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

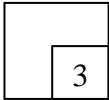**1**   A function *f* is defined by $f : x \to 3 + \dfrac{6}{x-1}, x \neq 1.$

Suatu fungsi f ditakrifkan oleh $f : x \to 3 + \dfrac{6}{x-1}, x \neq 1.$

Find
Cari

(a)   the image of 2*k*,
imej bagi 2*k,*

(b)   the object that has image 0.
objek yang mempunyai imej 0.

[3 *marks*]
[3 *markah*]

1

3

Answer / *Jawapan*: (a) ....

(b) ....

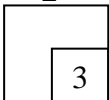**2**   Given the functions $g : x \to 4x + 3$ and $fg : x \to 16x^2 + 24x + 14$, find the function *f*.

[3 *marks*]

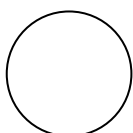*Diberi fungsi-fungsi* $g : x \to 4x + 3$ *dan* $fg : x \to 16x^2 + 24x + 14$, *cari fungsi f.*

[3 *markah*]

2

3

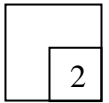Answer / *Jawapan*:.......................................

3   The quadratic equation $px^2 + 30x + 45 = 0$ has equal roots. Find the value of *p*.

[*2 marks*]

Persamaan kuadratik px² + 30x + 45 = 0 mempunyai punca-punca yang sama. Cari nilai p.

[*2 markah*]

Answer / *Jawapan*: ....

4   It is given that the curve $y = p + (x - r)^2$, where *p* and *r* are constants, intersects the *x*-axis at points $(-4, 0)$ and $(1, 0)$. Find the value of *p* and of *r*.
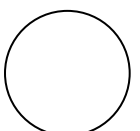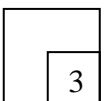
[*3 marks*]

Diberi bahawa lengkung $y = p + (x - r)^2$, dengan keadaan p dan r adalah pemalar, menyilang paksi-x pada titik-titik $(-4, 0)$ dan $(1, 0)$. Cari nilai p dan nilai r.

[*3 markah*]

Answer / *Jawapan* :   *p* = ...
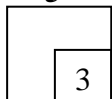
r = ……………..

5   Find the range of values of x for which $4x^2 + 12x - 14 < x(2x + 9)$.

[3 *marks*]

Cari julat nilai x bagi $4x^2 + 12x - 14 < x(2x + 9)$.

[3 *markah*]

5

3

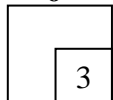Answer / *Jawapan* : ....

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6   Given that $\log_4 y = a$ and $\log_8 2y = b$, find the relation between a and b.

[3 *marks*]

Diberi bahawa $\log_4 y = a$ *dan* $\log_8 2y = b$, *cari hubungan antara a dan b.*

[3 *markah*]

6

3
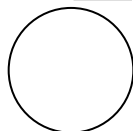
Answer / *Jawapan* : ....

7   Solve the equation $6^{(x-1)} = 3^4 - 3^x$.

[3 *marks*]

Selesaikan persamaan $6^{(x-1)} = 3^4 - 3^x$.

[3 *markah*]

Answer / *Jawapan* : $x = $ ....

7

3

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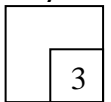
8   Given that $\log_5 9 + 2 \log_5 k = 0$, find the value of *k*.

[4 *marks*]

Diberi bahawa $\log_5 9 + 2 \log_5 k = 0$, *cari nilai k.*

.   [4 *markah*]

Answer / *Jawapan*: $k = $ ....

8

4
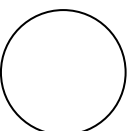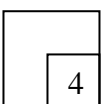
9 The first three terms of a geometric progression are $x + 20, x - 4, x - 20$.
Calculate the value of x and the common ratio, r.

[3 *marks*]

Tiga sebutan yang pertama bagi suatu janjang geometri ialah $x + 20, x - 4, x - 20$.
Hitung nilai x dan nisbah sepunya, r.

[3 *markah*]

Answer / *Jawapan* : $x =$ ....

$r =$ ……………….

10 The nth term of an arithmetic progression, T_n , is given by $T_n = 15 + 5n$.
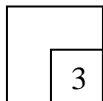Find the sum of the first n terms of the progression.

[3 *marks*]

Sebutan ke-n bagi suatu janjang aritmetik, T_n , diberi oleh $T_n = 15 + 5n$.
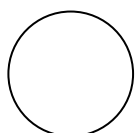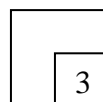*Cari hasil tambah n sebutan yang pertama bagi janjang tersebut.*

[3 *markah*]

Answer / *Jawapan* : ....

11 The variables *x* and *y* are related by the equation $y\sqrt{x} = ab\sqrt{x} + \dfrac{b}{\sqrt{x}}$, where *a* and *b* are constants. A straight line is obtained by plotting *y* against $\dfrac{1}{x}$ and passes through the points $(0, 6)$ and $(-2, 0)$. Find the value of *a* and of *b*.

[3 *marks*]

Pembolehubah x dan y dikaitkan oleh persamaan $y\sqrt{x} = ab\sqrt{x} + \dfrac{b}{\sqrt{x}}$ *dengan keadaan a dan b adalah pemalar. Satu garis lurus diperoleh apabila y diplotkan bertentangan dengan* $\dfrac{1}{x}$ *dan melalui titik* $(0, 6)$ *dan* $(-2, 0)$. *Cari nilai a dan nilai b.*

[3 *markah*]

Answer / *Jawapan* : *a* = ...

b = …………………

11

3

12 Given that the points *A*(2, 4), *B*(6, 1) and *C*(*p*, *q*) are collinear, express *p* in term of *q*.

[3 *marks*]

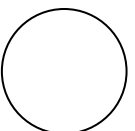*Diberi bahawa titik-titik A(2, 4), B(6, 1) dan C(p, q) adalah segaris, ungkap p dalam sebutan q.*

[3 *markah*]

Answer / *Jawapan* : ....

12

3

13 The points $(3p,\ p)$ and $(p-6,\ 3-4p)$ are equidistant from the origin. Calculate the possible values of p.
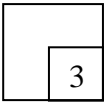
[3 *marks*]

Titik-titik $(3p,\ p)$ *dan* $(p-6,\ 3-4p)$ *adalah sama jarak dari asalan. Hitung nilai-nilai yang mungkin bagi p.*

[3 *markah*]
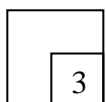
13

3

Answer / *Jawapan* : $p = $ ………………

14 Given $\underset{\sim}{a} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$ and $\underset{\sim}{b} = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$, find the unit vector in the direction of $3\underset{\sim}{a} + \underset{\sim}{b}$.
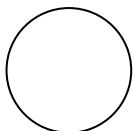
[3 *marks*]

Diberi $\underset{\sim}{a} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$ *dan* $\underset{\sim}{b} = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$**,** *cari vektor unit dalam arah* $3\underset{\sim}{a} + \underset{\sim}{b}$.

[3 *markah*]

14

3

Answer / *Jawapan*: ....

15 It is given that $p = (h + 1)i - 2j$ and $q = - 2i + (h - 2)j$.
If p is parallel to q, find the possible values of h.

[3 *marks*]

Diberi bahawa $p = (h + 1)i - 2j$ dan $q = - 2i + (h - 2)j$.
Jika p selari dengan q, cari nilai-nilai yang mungkin bagi h.

[3 *markah*]

Answer / *Jawapan* : ....
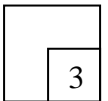
16 It is given that $\cos\theta = m$, where θ is an acute angle. Find $\sin\frac{1}{2}\theta$ in term of *m*.

[3 *marks*]

Diberi bahawa $\text{kos}\,\theta = m$, *dengan keadaan* θ *adalah sudut tirus. Cari* $\sin\frac{1}{2}\theta$

dalam sebutan m.

[3 *markah*]

Answer / *Jawapan* :..
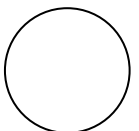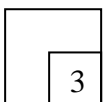
17   Solve the equation $\sin x + \sin 2x = 0$ for $0° \leq x \leq 360°$

[3 *marks*]

Selesaikan persamaan $\sin x + \sin 2x = 0$ *untuk* $0° \leq x \leq 360°$.

[3 *markah*]

17

3

Answer / *Jawapan* : ....

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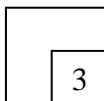
18   Diagram 1 shows a semicircle *ABCD* centred at *O*.
Rajah 1 *menunjukkan sebuah semibulatan ABCD berpusat di O.*
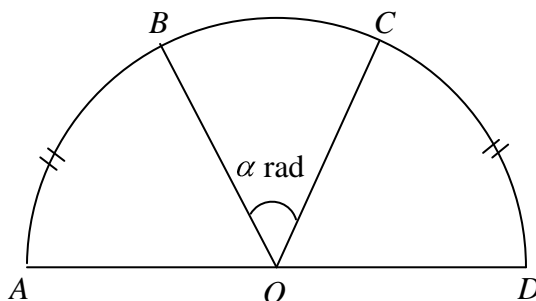

Diagram 1
Rajah 1

It is given that the sum of arc *AB* and arc *CD* is equal to the perimeter of sector *OBC*. Find α , in terms of π .
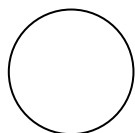
[4 *marks*]

Diberi bahawa jumlah panjang lengkok AB dan lengkok CD adalah sama dengan perimeter sektor OBC. Cari α *, dalam sebutan* π .

[4 *markah*]

18

4

Answer / *Jawapan* : ....

19 Find the coordinates of the turning points of the curve $y = 2x^3 - 9x^2 + 4$.

[3 *marks*]

Cari koordinat titik-titik pusingan bagi lengkung $y = 2x^3 - 9x^2 + 4$.

[3 *markah*]

19

3
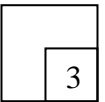
Answer / *Jawapan* : ....

20 Find the positive value of t if $\displaystyle\int_1^t x(x+1)(x-1)\,dx = \frac{1}{4}$.

[4 *marks*]

Cari nilai t yang positif jika $\displaystyle\int_1^t x(x+1)(x-1)\,dx = \frac{1}{4}$.

[4 *markah*]

20

4
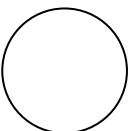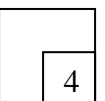
Answer / *Jawapan* : ....

21 Given $\int_{1}^{2} 3g(x)dx = 4$, find

Diberi $\int_{1}^{2} 3g(x)dx = 4$, *cari*

(a) $\int_{2}^{1} g(x)dx$,

(b) the value of the constant h if $\int_{1}^{2} [2g(x) + hx]dx = 11\frac{2}{3}$.

nilai pemalar h jika $\int_{1}^{2} [2g(x) + hx]dx = 11\frac{2}{3}$.

[4 *marks*]
[4 *markah*]

21

4

Answer / *Jawapan* : (a) ....

(b) ....

22 Find the number of different arrangements of all the 10 letters from the word
L O G A R I T H M S if

Cari bilangan susunan yang berlainan bagi semua 10 *huruf daripada perkataan*
L O G A R I T H M S *jika*

    (a)   the three vowels must be side by side,
        tiga huruf vokal mesti bersebelahan,

    (b)   the consonants G and H must be separated.
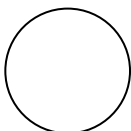   *konsonan* G *dan* H *mesti dipisahkan.*

[4 *marks*]
[4 *markah*]

22

4

Answer / *Jawapan* : (a) ....

(b) ....

23 A committee of 5 members is to be formed from 6 men and 4 women. Find the number of different committees that can be formed if

Suatu jawatankuasa 5 orang ahli hendak dibentuk daripada 6 orang lelaki dan 4 orang perempuan. Cari bilangan jawatankuasa berlainan yang dapat dibentuk jika

(a) there is no restriction,
   tiada syarat dikenakan,

(b) the number of men is more than women.
   bilangan lelaki lebih daripada perempuan.

[4 *marks*]
[4 *markah*]

Answer / *Jawapan* : (a) ....

(b)...

23

4

24 Bag *X* contains *k* red balls and 2 green balls. Bag *Y* contains 4 red balls and 8 green balls. One ball is randomly chosen from each bag. The probability of getting one red ball and one green ball is $\frac{5}{9}$. Find the value of *k*.
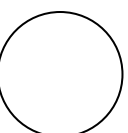
[3 *marks*]

Beg X mengandungi k bola merah dan 2 bola hijau. Beg Y mengandungi 4 bola merah dan 8 bola hijau. Sebiji bola dipilih secara rawak daripada setiap bag. Kebarangkalian mendapat sebiji bola merah dan sebiji bola hijau ialah $\frac{5}{9}$. Cari nilai k.

[3 *markah*]

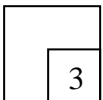Answer / *Jawapan*: *k* = ...

24

3

25   The probability that Ali scored a goal from a penalty kick in a soccer practice is *t*.
Ali attempts *n* penalty kicks and the number of goals is recorded. Given that the mean
and the standard deviation of the number of goals scored are 60 and 6 respectively, find
the value of *t* and of *n*.

[3 *marks*]

*Kebarangkalian Ali menjaringkan gol bagi satu tendangan penalti dalam satu latihan
bola sepak ialah t. Ali melakukan n tendangan penalti dan bilangan jaringan gol
dicatat. Diberi min dan sisihan piawai bagi bilangan jaringan gol masing-masing ialah
60 dan 6, cari nilai t dan nilai n.*

[3 *markah*]

25

3

Answer / *Jawapan* : *t* =.......................................

n =………………………