PAPER 1 **Time: 2 hours**

This question paper consists of 25 questions. Answer all questions. Write your answers in the spaces provided in the question paper.
Kertas soalan ini mengandungi 25 soalan. Jawab **semua** *soalan. Tulis jawapan anda dalam ruang yang disediakan dalam kertas soalan.*

For Examiner's Use

1 Diagram 1 shows the relation between set X and set Y in the graph form.
Rajah 1 menunjukkan hubungan antara set X dan set Y dalam bentuk graf.

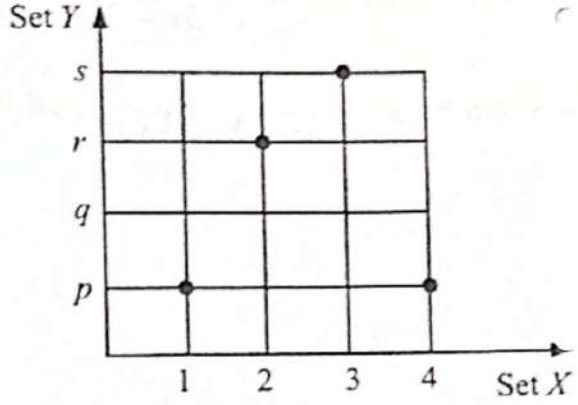

Diagram 1
Rajah 1

State
Nyatakan

(*a*) the relation in the form of ordered pairs.
hubungan itu dalam bentuk pasangan tertib,

(*b*) the type of the relation.
jenis hubungan itu,

(*c*) the range of the relation.
julat hubungan itu.

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

Answer / *Jawapan*:
(*a*)

(*b*)

(*c*)

1

For Examiner's Use

2 Given the functions $g : x \to 2x + 1$ and $h : x \to 3x + 6$, find
Diberi fungsi $g : x \to 2x + 1$ *dan* $h : x \to 3x + 6$, *cari*

(*a*) $g^{-1}(x)$, (*b*) $hg^{-1}(9)$.

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

Answer / *Jawapan*:

(*a*)

(*b*)

2 | 3

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3 Given the functions $g : x \to x - 8$ and $h : x \to \dfrac{x}{3x - 2}$, $x \neq \dfrac{2}{3}$, find the value of $hg(10)$.

[3 *marks*]

Diberi fungsi $g : x \to x - 8$ *dan* $h : x \to \dfrac{x}{3x - 2}$, $x \neq \dfrac{2}{3}$, *cari nilai* $hg(10)$. [3 *markah*]

Answer / *Jawapan*:

3 | 3

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4 Diagram 4 shows the graph of a quadratic function $y = f(x)$.
Rajah 4 menunjukkan graf fungsi kuadratik $y = f(x)$.

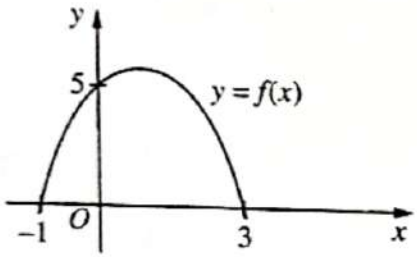


Diagram 4
Rajah 4

State
Nyatakan

(*a*) the roots of the equation $f(x) = 0$,
punca-punca bagi persamaan $f(x) = 0$,

(*b*) the equation of the axis of symmetry of the curve.
persamaan paksi simetri bagi lengkung itu.

4 | 3

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

Answer / *Jawapan*:

(*a*) (*b*)

For Examiner's Use

4

3

5 The quadratic equation $(1-p)x^2 - 6x + 10 = 0$, where p is a constant, has two different roots.
Find the range of values of p. [3 *marks*]
Persamaan kuadratik $(1-p)x^2 - 6x + 10 = 0$, *dengan keadaan p ialah pemalar, mempunyai dua punca berbeza.*
Cari julat nilai p. [3 *markah*]

Answer / *Jawapan*:

5

3

6 The quadratic function $f(x) = -x^2 + 4x - 3$ can be expressed in the form of $f(x) = -(x-2)^2 + k$, where k is constant.
Fungsi kuadratik $f(x) = -x^2 + 4x - 3$ *boleh diungkapkan dalam bentuk* $f(x) = -(x-2)^2 + k$, *dengan keadaan k ialah pemalar.*

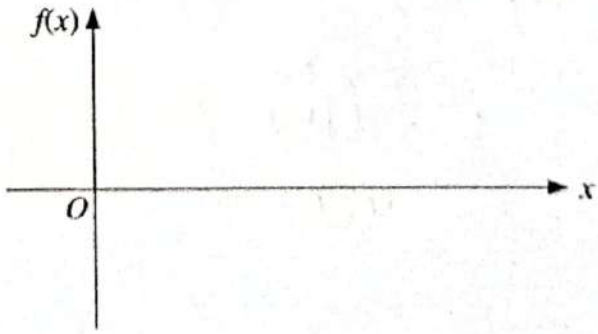
(*a*) Find the value of k.
Cari nilai k.

