

Answer all questions.
Jawab semua soalan.

For
Examiner's
Use

- 1 Form a quadratic equation with roots a and $\frac{2}{a}$.

Give your answer in general form.

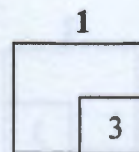
Bentukkan persamaan kuadratik dengan punca-punca a dan $\frac{2}{a}$.

Beri jawapan anda dalam bentuk am.

[3 marks]

[3 markah]

Answer / Jawapan :



For
Examiner's
Use

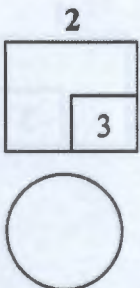
- 2 A group of 150 students were selected to complete a science project in a certain number of weeks. On the second week, 4 students withdrew from the project. The next following week, another 4 students quit and so on. Find the number of weeks in which the work was completed when only 22 students left.

Sekumpulan 150 orang pelajar telah dipilih untuk menyiapkan suatu projek sains dalam beberapa minggu tertentu. Pada minggu kedua, 4 orang pelajar menarik diri dari projek tersebut. Pada minggu berikutnya, 4 orang pelajar lain menarik diri dan seterusnya. Cari bilangan minggu projek tersebut dapat diselesaikan apabila hanya terdapat 22 orang pelajar sahaja yang tinggal pada minggu tersebut.

[3 marks]

[3 markah]

Answer / Jawapan :



3. It is given that 1 , m^2 and m^4 are first three consecutive terms of a geometric progression.

Diberi bahawa 1 , m^2 dan m^4 ialah tiga sebutan pertama berturutan bagi suatu jangjang geometri.

Find the sum to infinity of the progression in terms of m .

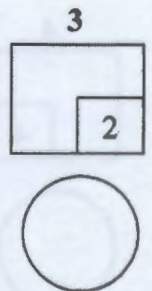
Cari hasil tambah sebutan hingga ketakterhinggaan jangjang itu dalam sebutan m .

[2 marks]

[2 markah]

Answer / Jawapan :

For
Examiner's
Use



For,
Examiner's
Use

- 4 The curve $y = f(x)$ is such that $\frac{d^2y}{dx^2} = 18x$. Given that $\frac{dy}{dx} = 13$ and $y = 11$ when $x = 1$, find the equation of the curve.

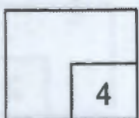
Suatu lengkung $y = f(x)$ adalah dengan keadaan $\frac{d^2y}{dx^2} = 18x$. Diberi bahawa $\frac{dy}{dx} = 13$ dan $y = 11$ apabila $x = 1$, cari persamaan lengkung itu.

[4 marks]

[4 markah]

Answer / Jawapan :

4



- 5 Diagram 1 shows two curves $y = h(x)$, $y = g(x)$ and the tangent to each curve when $x = 0$.

Rajah 1 menunjukkan dua lengkung $y = h(x)$, $y = g(x)$ dan garis tangen kepada setiap lengkung itu apabila $x = 0$.

For
Examiner's
Use

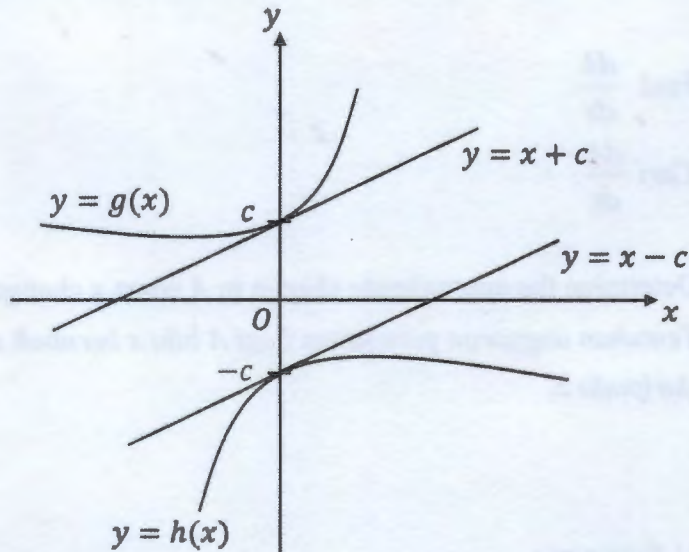


Diagram 1
Rajah 1

The two tangent lines are parallel and the gradient of the tangent line $y = g(x)$ at point P is 1.

