah yang dibayar oleh Intan jika harga asal telefon pintar ialah RM 1899. Berikan jawapan anda kepada RM yang terhampir.

Hence, calculate the lowest price paid by Intan if the original price of the smartphone is RM 1899. State your answer to the nearest RM.

[2 markah]

[2 marks]

Jawapan / Answer :

- 8 (a) Diberi a ialah sebutan pertama dan d ialah beza sepunya bagi suatu jangjang aritmetik. Tunjukkan bahawa hasil tambah bagi n sebutan yang pertama bagi jangjang itu ialah $S_n = \frac{n}{2}[2a + (n-1)d]$.

Given that a is the first term and d is the common difference of an arithmetic progression. Show that the sum of the first n^{th} term of the progression is

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

[3 markah]

[3 marks]

- (b) Kedai Kek Zaki menjual 400 biji kek pada minggu pertama. Pada minggu kedua, jualannya telah merosot sebanyak 8 biji sehingga minggu ke-7. Pada minggu berikutnya, kedai itu mengadakan promosi dan jualannya bertambah sebanyak 100% dari jualan minggu sebelumnya.

Dengan menggunakan rumus dari bahagian 8(a), hitung jumlah kek yang telah dijual bermula minggu pertama sehingga minggu promosi itu.

Zaki Bakery has sold 400 cakes on the first week. On the second week, the sales has decreased by 8 cakes until the 7th week. On the following week, due to the promotion, the sale has increased by 100% compared to the previous week. By using the formula given in 8(a), calculate the number of cakes that have been sold starting from the first week until the promotion week.

[4 markah]

[4 marks]

Jawapan / Answer :

Jawapan / Answer :

- 9 Diberi bahawa persamaan suatu lengkung ialah $y = 2x^2 + x + 1$.

Given that the equation of the curve is $y = 2x^2 + x + 1$.

- (a) Cari persamaan garis normal kepada lengkung pada titik $(2, 11)$.

Find the equation of the normal to the curve at point $(2, 11)$.

[4 markah]

[4 marks]

- (b) Seterusnya, cari koordinat titik di mana garis normal itu menyilang lengkung sekali lagi.

Hence, find the coordinates of the point such that the normal meets the curve again.

[2 markah]

[2 marks]

Jawapan / Answer :

Jawapan / Answer :

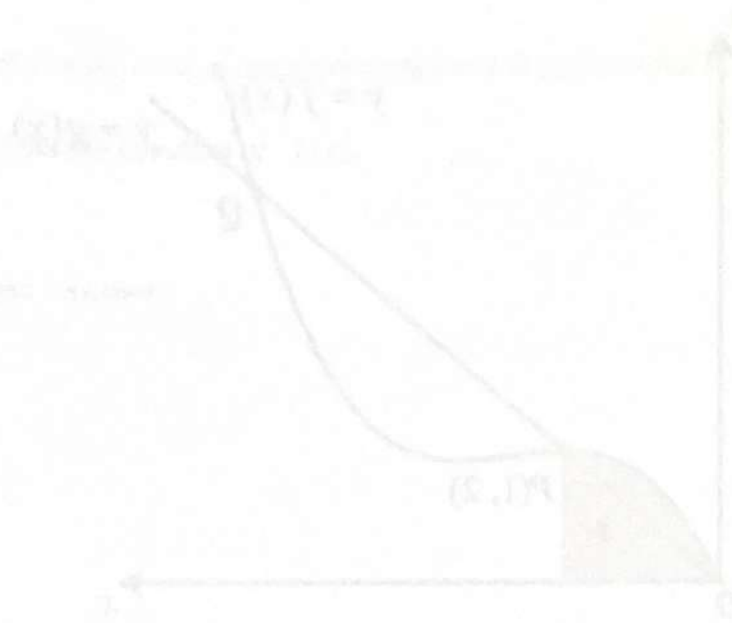


Diagram 1

Diagram 1 shows two curves, $y = f(x)$ and $y = g(x)$, on a Cartesian coordinate system. The region between the curves and the x-axis from $x = 0$ to $x = 2$ is shaded.

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The curve $y = f(x)$ and the straight line $y = g(x)$ intersect at the point $(2, 2)$.

The area of the shaded region is $\frac{2}{3}$ unit².

