

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

- 1 Given that $f : x \rightarrow \frac{x+10}{x}$, $x \neq 0$. Find the object when the image is 3. [2 marks]

Diberi bahawa $f : x \rightarrow \frac{x+10}{x}$, $x \neq 0$. Cari objek apabila imej ialah 3. [2 markah]

Answer/Jawapan :

1

2

- 2 Given the functions $g(x) = 6x$ and $h(x) = 3m + nx$. Express m in terms of n such that $hg(2) = 15$. Hence, find the value of $h(10)$ if the value of n is -1 . [3 marks]

Diberi fungsi-fungsi $g(x) = 6x$ dan $h(x) = 3m + nx$. Ungkapkan m dalam sebutan n dengan keadaan $hg(2) = 15$. Seterusnya, cari nilai bagi $h(10)$ jika nilai bagi n ialah -1 . [3 markah]

Answer/Jawapan :

2

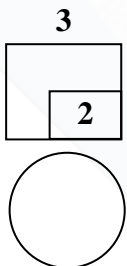
3

[Lihat halaman sebelah
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- 3 Given that the quadratic equation $2x^2 - 2qx = 2p - 1$, where p and q are constants, has two equal roots. Express p in terms of q . [2 marks]

Diberi persamaan kuadratik $2x^2 - 2qx = 2p - 1$, dengan keadaan p dan q ialah pemalar, mempunyai punca-punca yang sama. Ungkapkan p dalam sebutan q . [2 markah]

Answer/Jawapan :



- 4 The variable x and y are related by the equation $y = kh^{\frac{x^2}{4}}$ where h and k are constants. Diagram 1 shows the straight line obtained by plotting $\log_{10} y$ against x^2 .

Pemboleh ubah x dan y dihubungkan oleh persamaan $y = kh^{\frac{x^2}{4}}$ di mana h dan k adalah pemalar. Rajah 1 menunjukkan satu garis lurus yang diperolehi dengan memplotkan $\log_{10} y$ melawan x^2 .

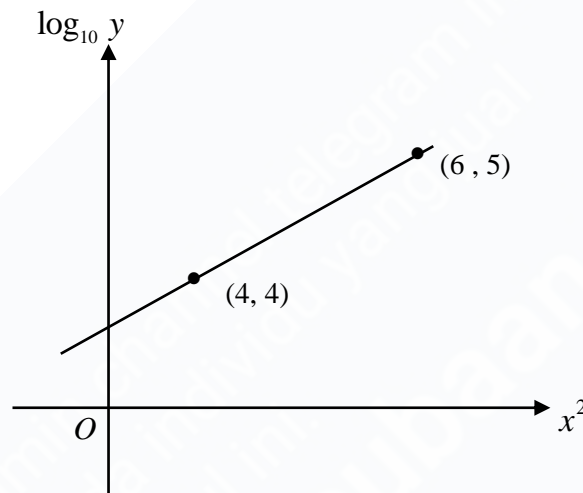


Diagram 1 / Rajah 1

Find the value of h and of k .
Cari nilai bagi h dan k .

[4 marks]
[4 markah]

Answer/Jawapan :

- 5 The graph of a quadratic function $g(x) = hx^2 + 6x + 2k$, where h and k are constants, has a minimum point.

Graf fungsi kuadratik $g(x) = hx^2 + 6x + 2k$, dengan keadaan h dan k adalah pemalar, mempunyai satu titik minimum.

- (a) Given h is an integer such that $-2 < h < 2$, state the value of h .
Diberi h ialah suatu integer dengan keadaan $-2 < h < 2$, nyatakan nilai h .
- (b) Using the answer from (a), find the range of value of k where the graph does not touch the x -axis.
Menggunakan jawapan dari (a), cari julat nilai k apabila graf itu tidak menyentuh paksi- x .

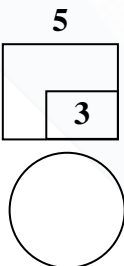
[3 marks]

[3 markah]

Answer/Jawapan :

(a)

(b)



- 6 Diagram 2 shows the graph of a quadratic function $f(x) = |p(x-1)^2 + q|$ with $(1, 9)$ is the maximum point.

Rajah 2 menunjukkan graf fungsi kuadratik $f(x) = |p(x-1)^2 + q|$ dengan $(1, 9)$ ialah titik maksimum.