Kedua-dua garis tangen tersebut adalah selari dan kecerunan garis tangen $y = g(x)$ pada titik P ialah 1.

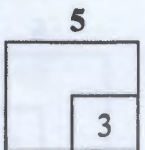
It is given that $f(x) = \frac{h(x)}{g(x)}$, find $f'(0)$.

Diberi bahawa $f(x) = \frac{h(x)}{g(x)}$, cari $f'(0)$.

[3 marks]

[3 markah]

Answer / Jawapan :



For
Examiner's
Use

6 The function A is defined by $A = \frac{1}{2}x^2(x+2)$.

Fungsi A ditakrifkan oleh persamaan $A = \frac{1}{2}x^2(x+2)$.

(a) Find $\frac{dA}{dx}$.
Cari $\frac{dA}{dx}$.

(b) Determine the approximate change in A when x changes by $p\%$ of 2.
Tentukan anggaran perubahan bagi A bila x berubah sebanyak $p\%$ daripada 2.

[4 marks]

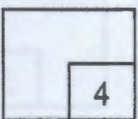
[4 markah]

Answer / Jawapan :

(a)

(b)

6



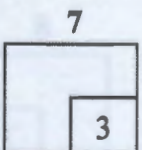
7' It is given that $k(x)$ is a function such that $x = \frac{7+k(x)}{3-k(x)}$, find $k^{-1}(2)$.

Diberi bahawa $k(x)$ ialah suatu fungsi dengan keadaan $x = \frac{7+k(x)}{3-k(x)}$, cari $k^{-1}(2)$.

[3 marks]

[3 markah]

Answer / Jawapan :



For
Examiner's
Use

- 8 Given the function $f(x) = mx - 5$ and $f^2(x) = 36x + 25$, where m is a constant and $m < 0$.

Diberi fungsi $f(x) = mx - 5$ dan $f^2(x) = 36x + 25$, dengan keadaan m ialah pemalar dan $m < 0$.

- (a) Express $f(3)$ in terms of m .
Ungkapkan $f(3)$ dalam sebutan m .

- (b) Find the value of m .
Cari nilai bagi m .

[3 marks]

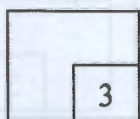
[3 markah]

Answer / Jawapan :

(a)

(b)

8



9. Table 1 below shows a set of positive integers which is arranged in ascending order.
Jadual 1 di bawah menunjukkan satu set integer positif yang disusun dalam tertib menaik.

*For
Examiner's
Use*

Integer Integer	1	$2v-1$	6	$2v+2$	10	12
Frequency Kekerapan	5	3	6	k	2	5

Table 1
Jadual 1

If v and k are positive integers,
Jika v dan k ialah integer positif,

- (a) Find the range of k if the mode is 6.
Cari julat bagi k jika mod ialah 6.
- (b) Let $k = 7$,
Andaikan $k = 7$,
- (i) express the median in terms of v ,
ungkapkan median dalam sebutan v ,
- (ii) find the value of v .
cari nilai v .

[4 marks]

[4 markah]

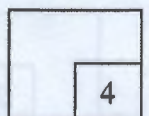
Answer / Jawapan :

(a)

(b) (i)

(ii)

9



For
Examiner's
Use

10 Given a set of data as follow.

Diberi satu set data seperti berikut.

2, 6, 8, 3, 10, 5

(a) Find the first quartile.
Cari kuartil pertama.

(b) If each value of the set of data is multiplied by 5 and then 10 is added to it, find the new first quartile.
Jika setiap nilai set data tersebut didarabkan dengan 5 dan kemudian ditambah dengan 10, cari kuartil pertama yang baru.

[2 marks]

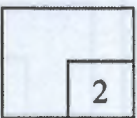
[2 markah]

Answer / Jawapan :

(a)

(b)

10



- 11 Diagram 2 shows the graph of $\frac{y}{x^2}$ against x .

Rajah 2 menunjukkan graf $\frac{y}{x^2}$ melawan x .