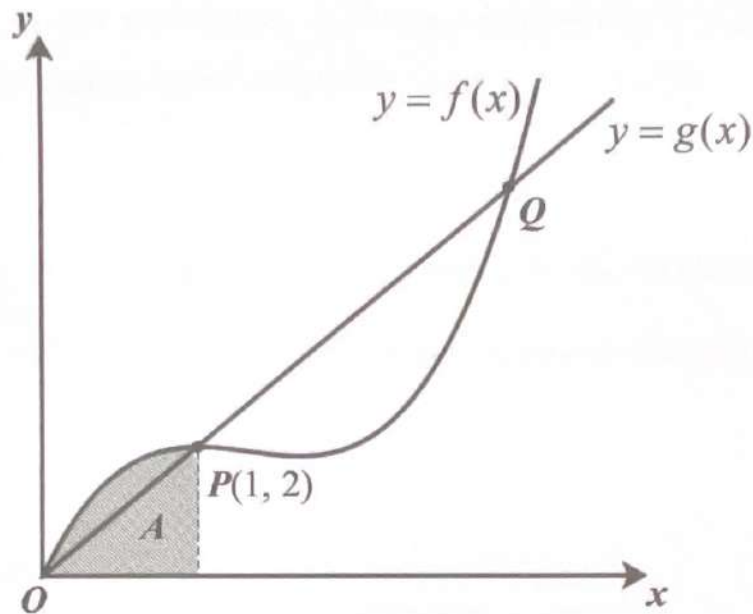
(a) Find the value of $\int_0^2 f(x) dx$.

$$\int_0^2 f(x) dx = \frac{2}{3}$$

$$\int_0^2 f(x) dx = \frac{2}{3}$$

Diagram 1

- 10 Rajah 3 menunjukkan sebuah lengkung $y = f(x)$ dan garis lurus $y = g(x)$.
 Diagram 3 shows the curve $y = f(x)$ and the straight line $y = g(x)$.



Rajah 3
 Diagram 3

Lengkung $y = f(x)$ dan garis lurus $y = g(x)$ bersilang di titik-titik O , P dan Q .

Diberi luas kawasan berlorek A ialah $1\frac{5}{12}$ unit².

The curve $y = f(x)$ and the straight line $y = g(x)$ intersects at points O , P and Q .

Given the area of the shaded region A is $1\frac{5}{12}$ unit².

- (a) Cari nilai bagi
 Find the value of

(i) $\int_1^0 f(x)dx$,

(ii) k jika $\int_0^1 [3f(x) - k]dx = 12$.

[5 markah]

[5 marks]

- (b) Diberi kawasan berlorek A diwakili oleh $\left[\frac{x^4}{4} - \frac{4}{3}x^3 + \frac{5}{2}x^2 \right]_0^1$.

Cari persamaan bagi $f(x)$.

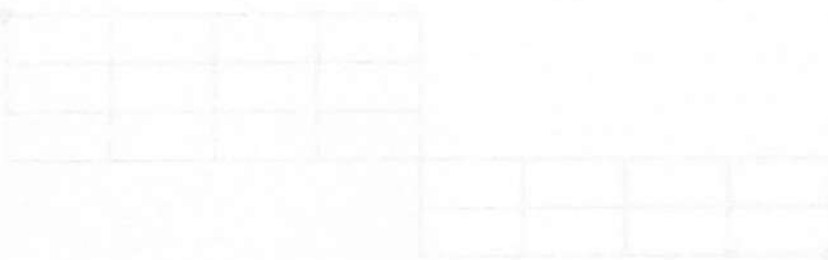
Given the area of the shaded region A is represented by $\left[\frac{x^4}{4} - \frac{4}{3}x^3 + \frac{5}{2}x^2 \right]_0^1$.

Find the equation of $f(x)$.

[1 markah]

[1 mark]

Jawapan / Answer :



- 11 (a) Satu pasukan yang mengandungi enam orang murid akan dibentuk untuk menyertai karnival STEM peringkat negeri. Penubuhan pasukan tersebut akan di pilih dari tujuh orang murid lelaki dan lima orang murid perempuan. Cari bilangan cara yang berbeza untuk membentuk pasukan itu jika
- A team of six students will be formed to participate in the state level STEM carnival. The establishment of the team will be chosen from seven male students and five female students. Find the number of different ways to form the team if*
- (i) murid perempuan melebihi murid lelaki,
female students exceed male students,

[2 markah]