(*b*) Sketch the graph of the function $f(x)$ on the given axes.
Lakar graf fungsi $f(x)$ *itu pada paksi-paksi yang diberikan.*

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

Answer / *Jawapan*:

(*a*) (*b*)



6

4

7 Solve the equation:
Selesaikan persamaan:

$$3^{x+2} - 3^x = \frac{8}{9}$$

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

Answer / *Jawapan*:

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8 Given $\log_2 3 = a$ and $\log_2 5 = b$, express $\log_8 45$ in terms of a and b. [3 *marks*]
Diberi $\log_2 3 = a$ *dan* $\log_2 5 = b$, *ungkapkan* $\log_8 45$ *dalam sebutan a dan b.* [3 *markah*]

Answer / *Jawapan*:

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9 The sum of the first n terms of an arithmetic progression is given by $S_n = \frac{n}{2}[3n + 1]$.
Hasil tambah n sebutan pertama bagi suatu janjang aritmetik diberi oleh $S_n = \frac{n}{2}[3n + 1]$.

Find
Cari

(*a*) the sum of the first 5 terms,
hasil tambah 5 sebutan pertama,

(*b*) the 5th term.
sebutan ke-5.

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

Answer / *Jawapan*:
(*a*)

(*b*)

10 It is given that $1, x^2, x^4, x^6, \ldots$ is a geometric progression and its sum to infinity is 3.
Diberi bahawa $1, x^2, x^4, x^6, \ldots$ *ialah suatu janjang geometri dan hasil tambah hingga ketakterhinggaan ialah* 3.

Find
Cari

(*a*) the common ratio in terms of x,
nisbah sepunya dalam sebutan x,

(*b*) the positive value of x.
nilai positif bagi x.

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

Answer / *Jawapan*:
(*a*)

(*b*)

For Examiner's Use

10

3

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11 The first three terms of an arithmetic progression are $3h, k, h + 2$.
Tiga sebutan pertama suatu janjang aritmetik ialah $3h, k, h + 2$.

(*a*) Express k in terms of h.
Ungkapkan k *dalam sebutan* h.

(*b*) Find the 10th term of the progression in terms of h.
*Cari sebutan ke-*10 *bagi janjang itu dalam sebutan* h.

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

Answer / *Jawapan*:
(*a*)

(*b*)

11

4

For Examiner's Use

12 The variables x and y are related by the equation $hy = kx^2 + hk$. A straight line graph is obtained by plotting y against x^2 as shown in Diagram 12.
Pemboleh ubah x dan y dihubungkan oleh persamaan $hy = kx^2 + hk$. Graf garis lurus diperoleh dengan memplotkan y melawan x^2, seperti ditunjukkan pada Rajah 12.

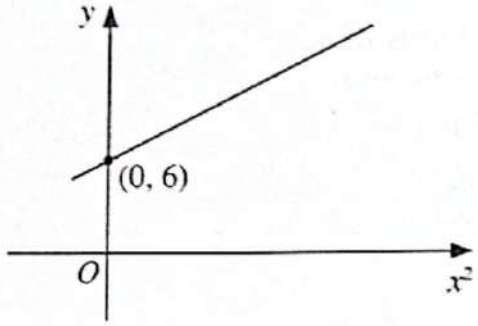

Diagram 12
Rajah 12

Given the gradient of the straight line is 3, find the value of h and of k. [3 *marks*]
Diberi kecerunan garis lurus itu ialah 3, cari nilai h dan nilai k. [3 *markah*]

Answer / *Jawapan*:

12 | 3

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13 A straight line passes through $A(-2, -5)$ and $B(6, 7)$.
Suatu garis lurus melalui $A(-2, -5)$ dan $B(6, 7)$.

(*a*) Given $C(h, 10)$ lies on the straight line AB, find the value of h.
Diberi $C(h, 10)$ terletak di atas garis lurus AB, cari nilai h.

(*b*) Point D divides the line segment AB in the ratio 1 : 3.
Find the coordinates of D.
Titik D membahagikan tembereng garis AB dalam nisbah 1 : 3.
Cari koordinat D.