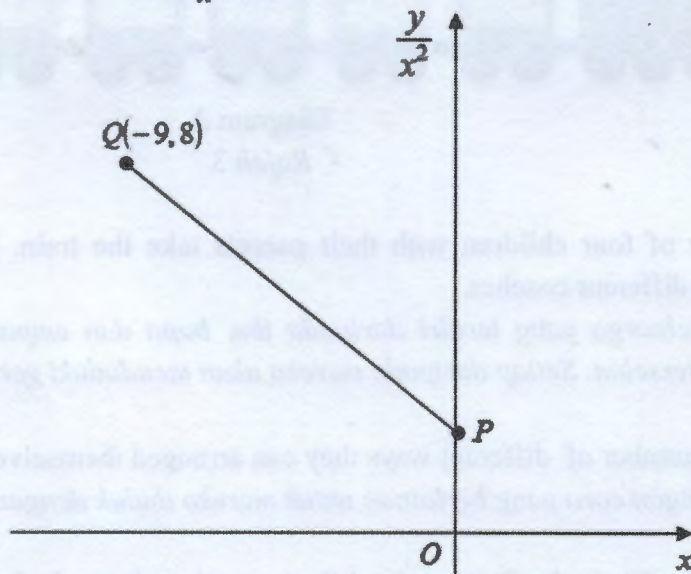


Diagram 2

Rajah 2

It is given that the gradient of straight line PQ is $-\frac{2}{3}$ and point P lies on the $\frac{y}{x^2}$ -axis.

Express y in terms of x .

Diberi bahawa kecerunan garis lurus PQ ialah $-\frac{2}{3}$ dan titik P terletak atas paksi- $\frac{y}{x^2}$.

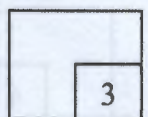
Ungkapkan y dalam sebutan x .

[3 marks]

[3 markah]

Answer / Jawapan :

11



For
Examiner's
Use

- 12 Diagram 3 shows six coaches of a train at an amusement park.
Rajah 3 menunjukkan enam gerabak keretapi di sebuah tapak hiburan.



Diagram 3
Rajah 3

A family of four children with their parents take the train. Each of them will be sitting in different coaches.

Sebuah keluarga yang terdiri daripada ibu, bapa dan empat orang anak menaiki keretapi tersebut. Setiap daripada mereka akan menduduki gerabak yang berlainan.

Find the number of different ways they can arranged themselves in such a way that
Cari bilangan cara yang berlainan untuk mereka duduk dengan keadaan

- (a) father sits in the first coach while the mother sits in the last coach.
bapa duduk di gerabak pertama manakala ibu duduk di gerabak terakhir.
- (b) their parents and the youngest child must sit in three consecutive coaches.
ibu bapa dan anak bongsu mesti duduk di dalam tiga gerabak yang berturutan.

[4 marks]

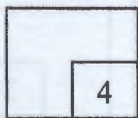
[4 markah]

Answer / Jawapan :

(a)

(b)

12



- 13 Table 2 shows the number of red and yellow marbles labelled with letter *A* and *B* in a box.

Jadual 2 menunjukkan bilangan guli berwarna merah dan kuning yang berlabel A dan B di dalam sebuah kotak.

*For
Examiner's
Use*

Letter Huruf	Colour Warna	Red Merah	Yellow Kuning
<i>A</i>		2	6
<i>B</i>		4	5

Table 2
Jadual 2

Two marbles are drawn randomly from the box. Find the probability that both marbles are labelled with the same letter but with a different colour.

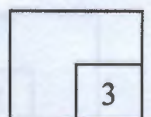
Dua biji guli dipilih secara rawak daripada kotak itu. Cari kebarangkalian bahawa kedua-dua guli itu dilabel dengan huruf yang sama tetapi berlainan warna.