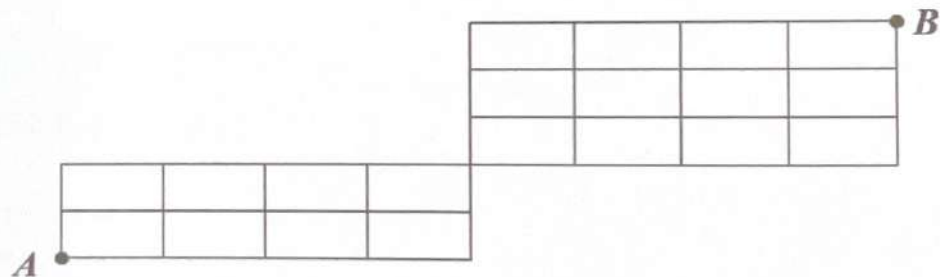
[2 marks]

- (ii) sekurang-kurangnya empat orang murid lelaki yang dipilih.
at least four selected male students.

[2 markah]

[2 marks]

- (b) Rajah 4 menunjukkan laluan bagi suatu objek. Objek itu hanya boleh bergerak ke atas atau ke kanan sahaja.
- Diagram 4 shows the route for an object. The object can only move up or to the right.*



Rajah 4
 Diagram 4

- Cari bilangan laluan bagi objek itu bergerak dari A ke B.
Find the number of routes for the object to move from point A to B.

[3 markah]

[3 marks]

Jawapan / Answer :

- 12 (a) Seorang peserta telah melakukan 3 kali percubaan dalam satu sesi latihan menembak .

A participant has shoot 3 times in a training session.

- (i) Anggapkan H ialah peristiwa kena pada sasaran dan H' ialah peristiwa tidak kena pada sasaran.

Lukis gambarajah pokok bagi menunjukkan semua kesudahan.

Let H be the results of hitting the target and H' be the results of not hitting the target.

Draw a tree diagram to show all possible outcomes. .

- (ii) Jika X mewakili bilangan kali kena pada sasaran , tunjukkan bahawa X ialah suatu pembolehubah rawak diskret.

If X represents the number of times hitting the target, show that X is a discrete random variable.

[3 markah]

[3 marks]

- (b) X ialah pembolehubah rawak binomial dengan bilangan percubaan sebanyak 12 kali dan sisihan piawai ialah $\sqrt{\frac{5}{3}}$. Jika p ialah kebarangkalian bagi kejayaan, cari nilai-nilai yang mungkin bagi p .

The random variable X of 12 trials is a binomial distribution with a standard deviation of $\sqrt{\frac{5}{3}}$. If probability of success is p , find the possible values of p .

[3 markah]

[3 marks]

Jawapan / Answer :

Jawapan / Answer :



Bahagian B

[16 markah]

Bahagian ini mengandungi tiga soalan. Jawab dua soalan.

- 13 (a) Selesaikan persamaan serentak berikut :
Solve the simultaneous equations :

$$3^{4x} \times \left(\frac{1}{9}\right)^{y-1} = 81$$

$$\frac{8^x}{2^y} = 64$$

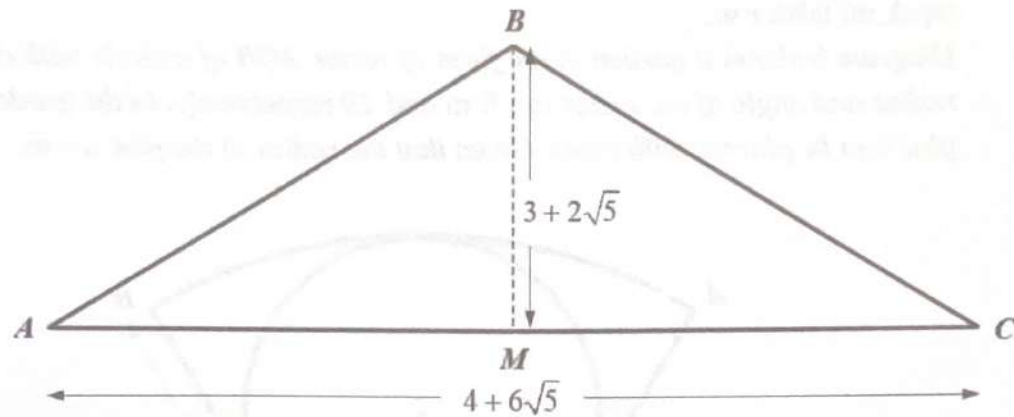
[4 markah]

[4 marks]

Jawapan / Answer :

(b) Rajah 5 menunjukkan segi tiga sama kaki ABC .

