The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.

Rumus-rumus berikut boleh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan

ALGEBRA

1 $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

2 $a^m \times a^n = a^{m+n}$

3 $a^m \div a^n = a^{m-n}$

4 $(a^m)^n = a^{mn}$

5 $\log_a mn = \log_a m + \log_a n$

6 $\log_a \dfrac{m}{n} = \log_a m - \log_a n$

7 $\log_a m^n = n \log_a m$

8 $\log_a b = \dfrac{\log_c b}{\log_c a}$

9 $T_n = a + (n-1)d$

10 $S_n = \dfrac{n}{2}[2a + (n-1)d]$

11 $T_n = ar^{n-1}$

12 $S_n = \dfrac{a(r^n - 1)}{r - 1} = \dfrac{a(1 - r^n)}{1 - r}, \; r \neq 1$

13 $S_\infty = \dfrac{a}{1 - r}, \; |r| < 1$

CALCULUS
KALKULUS

1 $y = uv, \; \dfrac{dy}{dx} = u\dfrac{dv}{dx} + v\dfrac{du}{dx}$

2 $y = \dfrac{u}{v}, \; \dfrac{dy}{dx} = \dfrac{v\dfrac{du}{dx} - u\dfrac{dv}{dx}}{v^2}$

3 $\dfrac{dy}{dx} = \dfrac{dy}{du} \times \dfrac{du}{dx}$

4 Area under a curve
Luas di bawah lengkung
$= \int_a^b y \; dx$ or (*atau*)
$= \int_a^b x \; dy$

5 Volume of revolution
Isipadu kisaran
$= \int_a^b \pi y^2 \; dx$ or (*atau*)
$= \int_a^b \pi x^2 \; dy$

STATISTICS
STATISTIK

1 $\bar{x} = \dfrac{\sum x}{N}$

2 $\bar{x} = \dfrac{\sum fx}{\sum f}$

3 $\sigma = \sqrt{\dfrac{\sum (x-\bar{x})^2}{N}} = \sqrt{\dfrac{\sum x^2}{N} - \bar{x}^2}$

4 $\sigma = \sqrt{\dfrac{\sum f(x-\bar{x})^2}{\sum f}} = \sqrt{\dfrac{\sum fx^2}{\sum f} - \bar{x}^2}$

5 $m = L + \left(\dfrac{\frac{1}{2}N - F}{f_m} \right) C$

6 $I = \dfrac{Q_1}{Q_0} \times 100$

7 $\bar{I} = \dfrac{\sum W_i I_i}{\sum W_i}$

8 ${}^nP_r = \dfrac{n!}{(n-r)!}$

9 ${}^nC_r = \dfrac{n!}{(n-r)!r!}$

10 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

11 $P(X = r) = {}^nC_r p^r q^{n-r}, \; p + q = 1$

12 Mean / *Min*, $\mu = np$

13 $\sigma = \sqrt{npq}$

14 $Z = \dfrac{X - \mu}{\sigma}$

GEOMETRY
GEOMETRI

1 Distance / *Jarak*
$= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

2 Midpoint / *Titik tengah*
$(x, y) = \left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2} \right)$

3 A point dividing a segment of a line
Titik yang membahagi suatu tembereng garis
$(x, y) = \left(\dfrac{nx_1 + mx_2}{m+n}, \dfrac{ny_1 + my_2}{m+n} \right)$

4 Area of triangle / *Luas segi tiga*
$= \dfrac{1}{2} \left| (x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3) \right|$

5 $|\mathbf{r}| = \sqrt{x^2 + y^2}$

6 $\hat{\mathbf{r}} = \dfrac{x\mathbf{i} + y\mathbf{j}}{\sqrt{x^2 + y^2}}$

TRIGONOMETRY
TRIGONOMETRI

1 Arc length, $s = r\theta$
Panjang lengkok, $s = j\theta$

2 Area of sector, $A = \frac{1}{2} r^2\theta$
Luas sector, $L = \frac{1}{2} j^2\theta$

3 $\sin^2 A + \cos^2 A = 1$
$\sin^2 A + \text{kos}^2 A = 1$

4 $\sec^2 A = 1 + \tan^2 A$
$\text{sek}^2 A = 1 + \tan^2 A$

5 $\text{cos ec}^2 A = 1 + \cot^2 A$
$\text{kosek}^2 A = 1 + \text{kot}^2 A$

6 $\sin 2A = 2\sin A\cos A$
$\sin 2A = 2\sin A\,\text{kos}\, A$

7 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2\cos^2 A - 1$
$= 1 - 2\sin^2 A$