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

Answer / *Jawapan*:
(*a*)

(*b*)

13 | 4

14 Point P moves such that its distance is always 5 units from $Q(-3, 4)$. Find the equation of the locus of P. [3 *marks*]
Titik P bergerak dengan keadaan jaraknya sentiasa 5 unit dari $Q(-3, 4)$. *Cari persamaan lokus bagi P.* [3 *markah*]

Answer / *Jawapan*:

For Examiner's Use

14

3

15 Diagram 15 shows the vector $\overrightarrow{OR}$.
Rajah 15 *menunjukkan vektor* $\overrightarrow{OR}$.

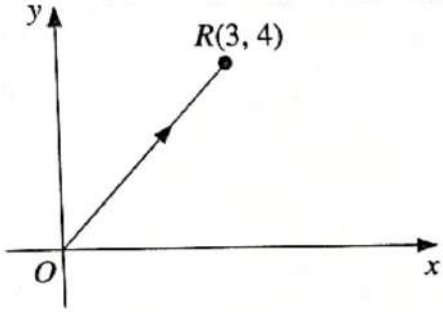

Diagram 15
Rajah 15

Express in the form $x\underset{\sim}{i} + y\underset{\sim}{j}$:
Ungkapkan dalam sebutan $x\underset{\sim}{i} + y\underset{\sim}{j}$:

(*a*) $\overrightarrow{OR}$,

(*b*) The unit vector in the direction of $\overrightarrow{OR}$.
Vektor unit dalam arah $\overrightarrow{OR}$.

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

Answer / *Jawapan*:

(*a*)

(*b*)

15

For Examiner's Use

16 Diagram 16 shows a triangle OAB and M is a point on AB.
Rajah 16 menunjukkan segi tiga OAB dan M ialah satu titik pada AB.

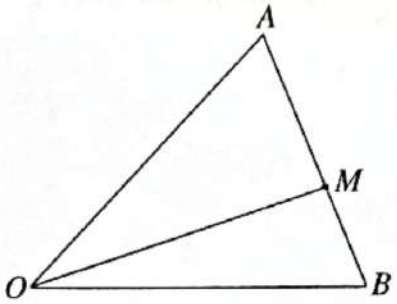

Diagram 16
Rajah 16

Given $\overrightarrow{OA} = 5\underset{\sim}{a}$, $\overrightarrow{OB} = 4\underset{\sim}{b}$ and $2AM = 3MB$, find

Diberi $\overrightarrow{OA} = 5\underset{\sim}{a}$, $\overrightarrow{OB} = 4\underset{\sim}{b}$ *dan* $2AM = 3MB$, *cari*

(*a*) $\overrightarrow{AB}$, (*b*) $\overrightarrow{OM}$.

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

Answer / *Jawapan*:
(*a*)

(*b*)

16
4

17 Diagram 17 shows a sector OPQ of a circle with centre O, and a sector NRS of a circle with centre N.
Rajah 17 menunjukkan sektor OPQ bagi sebuah bulatan berpusat O dan sektor NRS bagi sebuah bulatan berpusat N.

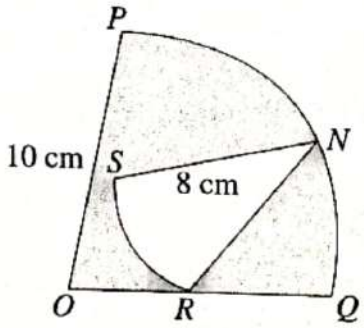

Diagram 17
Rajah 17

Given $\angle POQ = 1.5$ radians and $\angle RNS = 0.5$ radian, find the area, in cm^2, of the shaded region. [3 *marks*]

Diberi $\angle POQ = 1.5$ *radian dan* $\angle RNS = 0.5$ *radian, cari luas, dalam* cm^2, *kawasan berlorek.* [3 *markah*]

Answer / *Jawapan*:

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18 Given $\cos\theta = p$, find $\tan^2\theta$. [2 *marks*]

Diberi kos $\theta = p$, *cari* $\tan^2\theta$. [2 *markah*]

Answer / *Jawapan*:

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19 Given $\frac{d}{dx}\left(\frac{2x}{3-x}\right) = g(x)$, find $\int_1^2 g(x)\,dx$. [3 *marks*]

Diberi $\frac{d}{dx}\left(\frac{2x}{3-x}\right) = g(x)$, *cari* $\int_1^2 g(x)\,dx$. [3 *markah*]

Answer / *Jawapan*:

For Examiner's Use

20 Given $y = 2x(x - 6)$, find
Diberi $y = 2x(x - 6)$, *cari*

(*a*) $\frac{dy}{dx}$,

(*b*) the value of x when y is minimum,
nilai x apabila y adalah minimum,

(*c*) the minimum value of y.
nilai minimum bagi y.