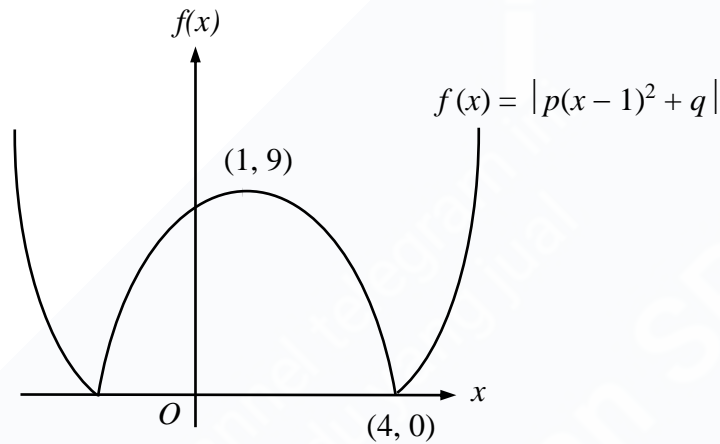


Diagram 2 / Rajah 2

Find,
Cari,

- (a) the value of p and of q ,
nilai p dan nilai q ,
- (b) the range of value of $f(x)$ for the domain $1 \leq x \leq 4$.
julat nilai $f(x)$ untuk domain $1 \leq x \leq 4$.

[3 marks]

[3 markah]

Answer/Jawapan :

(a)

(b)

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10

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7 It is given that $b = a^2$, where a and b are constants.

Solve the equation $a^4 = 7a^2 + 18$.

[3 marks]

Diberi bahawa $b = a^2$, dengan keadaan a dan b adalah pemalar.

Selesaikan persamaan $a^4 = 7a^2 + 18$.

[3 markah]

Answer/Jawapan :

7

3

8 Given $\log_6 3 = p$, express in terms of p

Diberi $\log_6 3 = p$, ungkapkan dalam sebutan p

(a) $\log_{\frac{1}{9}} \sqrt{6}$,

(b) $\log_6 2$.

[4 marks]

[4 markah]

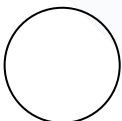
Answer/Jawapan :

(a)

(b)

8

4



- 9 A straight line passes through $A(-3, 5)$ and $C(r, -1)$. If $B(0, 3)$ lies on the straight line AC , find

Satu garis lurus melalui $A(-3, 5)$ dan $C(r, -1)$. Jika $B(0, 3)$ terletak pada garis lurus AC , cari

(a) $AB:BC$,

(b) r .

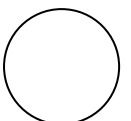
[4 marks]

[4 markah]

Answer/Jawapan :

(a)

(b)



- 10 Aiman draws a straight line such that it is always equidistant from two points, $A(-1, -4)$ and $B(3, -2)$. He says that his y -intercept is 1.

Is Aiman's statement correct? Justify your answer.

[4 marks]

Aiman melukis satu garis lurus dengan keadaan garis itu sentiasa sama jarak dari dua titik, $A(-1, -4)$ dan $B(3, -2)$. Dia menyatakan bahawa pintasan- y ialah 1.

Adakah pernyataan Aiman itu benar? Justifikasikan jawapan anda.

[4 markah]

Answer/Jawapan :

10

4

- 11 Diagram 3 shows the mass of a group of students in a school.

Rajah 3 menunjukkan jisim sekumpulan pelajar di sebuah sekolah.

51, 40, 46, 34, 41, 45, 38

Diagram 3 / Rajah 3

Find

Cari

- (a) the range of the mass,
julat bagi jisim,
- (b) the interquartile range of the mass.
julat antara kuartil bagi jisim.

[3 marks]

[3 markah]

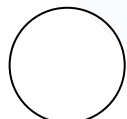
Answer/Jawapan :

(a)

(b)

11

3



- 12 A bag contains of six cards labelled 0, 1, 2, 3, 4 and 5. A card is taken out from the bag, recorded and is replaced back. This process is repeated for 40 times and recorded in table 1.

Sebuah beg mengandungi enam kad berlabel 0, 1, 2, 3, 4 dan 5. Satu kad dikeluarkan daripada beg itu, dicatat dan dikembalikan semula. Proses ini diulangi sebanyak 40 kali dan dicatatkan dalam jadual 1.

Card Kad	0	1	2	3	4	5
Frequency Kekerapan	3	4	9	5	a	11

Table 1 / *Jadual 1*

Find
Cari

- (a) the value of a ,
nilai a ,
- (b) the standard deviation.
sisihan piawai.

[4 marks]
[4 markah]

Answer/*Jawapan* :

(a)

(b)

- 13 Diagram 4 shows a major sector of $OPRQ$ with centre O
Rajah 4 menunjukkan sebuah sektor major $OPRQ$ dengan pusat O .

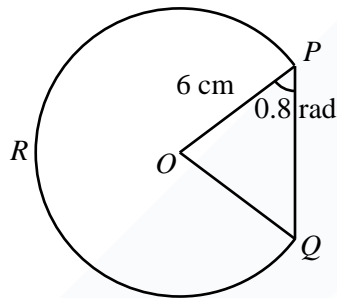


Diagram 4 / Rajah 4

Calculate

Hitung

- (a) the minor angle of POQ in radians,
sudut minor POQ dalam radian,
(b) the major arc length of PRQ .
panjang lengkok major PRQ .