$\text{kos}\, 2A = \text{kos}^2 A - \sin^2 A$
$= 2\,\text{kos}^2 A - 1$
$= 1 - 2\sin^2 A$

8 $\tan 2A = \frac{2\tan A}{1 - \tan^2 A}$

9 $\sin(A \pm B) = \sin A\cos B \pm \cos A\sin B$
$\sin(A \pm B) = \sin A\,\text{kos}\, B \pm \text{kos}\, A\sin B$

10 $\cos(A \pm B) = \cos A\cos B \mp \sin A\sin B$
$\text{kos}(A \pm B) = \text{kos}\, A\,\text{kos}\, B \mp \sin A\sin B$

11 $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A\tan B}$

12 $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

13 $a^2 = b^2 + c^2 - 2bc\cos A$
$a^2 = b^2 + c^2 - 2bc\,\text{kos}\, A$

14 Area of triangle / *Luas segi tiga*
$= \frac{1}{2} ab\sin C$

Untuk Kegunaan Pemeriksa

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

1 The first three terms of an arithmetic progressions are $p, 10$ and q. Find the value of $p + q$.

Tiga sebutan pertama suatu janjang aritmetik ialah $p, 10$ *dan* q. *Cari nilai* $p + q$.

[2 *marks*]

[2 *markah*]

Answer / *Jawapan* :

1

2

2 The first term and second term of a geometric progression are 18 and 4 respectively. Find the sum to infinity of the progression.

Sebutan pertama dan sebutan kedua bagi suatu janjang geometri masing-masing ialah 18 *dan* 4. *Cari hasil tambah ketakterhinggaan bagi janjang ini.*

[2 *marks*]

[2 *markah*]

Answer / *Jawapan* :

2

2

Untuk Kegunaan Pemeriksa

3 Given $A(-6, 6)$, $B(2, -3)$ and $C(4, k)$ forms a triangle with $\angle ACB = 90°$. Find the possible value of k.

Diberi $A(-6, 6), B(2, -3)$ *dan* $C(4, k)$ *membentuk sebuah segitiga dengan* $\angle ACB = 90°$. *Cari nilai yang mungkin bagi* k.

[3 *marks*]

[3 *markah*]

Answer / *Jawapan* :

3

3

---

4 Determine whether the locus $2x^2 + 2y^2 - 5x + 6y + 13 = 0$ passes through the y-axis or not.

Tentukan sama ada lokus $2x^2 + 2y^2 - 5x + 6y + 13 = 0$ *melalui paksi-y atau tidak.*

[4 *marks*]

[4 *markah*]

Answer / *Jawapan* :

4

4

Untuk Kegunaan Pemeriksa

5 Solve the question:

Selesaikan:

$$3^{x-1} + 3^x - 12 = 0$$

[2 *marks*]

[2 *markah*]

Answer / *Jawapan* :

5

2

---

6 Simplify :

Ringkaskan :

$$(7x^{-1})^2 \times (49^{-2}xy)^3 \div (7xy)^{-2}$$

[3 *marks*]

[3 *markah*]

Answer / *Jawapan* :

6

3

Untuk Kegunaan Pemeriksa

7 Solve the equation :

Selesaikan persamaan :

$$\log_x 128 - \log_{\sqrt{x}} 2x = 3$$

[3 *marks*]

[3 *markah*]

Answer / *Jawapan* :

7

3

---

8 Given $\underline{p} = \begin{pmatrix} 5 \\ -12 \end{pmatrix}$ and $\underline{q} = \begin{pmatrix} k+2 \\ 3 \end{pmatrix}$, find

Diberi $\underline{p} = \begin{pmatrix} 5 \\ -12 \end{pmatrix}$ dan $\underline{q} = \begin{pmatrix} k+2 \\ 3 \end{pmatrix}$, cari

(a) $\left|\underline{p}\right|$

(b) the value of k that $\underline{p} + \underline{q}$ is parallel to the y-axis

nilai k dengan keadaan $\underline{p} + \underline{q}$ adalah selari dengan paksi - y

[3 *marks*]

Answer / *Jawapan* : [3 *markah*]

(a)

(b)

8

3

Untuk Kegunaan Pemeriksa

9 Diagram 1 shows the vectors $\overrightarrow{AB}$, $\overrightarrow{AD}$ and $\overrightarrow{AC}$ drawn on a square grid.