[3 marks]

[3 markah]

Answer / Jawapan :

13



[Lihat halaman sebelah
SULIT

For
Examiner's
Use

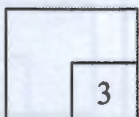
- 14 Find the value of :
Cari nilai bagi :

$$4^a \times 16^{2a} \times \frac{1}{32^{2a}}$$

Answer / Jawapan :

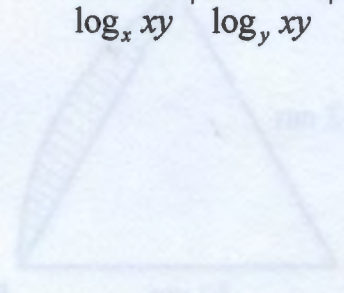
[3 marks]
[3 markah]

14



- 15 Find the value of x which satisfy the following equation :
 Cari nilai x yang memuaskan persamaan berikut :

$$\frac{2}{\log_x xy} + \frac{2}{\log_y xy} + 3 = 5x$$

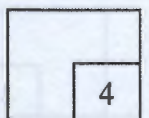


[4 marks]
 [4 markah]

Answer / Jawapan :

For
 Examiner's
 Use

15



[Lihat halaman sebelah
 SULIT

For
Examiner's
Use

- 16 Diagram 4 shows part of a circle with centre O and radius 12 cm.
Rajah 4 menunjukkan sebuah bulatan berpusat O dan jejari 12 cm.

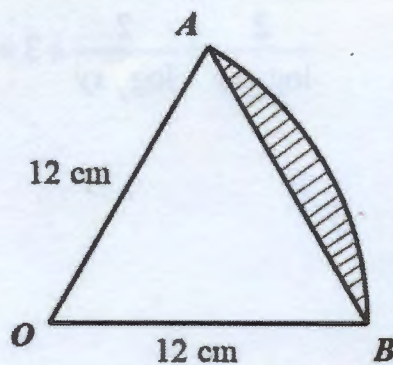


Diagram 4
Rajah 4

Given the length of arc AB is 4π cm, calculate,
Diberi bahawa panjang lengkok AB ialah 4π cm, kira,

- (a) the angle of AOB in radians,
sudut AOB dalam radian,

[1 mark]

[1 markah]

- (b) the area of the shaded region.
luas kawasan berlorek.

[3 marks]

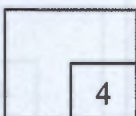
[3 markah]

Answer / Jawapan :

(a)

(b)

16



- 17 Solve the equation $\cos 2\theta = \cos \theta$ for $0 \leq \theta \leq 2\pi$.
Give your answer in terms of π .

*Selesaikan persamaan $\cos 2\theta = \cos \theta$ untuk $0 \leq \theta \leq 2\pi$.
Beri jawapan anda dalam sebutan π .*

[4 marks]

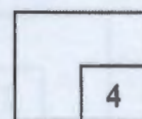
[4 markah]

Answer / Jawapan :



For
Examiner's
Use

17



For
Examiner's
Use

- 18 Diagram 5 shows a probability distribution graph for a random variable X , $X \sim N(\mu, \sigma)$.
Rajah 5 menunjukkan graf taburan kebarangkalian bagi suatu pembolehubah rawak X , $X \sim N(\mu, \sigma)$.

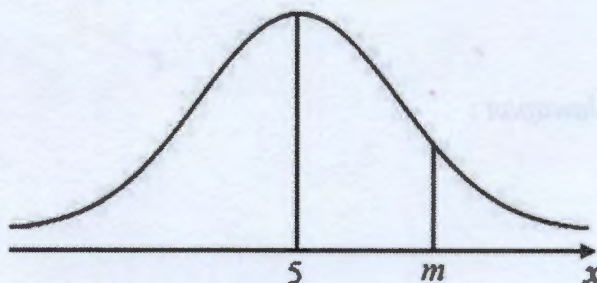


Diagram 5
Rajah 5

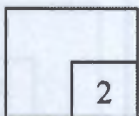
Given the z-score of m is K . Express σ in terms of m and of K .
Diberi skor-z bagi m ialah K . Ungkapkan σ dalam sebutan m dan K .

[2 marks]

[2 markah]

Answer / Jawapan :

18



- 19 Diagram 6 shows a graph of probability distribution of random variable X such that $X \sim B(3, p)$.

Rajah 6 menunjukkan graf taburan kebarangkalian bagi pembolehubah rawak X dengan keadaan $X \sim B(3, p)$.