Diagram 5 shows isosceles triangle ABC .



Rajah 5
Diagram 5

Diberi bahawa $BA = BC$ dan M ialah titik tengah bagi AC . Cari $\tan \angle BAC$

dalam bentuk $\frac{a+b\sqrt{5}}{c}$ dengan a , b dan c ialah integer positif.

Given that $BA = BC$ and M is the midpoint of AC . Find $\tan \angle BAC$ in the form

$\frac{a+b\sqrt{5}}{c}$ with a , b dan c are positive integer.

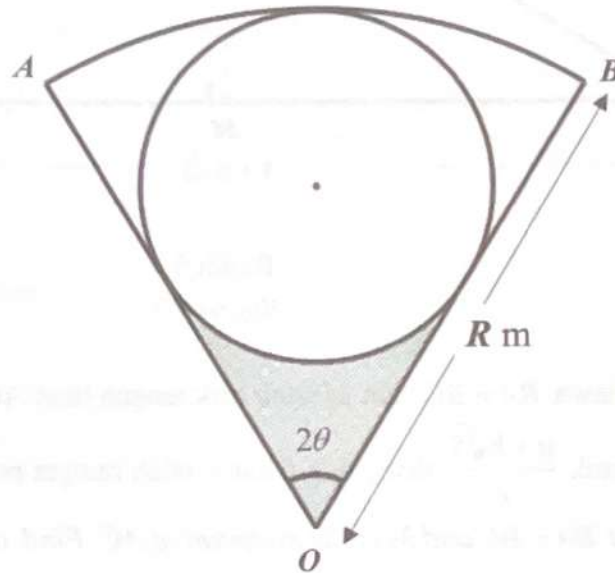
[4 markah]

[4 marks]

Jawapan / Answer :

- 14 Rajah 6 menunjukkan sebuah taman berbentuk sektor AOB bagi sebuah bulatan dengan pusat O . Jejari dan sudut sektor itu masing-masing ialah R m dan 2θ . Dalam taman ini, satu tapak berbentuk bulat akan ditanam dengan bunga ros. Diberi jejari tapak ini ialah r m.

Diagram 6 shows a garden in the form of sector AOB of a circle with centre O . The radius and angle of the sector are R m and 2θ respectively. In the garden, a circular plot is to be planted with roses. Given that the radius of the plot is r m.



Rajah 6
Diagram 6

- (a) Tunjukkan bahawa $R = r \left(1 + \frac{1}{\sin \theta} \right)$.

Show that $R = r \left(1 + \frac{1}{\sin \theta} \right)$.

[2 markah]

[2 marks]

- (b) Di beri bahawa $\theta = 30^\circ$, cari nisbah bahagian taman yang akan di tanam dengan bunga ros.

Given that $\theta = 30^\circ$, find the ratio of the garden that is to be planted with roses.

[3 markah]

[3 marks]

- (c) Seterusnya, hitung panjang pagar yang diperlukan untuk memagari keseluruhan kawasan berlorek jika $R = 15$.

Hence, calculate the length of fencing required to fence along the shaded region when $R = 15$.

[3 markah]

[3 marks]

Jawapan / Answer :

Diagram 1
Diagram 2

Diagram 3
Diagram 4

Diagram 5
Diagram 6

- 15 (a) Diberi $\cos 20^\circ = h$ dan $\sin 48^\circ = g$.

Given $\cos 20^\circ = h$ and $\sin 48^\circ = g$.

Ungkapkan $\sin 68^\circ$ dalam sebutan h dan / atau g .

Express $\sin 68^\circ$ in terms of h and / or g .

[3 markah]

[3 marks]

- (b) Selesaikan persamaan $4\cot^2\theta - \operatorname{cosec}^2\theta = 2$ untuk $0^\circ \leq \theta \leq 360^\circ$.

Solve the equation $4\cot^2\theta - \operatorname{cosec}^2\theta = 2$ for $0^\circ \leq \theta \leq 360^\circ$.

[3 markah]

[3 marks]

- (c) Diberi $\theta = 30^\circ$, tunjukkan bahawa $\cos \frac{\theta}{2} = \frac{\sqrt{2+\sqrt{3}}}{2}$.

Given $\theta = 30^\circ$, show that $\cos \frac{\theta}{2} = \frac{\sqrt{2+\sqrt{3}}}{2}$.

[2 markah]

[2 marks]

Jawapan / Answer :

Jawapan / *Answer* :

KERTAS PEPERIKSAAN TAMAT