Rajah 1 *menunjukkan vektor – vektor* $\overrightarrow{AB}$, $\overrightarrow{AD}$ *dan* $\overrightarrow{AC}$ *dilukis pada grid segi empat sama.*

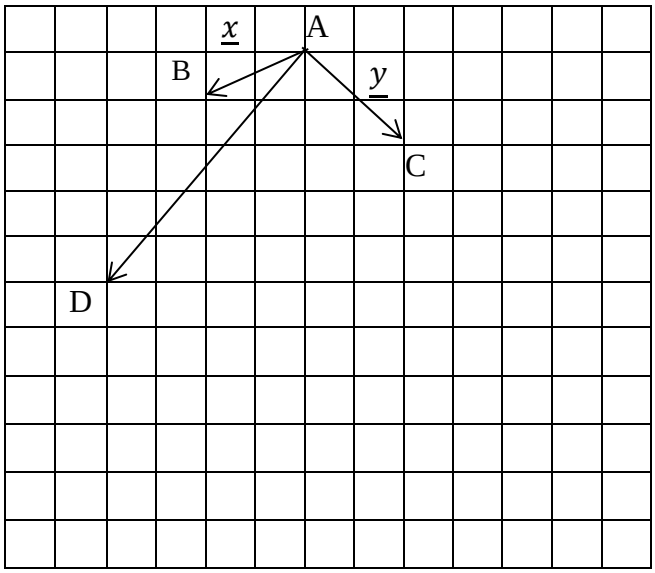

Diagram 1
Rajah 1

(a) Express $\overrightarrow{AD}$ in the form $p\underline{x} + q\underline{y}$, where p and q are constants.

Ungkapkan $\overrightarrow{AD}$ *dalam bentuk* $p\underline{x} + q\underline{y}$, *dengan keadaan p dan q ialah pemalar.*

(b) On the diagram 1, mark and label the point W such that $\overrightarrow{DW} + \overrightarrow{AB} = 2\overrightarrow{AC}$

Pada rajah 1, *tanda dan labelkan titik* W *dengan keadaan* $\overrightarrow{DW} + \overrightarrow{AB} = 2\overrightarrow{AC}$

[3 marks]

[3 markah]

Answer / *Jawapan* :

(a)

9

3

(b)

Untuk Kegunaan Pemeriksa

10 A cuboid with square base has a total surface area, $A = 3x^2 - 4x$, where x is the length of the side of the base.

Sebuah kuboid dengan tapak segi empat sama mempunyai jumlah luas permukaan, $A = 3x^2 - 4x$, *di mana* x *ialah panjang sisi bagi tapak.*

Find

Cari

(a) $\frac{dA}{dx}$

(b) The small change in the total surface area when the length of the side of the base decreases from 5 to 4.99 cm.

Perubahan kecil bagi jumlah luas permukaan apabila panjang sisi tapak menyusut dari 5 ke 4.99 cm.

[3marks]

[3 markah]

Answer / *Jawapan :*

10

3

Untuk Kegunaan Pemeriksa

11 Given that $\int_1^4 g(x)dx = -3$, find

Diberi bahawa $\int_1^4 g(x)dx = -3$, *cari*

(a) the value of $\int_4^1 g(x)dx$,
nilai $\int_4^1 g(x)dx$,

(b) the value of k if $\int_1^4 [k - g(x)]\,dx = 6$.
nilai k *jika* $\int_1^4 [k - g(x)]\,dx = 6$.

[3 marks]

[3 markah]

Answer / *Jawapan* :

(a)

(b)

11

3

Untuk Kegunaan Pemeriksa

12 It is given that $\int \left(\frac{3}{x^3} + nx^2 + 3\right) dx = \frac{m}{x^2} + 2x^3 + 3x + c$, when $c, m,$ and n are constants. Find the value of m and n.