For
Examiner's
Use

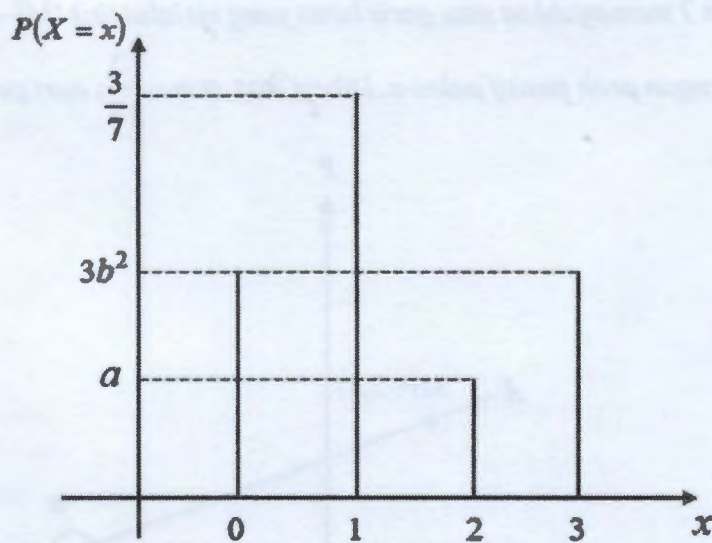


Diagram 6
Rajah 6

- (a) Express b in terms of a .
Ungkapkan b dalam sebutan a .
- (b) Find $P(X \geq 1)$ and give your answer in terms of b .
Cari $P(X \geq 1)$ dan beri jawapan anda dalam sebutan b .

[4 marks]

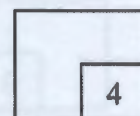
[4 markah]

Answer / Jawapan :

(a)

(b)

19



[Lihat halaman sebelah
SULIT

For
Examiner's
Use

- 20 Diagram 7 shows a straight line that passes through point $M(-2,3)$ and makes an angle α from the positive x -axis. Using $\cos \alpha = -\frac{12}{13}$, find the equation of the straight line AB .

Rajah 7 menunjukkan satu garis lurus yang melalui titik $M(-2,3)$ dan membuat sudut α dengan arah positif paksi- x . Diberi $\cos \alpha = -\frac{12}{13}$, cari persamaan garis lurus AB .

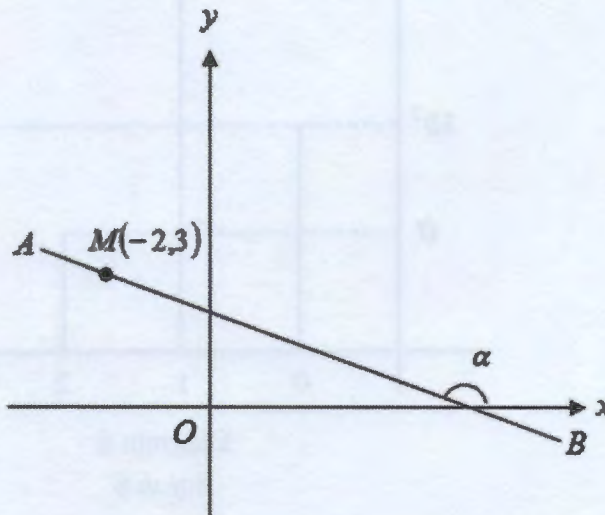
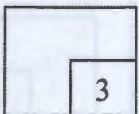


Diagram 7
Rajah 7

[3 marks]
[3 markah]

Answer / Jawapan :

20



- 21 Given points $A(-2,2)$, $B(0,4)$ and $C(3,7)$ are on a straight line. Point B divides the line segment AC such that $AB = kAC$.

Diberi titik-titik $A(-2,2)$, $B(0,4)$ dan $C(3,7)$ terletak pada satu garis lurus. Titik B membahagi tembereng garis AC dengan keadaan $AB = kAC$.

Find the value of k and state the ratio of $AB : BC$.

Cari nilai bagi k dan nyatakan nisbah bagi $AB : BC$.

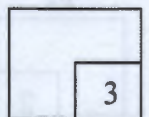
[3 marks]

[3 markah]

Answer / Jawapan :

For
Examiner's
Use

21



[Lihat halaman sebelah
SULIT

For
Examiner's
Use

22

Given $\underline{r} = \begin{pmatrix} 3n-2 \\ 5 \end{pmatrix}$ and $\underline{s} = \begin{pmatrix} m-1 \\ 15 \end{pmatrix}$, express m in terms of n such that $4\underline{r} + \underline{s}$ is parallel to the y -axis.

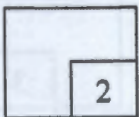
Diberi $\underline{r} = \begin{pmatrix} 3n-2 \\ 5 \end{pmatrix}$ dan $\underline{s} = \begin{pmatrix} m-1 \\ 15 \end{pmatrix}$, ungkapkan m dalam sebutan n dengan keadaan $4\underline{r} + \underline{s}$ adalah selari dengan paksi- y .

[2 marks]

[2 markah]

Answer / Jawapan :

22



- 23 Diagram 8 shows the position of two sailboats, A and B and jetty Q .
Rajah 8 menunjukkan kedudukan dua buah perahu layar, A dan B dan jeti Q .

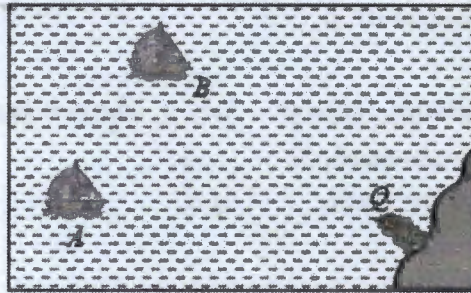


Diagram 8
Rajah 8

Sailboat A is situated 450 m from jetty Q and sailboat B is situated 200 m from jetty Q .

Perahu layar A berada 450 m dari jeti Q dan perahu layar B berada 200 m dari jeti Q .

- (a) By using \underline{u} to represent 50 m in direction of QB , and \underline{v} to represent 100 m in direction of QA , express \overline{AB} in terms of \underline{u} and \underline{v} .

Dengan menggunakan \underline{u} untuk mewakili 50 m pada arah QB , dan \underline{v} untuk mewakili 100 m pada arah QA , ungkapkan \overline{AB} dalam sebutan \underline{u} dan \underline{v} .

- (b) It is given that the sailboat A and B have the same magnitude of 45 kmh^{-1} . If the magnitude of sailboat A is $(26\underline{i} - k\underline{j}) \text{ kmh}^{-1}$, find the value of k to the nearest integer where $k > 0$.

Diberi perahu layar A dan B mempunyai magnitud yang sama iaitu 45 kmh^{-1} . Jika magnitud perahu layar A ialah $(26\underline{i} - k\underline{j}) \text{ kmh}^{-1}$, cari nilai k kepada integer terdekat di mana $k > 0$.

[4 marks]

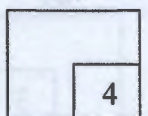
[4 markah]

Answer / Jawapan :

(a)

(b)

23



[Lihat halaman sebelah
SULIT

For
Examiner's
Use

- 24 Given the quadratic function $f(x) = x^2 - 2x + p$, where p is a constant, is always greater than 3.
Find the smallest integer of p .

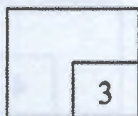
*Diberi fungsi kuadratik $f(x) = x^2 - 2x + p$, dengan keadaan p ialah pemalar, adalah sentiasa lebih besar daripada 3.
Cari nilai p yang paling kecil.*

[3 marks]

[3 markah]

Answer / Jawapan :

24



For
Examiner's
Use

25. The equation of the curve $y = 2x^2 + ax + 12$ can be expressed in the form of $y = 2(x - 3)^2 + b$, where a and b are constants.

Persamaan suatu lengkung $y = 2x^2 + ax + 12$ boleh diungkapkan dalam bentuk $y = 2(x - 3)^2 + b$ dengan keadaan a dan b ialah pemalar.

- (a) Find the value of a and of b .
Cari nilai a dan nilai b .
- (b) Hence, find the minimum value of y .
Seterusnya, cari nilai minimum bagi y .

[3 marks]

[3 markah]

Answer / Jawapan :

(a)

(b)

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT