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

Answer / *Jawapan*:
(*a*)

(*b*)

(*c*)

20 | 3

---

21 The volume of a sphere is increasing at a constant rate of 12.8π cm^3 s^{-1}.
Find the radius of the sphere at the instant when the radius is increasing at a rate of 0.2 cm s^{-1}.

$\left[\text{Volume of sphere, } V = \frac{4}{3}\pi r^3\right]$ [3 *marks*]

Isi padu sebuah sfera bertambah dengan kadar tetap 12.8π cm^3 s^{-1}.
Cari jejari sfera itu pada ketika jejari bertambah dengan kadar 0.2 cm s^{-1}.

$\left[\textit{Isi padu sfera, } V = \frac{4}{3}\pi j^3\right]$ [3 *markah*]

Answer / *Jawapan*:

21 | 3

22 A set of data consists of 2, 3, 3, 4, 5, 7 and 9.
Determine the interquartile range of the data. [3 *marks*]
Suatu set data terdiri daripada 2, 3, 3, 4, 5, 7 *dan* 9.
Tentukan julat antara kuartil bagi data itu, [3 *markah*]

Answer / *Jawapan*:

For Examiner's Use

22

3

23 There are 6 sweets, each with a different flavour, which are to be divided equally between 2 children.
Find the number of different ways the division of the sweets can be done.
[3 *marks*]
Terdapat 6 *biji gula-gula, setiap satu berlainan perisa, yang dibahagikan sama banyak antara* 2 *orang kanak-kanak.*
Cari bilangan cara yang berlainan pembahagian gula-gula itu dapat dilakukan. [3 *markah*]

Answer / *Jawapan*:

23

3

24 In a selection of a class monitor, the probability that student X is chosen is $\frac{1}{3}$, while the probability that either student X or student Y is chosen is $\frac{2}{5}$.
Find the probability that
Dalam suatu pemilihan seorang ketua kelas, kebarangkalian murid X dipilih ialah $\frac{1}{3}$, *manakala kebarangkalian murid X atau murid Y dipilih ialah* $\frac{2}{5}$.
Cari kebarangkalian bahawa
(*a*) student Y is chosen,
murid Y dipilih,

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(*b*) student X or student Y is **not** chosen.
murid X atau murid Y **tidak** *dipilih.*

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

Answer / *Jawapan*:

(*a*)

(*b*)

24

3

25 The discrete random variable X has a binomial probability distribution with $n = 4$, where n is the number of trials. Diagram 25 shows the probability distribution of X.
Pemboleh ubah rawak diskret X mempunyai satu taburan kebarangkalian binomial dengan $n = 4$, *dengan keadaan n ialah bilangan percubaan. Rajah 25 menunjukkan taburan kebarangkalian bagi X.*

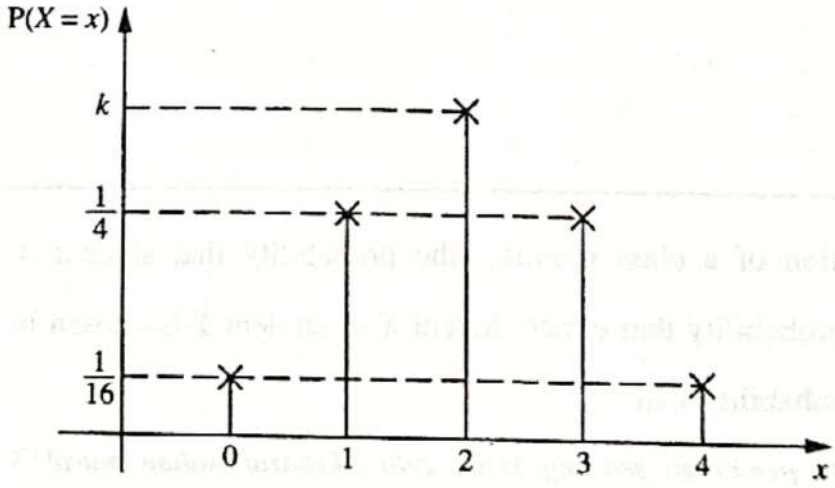

Diagram 25
Rajah 25

Find
Cari

(*a*) the value of k,
nilai k,

(*b*) $P(X \geq 3)$.

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

For Examiner's Use

Answer / *Jawapan*:

(*a*)

(*b*)

25

4

END OF QUESTION PAPER
KERTAS SOALAN TAMAT