Diberi bahawa $\int \left(\frac{3}{x^3} + nx^2 + 3\right) dx = \frac{m}{x^2} + 2x^3 + 3x + c$, *apabila* $c, m,$ *dan* n *adalah pemalar. Cari nilai* m *dan* n.

[3 *marks*]

[3 *markah*]

Answer / *Jawapan* :

12

3

Untuk Kegunaan Pemeriksa

13 Diagram 2 shows the graph of a quadratic function $f(x) = 14 - (x - d)^2$, where d, h and k are constant.

Rajah 2 menunjukkan graf fungsi kuadratik $f(x) = 14 - (x - d)^2$, *dengan keadaan* d, h *dan* k *ialah pemalar.*

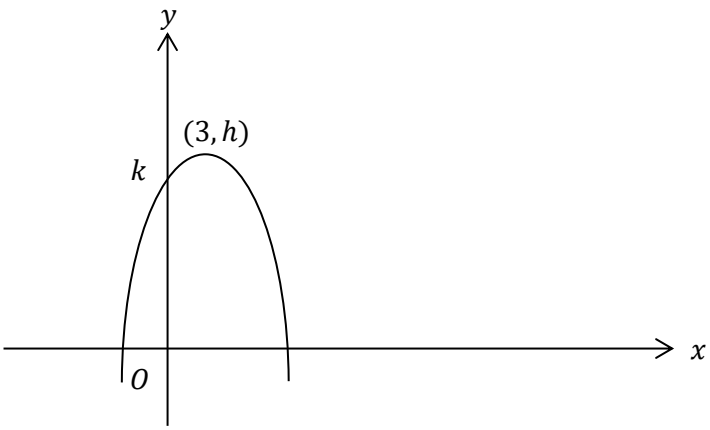

Diagram 2
Rajah 2

Find the value of d, h and k.

Cari nilai bagi d, h *dan* k.

(a) d and h
d *dan* h

(b) the coordinate of k
koordinat k

[3 *marks*]

[3 *markah*]

Answer / *Jawapan* :

13

3

Untuk Kegunaan Pemeriksa

14 Given the quadratic equation $kx(x-1) = 5$.

Diberi persamaan kuadratik $kx(x-1) = 5$.

(a) Express x in terms of k.

Ungkapkan x *dalam sebutan* k.

(b) Express k in terms of m when 2 and m are the roots of the equation $kx(x-1) = 5$.

Ungkapkan k *dalam sebutan* m *apabila* 2 *dan* m *adalah punca-punca bagi persamaan kuadratik* $kx(x-1) = 5$.

[4 *marks*]

[4 *markah*]

Answer / *Jawapan* :

14

4

Untuk Kegunaan Pemeriksa

15 Diagram 3 shows the straight line graph.

Rajah 3 menunjukkan graf garis lurus.

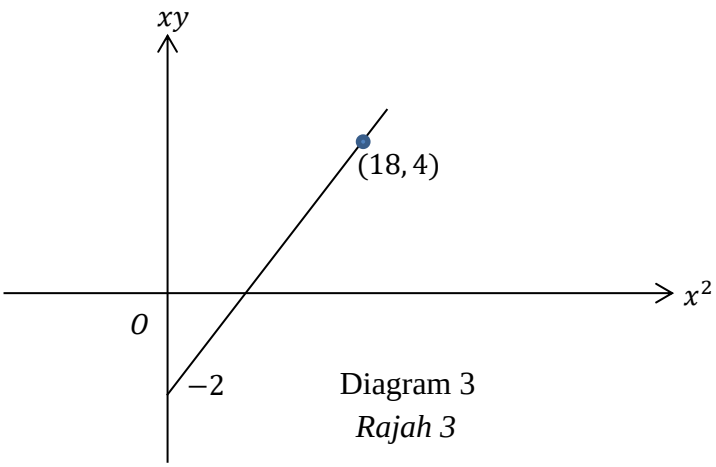

Diagram 3
Rajah 3

The variables x and y are related by the equation $x + \frac{p}{x} = qy$, where p and q are constants. Find the value of p and of q.

Pemboleh ubah x and y dihubungkan oleh persamaan $x + \frac{p}{x} = qy$, di mana p dan q ialah pemalar. Cari nilai p dan nilai q.

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

Answer / *Jawapan* :

15

3

Untuk Kegunaan Pemeriksa

16 Table 1 shows the achievement of three classes, 5 Dahlia, 5 Melur and 5 Vinca in an Additional Matehematics test.

Jadual 1 *menunjukkan pencapaian bagi tiga kelas,* 5 *Dahlia,* 5 *Melur dan* 5 *Vinca dalam satu ujian Matematik Tambahan.*

Class ***Kelas***	**Mean mark** ***Min markah***	**Standard deviation of the mark** ***Sisihan piawai bagi markah***
5 Dahlia	75	4
5 Melur	70	1
5 Vinca	75	2

Table 1
Jadual 1

(a) Which class shows the most consistent achievement in the test?
Give reason for your answer.
Kelas manakah menunjukkan pencapaian yang paling konsisten dalam ujian itu?
Beri sebab untuk jawapan anda.

(b) State the varians for the class stated in 1(a).
Nyatakan varians bagi kelas yang dinyatakan di 1*(a).*

[3 *marks*]

[3 *markah*]

Answer / *Jawapan* :

16

3

Untuk Kegunaan Pemeriksa

17 Afiq and Chan are qualified to the final of a badminton tournament in their school. The player who first wins any two sets of the match is the winner. The probability Afiq wins in any of the sets is $\frac{3}{7}$.

Afiq dan Chan layak ke pertandingan peringkat akhir kejohanan badminton di sekolah mereka. Pemain yang pertama memenangi mana-mana dua set permainan adalah pemenang. Kebarangkalian Afiq menang dalam mana-mana set ialah $\frac{3}{7}$.

Find the probability that
Cari kebarangkalian bahawa

(a) the winner is determined after two sets of the match.
pemenang ditentukan selepas dua set permainan.

(b) Afiq will win the tournament after playing three sets of the match.
Afiq akan menang kejohanan itu selepas bermain tiga set permainan.

[4 *marks*]

[4 markah]

Answer / *Jawapan* :

17

4

Untuk Kegunaan Pemeriksa

18 Given the function $f(x) = 5 - 2x$ and $g(x) = 3x$, find

(a) the value of x when $f(x)$ maps onto itself,

nilai x apabila $f(x)$ memetakan kepada diri sendiri,

(b) the value of x if $gf(x) = \frac{1}{2}g(x)$.

nilai x jika $gf(x) = \frac{1}{2}g(x)$.

[3 *marks*]

[3 *markah*]

Answer / *Jawapan* :

(a)

(b)

18

3

Untuk Kegunaan Pemeriksa

19 Diagram 4 below shows the composite function *hf*.

Rajah 4 *menunjukkan fungsi gubahan hf*.

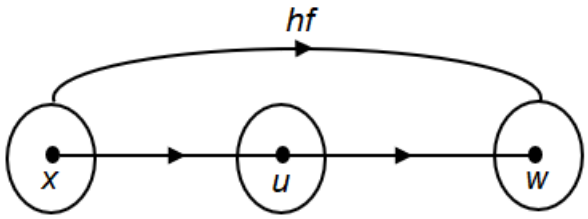

Diagram 4

Rajah 4

State/ Nyatakan

(a) the function that maps *x* to *u*,

fungsi yang memetakan x kepada u,

(b) $hf(x)$

(c) $h^{-1}(w)$

[4 *marks*]

[4 markah

Answer / *Jawapan* :

(a)

(b)

(c)

19

4

Untuk Kegunaan Pemeriksa

20 (a) State the value of ${}^{n}C_{n}$.

Nyatakan nilai bagi ${}^{n}C_{n}$.

(b) There are 12 different coloured balls in a basket. Find the number of ways if

Dalam sebuah raga terdapat 12 *biji bola berlainan warna. Cari bilangan cara jika*

(i) 4 balls can be chosen,

4 *bola boleh dipilih,*

(ii) at least 10 balls can be chosen.

sekurang-kurangnya 10 *biji bola boleh dipilih.*

[4 *marks*]

[4 *markah*]

Answer / *Jawapan* :

(a)

(b) (i)

(ii)

20

4

Untuk Kegunaan Pemeriksa

21 Diagram 5 shows the graph of binomial distribution $X \sim B(4, p)$.

Rajah 5 *menunjukkan graf bagi taburan binomial* $X \sim B(4, p)$.