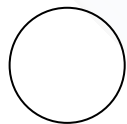
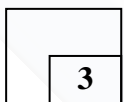
[3 marks]
[3 markah]

Answer/Jawapan :

(a)

(b)

13



14 Diagram 5 shows a regular hexagon in a circle with centre N .

Rajah 5 menunjukkan heksagon sekata terterap di dalam sebuah bulatan berpusat di N .

(a) State angle PMQ in terms of π radians,

Nyatakan sudut PMQ dalam sebutan π radian,

(b) Hence, express the shaded area in terms of j , where j is the radius of the circle.

Seterusnya, ungkapkan luas kawasan berlorek dalam sebutan j di mana j adalah jejari bulatan

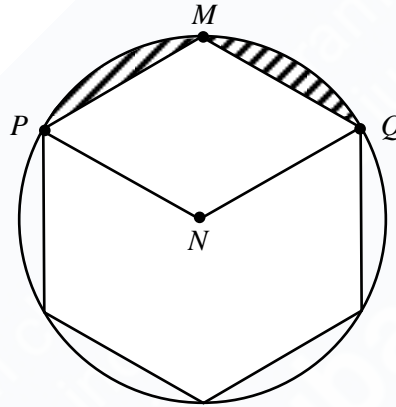


Diagram 5 / Rajah 5

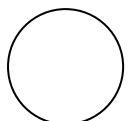
[4 marks]

[4 markah]

Answer/Jawapan :

(a)

(b)



15 Given $f(k) = a(2k-1)^5$ and $f'(k) = 20(2k-1)^b$. Find the value of a and of b .

[2 marks]

Diberi $f(k) = a(2k-1)^5$ dan $f'(k) = 20(2k-1)^b$. Cari nilai a dan nilai b .

[2 markah]

Answer/Jawapan :

15

2

16 The gradient function of a curve is $px^2 - qx$, where p and q are constants. The curve has a turning point at $(3, -4)$. The gradient of the tangent to the curve is 8 when $x = -1$. Find the value of p and of q .

[4 marks]

Fungsi kecerunan suatu lengkung ialah $px^2 - qx$, dengan keadaan p dan q adalah pemalar. Lengkung itu mempunyai titik pusingan pada $(3, -4)$. Kecerunan tangen kepada lengkung itu ialah 8 apabila $x = -1$. Cari nilai p dan nilai q .

[4 markah]

Answer/Jawapan :

16

4

- 17 The sixth term of an arithmetic progression is 47 and sum of the first ten terms is 410.
Find the first term and common difference of the progression. [3 marks]

Sebutan keenam bagi suatu jangjang aritmetik ialah 47 dan hasil tambah sepuluh sebutan pertama ialah 410. Cari sebutan pertama dan beza sepunya bagi jangjang itu. [3 markah]

Answer/Jawapan :

17

3

- 18 It is given that x , 8, $y + 5$ are three consecutive terms of an geometric progression.
Diberi bahawa x , 8, $y + 5$ ialah tiga sebutan berturutan bagi suatu jangjang geometri.

- (a) Express y in terms of x .
Ungkapkan y dalam sebutan x .
- (b) If $y = -1$, find the the sum to infinity of the progression.
Jika $y = -1$, cari hasil tambah ketak terhinggaan jangjang itu.

[4 marks]
[4 markah]

Answer/Jawapan :

(a)

(b)

18

4

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19 Find $\int_{-2}^a \left(\frac{3}{x^2} + 2 \right) dx$, in terms of a .

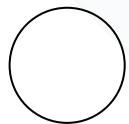
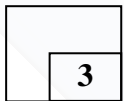
[3 marks]

Cari $\int_{-2}^a \left(\frac{3}{x^2} + 2 \right) dx$, dalam sebutan a .

[3 markah]

Answer/Jawapan :

19



- 20 Diagram 6 shows the shaded region P and Q with the area of 10 unit².
Rajah 6 menunjukkan rantau berlorek P dan Q dengan luas 10 unit².

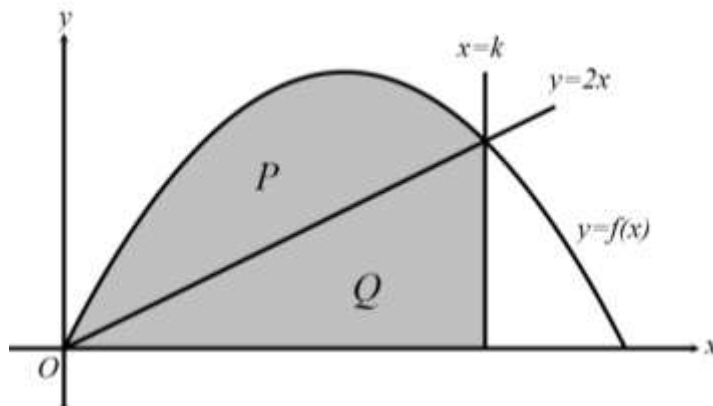


Diagram 6 / Rajah 6

- (a) Using definite integral, write an expression to represent the area of P .
Menggunakan kamiran tentu, tulis ungkapan mewakili luas kawasan P .
- (b) If the area of P is 6 unit², find the value of k .
Jika luas kawasan P ialah 6 unit², cari nilai k .

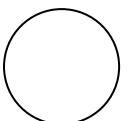
[3 marks]

[3 markah]

Answer/Jawapan :

(a)

(b)

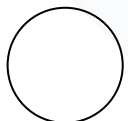


- 21 The variables x and y are related by the equation $\frac{y}{2} = \frac{p}{x} - \frac{q}{x^2}$, where p and q are constants. Explain how the value of p and the value of q can be obtained from a suitable straight line graph. [3 marks]

Pembolehkan x dan y dihubungkan oleh persamaan $\frac{y}{2} = \frac{p}{x} - \frac{q}{x^2}$, di mana p dan q adalah pemalar. Terangkan bagaimana nilai p dan nilai q boleh diperolehi daripada satu graf garis lurus yang sesuai. [3 markah]

Answer/Jawapan :

21



- 22 Diagram 7 shows two vectors, \vec{OA} and \vec{OB} on a Cartesian plane.
Rajah 7 menunjukkan dua vektor \vec{OA} dan \vec{OB} pada satah Cartes.

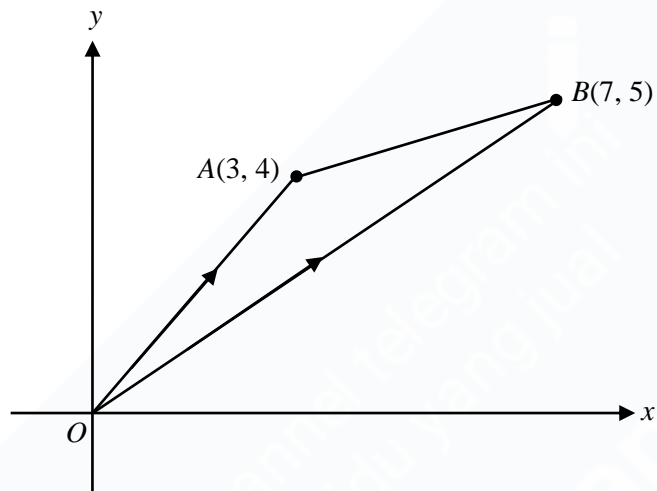


Diagram 7 / Rajah 7

- (a) State \vec{OA} in form of $\begin{pmatrix} x \\ y \end{pmatrix}$

Nyatakan \vec{OA} dalam bentuk $\begin{pmatrix} x \\ y \end{pmatrix}$.

- (b) Express \vec{AB} in the form $x\vec{i} + y\vec{j}$

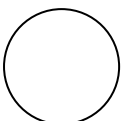
Ungkapkan \vec{AB} dalam bentuk $x\vec{i} + y\vec{j}$

[3 marks]
[3 markah]

Answer/Jawapan :

(a)

(b)



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

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

$$\underline{a} = \begin{pmatrix} 9 \\ r-2 \end{pmatrix}, \quad \underline{b} = \begin{pmatrix} 3 \\ \frac{1}{2} \end{pmatrix}$$

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

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

Find the value of

Cari nilai

(a) k ,

(b) r .

[3 marks]

[3 markah]

Answer/Jawapan :

(a)

(b)

23

3

24 Solve the equation $2(1 - \cos x) = -\sin^2 x$ for $0^\circ \leq x \leq 360^\circ$.

[3 marks]

Selesaikan persamaan $2(1 - \cos x) = -\sin^2 x$ bagi $0^\circ \leq x \leq 360^\circ$.

[3 markah]

Answer / Jawapan:

24

3

25 It is given that $\sin x = k$, where k is a constant and $0^\circ < x < 90^\circ$.

Diberi bahawa $\sin x = k$, dengan keadaan k adalah pemalar dan $0^\circ < x < 90^\circ$.

Express in terms of k

Ungkapkan dalam sebutan k

(a) $\sin(-x)$,

(b) $\sec x$.

$\sec x$.

[3 marks]

[3 markah]

Answer/Jawapan :

(a)

(b)

25

3

Kertas Soalan Tamat