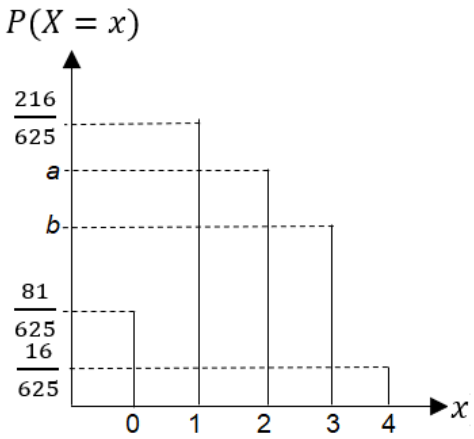

Diagram 5

Rajah 5

(a) Express $P(X \leq 1) + P(X > 3)$ in terms of *a* and *b*,

Ungkapkan $P(X \leq 1) + P(X > 3)$ *dalam sebutan a dan b*.

(b) Find the value of *p*.

Cari nilai p. [4 *marks*]

[4 *markah*]

Answer / *Jawapan* :

(a)

21

(b)

4

Untuk Kegunaan Pemeriksa

22. Diagram 6 shows the normal distribution graph for a random variable $X \sim N(\mu, 4)$.

Rajah 6 *menunjukkan graf taburan normal bagi pemboleh ubah rawak* $X \sim N(\mu, 4)$.

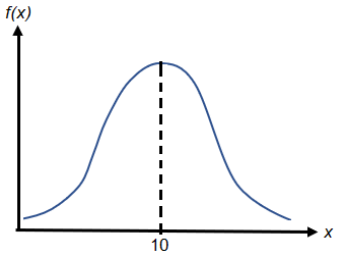

Diagram 6

Rajah 6

(a) State

Nyatakan

(i) the value of μ

nilai μ,

(ii) value of standard deviation

nilai bagi sisihan piawai.

(b) By using values of min and standard deviation from (a), find value of $P(X \geq 13)$.

Dengan menggunakan nilai min dan sisihan piawai dari (a), cari nilai bagi $P(X \geq 13)$.

[4 *marks*]

[4 markah]

Answer / *Jawapan* :

(a) (i)

(ii)

(b)

22

4

Untuk Kegunaan Pemeriksa

23 Diagram 7 shows the sector *OPQ* with centre *O*.
Rajah 7 menunjukkan sebuah sektor OPQ dengan pusat O.
[Use/ *Guna* $\pi = 3.142$]

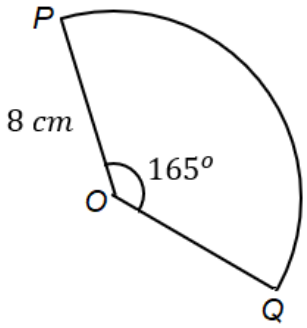

Diagram 7
Rajah 7

Calculate/ *Hitung*

(a) $\angle POQ$ in terms of π radian,
$\angle POQ$ *dalam sebutan* π *radian,*

(b) the perimeter, in cm, sector *OPQ*.
perimeter, dalam cm, sektor OPQ. [3 *marks*]
[3 *markah*]

Answer / Jawapan :

(a)

23

(b)

3

Untuk Kegunaan Pemeriksa

24 Solve the equation $2\sin^2 x - 3\cos x$ for $0° \leq x \leq 360°$.

Selesaikan persamaan $2\sin^2 x - 3\cos x$ *bagi* $0° \leq x \leq 360°$.

[3 *marks*]

[3 *markah*]

Answer / *Jawapan* :

24

3

25 Given that $\cos x = h$. State in terms of *h* for the value of

Diberi bahawa $kos\ x = h$. *Nyatakan dalam sebutan h bagi nilai*

(a) $sec\ 2x$

$sek\ 2x$

(b) $\sin(90^o + x)$

[4 *marks*]

[4 *markah*]

Answer / *Jawapan* :

(a)

(b)

25

4

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT