



**JABATAN PELAJARAN NEGERI TERENGGANU**  
**PEPERIKSAAN PERTENGAHAN TAHUN (OTI 1) 2010**  
**TINGKATAN 5**

**ADDITIONAL MATHEMATICS**

**Paper 1**

**Two Hours**

NAMA: .....

TINGKATAN: .....

**DO NOT OPEN THIS QUESTION PAPER  
UNTIL YOU ARE TOLD TO DO SO**

1. *This question paper consists of 25 questions.*
2. *Answer all questions.*
3. *Give only one answer for each question.*
4. *Write your answers in the spaces provided in this question paper.*
5. *Show your working. It may help you to get marks.*
6. *If you wish to change your answer, cross out the work that you have done. Then write down the new answer.*
7. *The diagrams in the questions provided are not drawn to scale unless stated.*
8. *The marks allocated for each question are shown in brackets.*
9. *You may use a non-programmable scientific calculator and a four-figure mathematical table.*
10. *This question paper must be handed in at the end of the examination.*

<i>Untuk Kegunaan Pemeriksa</i>		
Soalan	Markah Penuh	Markah Diperoleh
1	2	
2	2	
3	2	
4	3	
5	3	
6	3	
7	4	
8	3	
9	3	
10	3	
11	4	
12	3	
13	3	
14	4	
15	3	
16	4	
17	4	
18	3	
19	4	
20	3	
21	3	
22	3	
23	3	
24	4	
25	4	
Jumlah	80	

Disediakan Oleh:  
AKRAM NEGERI TERENGGANU

Dibiayai Oleh:  
KERAJAAN NEGERI TERENGGANU

**TERENGGANU ANJUNG ILMU**

Dicetak Oleh:  
Percetakan Yayasan Islam Terengganu Sdn. Bhd.  
Tel: 609-666 8611/6652/8601 Faks: 609-666 0611/0063

This question paper consists of 24 printed pages

[Lihat sebelah  
**SULIT**

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

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

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

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

$$4. (a^m)^n = a^{m \cdot n}$$

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

$$6. \log_a \frac{m}{n} = \log_a m - \log_a n$$

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

$$8. \log_a b = \frac{\log_c b}{\log_c a}$$

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

$$10. S_n = \frac{n}{2} \{2a + (n-1)d\}$$

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

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

$$13. S_\infty = \frac{a}{1 - r}, |r| < 1$$

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### CALCULUS / KALKULUS

$$1. y = uv$$

$$\frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$$

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

$$3. \frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$$

$$4. \text{Area under a curve}$$

Luas di bawah lengkung

$$= \int_a^b y \, dx \text{ or / atau}$$

$$= \int_a^b x \, dy$$

$$5. \text{Volume generated}$$

Isipadu janaan

$$= \int_a^b \pi y^2 \, dx \text{ or / atau}$$

$$= \int_a^b \pi x^2 \, dy$$

## STATISTICS / STATISTIK

1.  $\bar{x} = \frac{\sum x}{N}$

2.  $\bar{x} = \frac{\sum fx}{\sum f}$

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

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

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

6.  $I = \frac{Q_1}{Q_0} \times 100$

7.  $\bar{I} = \frac{\sum W_i I_i}{\sum W_i}$

8.  ${}^n P_r = \frac{n!}{(n-r)!}$

9.  ${}^n C_r = \frac{n!}{(n-r)! r!}$

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

11.  $p(X=r) = {}^n C_r p^r q^{n-r}, p+q=1$

12. Mean / Min = np

13.  $\sigma = \sqrt{npq}$

14.  $Z = \frac{X - \mu}{\sigma}$

## GEOMETRI (GEOMETRY)

1. Distance / Jarak

$$= \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

2. Midpoint / Titik tengah

$$(x, y) = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

3. A point dividing a segment of a line

*Titik yang membahagi suatu tembereng garis*

$$(x, y) = \left( \frac{nx_1 + mx_2}{m+n}, \frac{ny_1 + my_2}{m+n} \right)$$

4. Area of triangle / Luas segi tiga

$$\frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)|$$

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

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

## TRIGONOMETRY / TRIGONOMETRI

1. Arc length,  $s = r\theta$   
Panjang lengkok,  $s = j\theta$
2. Area of sector =  $\frac{1}{2} r^2 \theta$   
Luas sektor,  $L = \frac{1}{2} j^2 \theta$
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.  $\text{cosec}^2 A = 1 + \cot^2 A$   
 $\text{kosek}^2 A = 1 + \text{kot}^2 A$
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.  $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$   
 $\sin(A \pm B) = \sin A \text{kos} B \pm \text{kos} A \sin B$
9.  $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$   
 $\text{kos}(A \pm B) = \text{kos} A \text{kos} B \mp \sin A \sin B$
10.  $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$
11.  $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$
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  
 $= \frac{1}{2} ab \sin C$

For  
examiner's  
use

Answer all questions.

Jawab semua soalan.

- 1 The graph in Diagram 1 shows the relation between set A and set B.  
Graf dalam Rajah 1 menunjukkan hubungan antara set A dan set B.

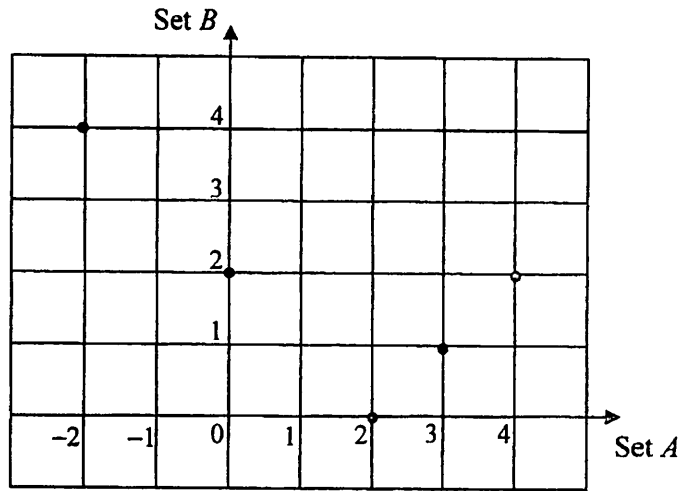


Diagram 1 / Rajah 1

State

Nyatakan

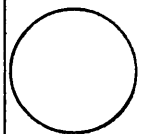
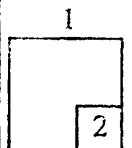
- (a) the image of 4,  
imej bagi 4,
- (b) the type of the relation.  
jenis hubungan itu.

[2 marks]

[2 markah]

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

(b) .....



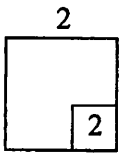
For  
examiner's  
use

- 2 Given the function  $f(x) = \frac{x}{1+x}$ ,  $x \neq -1$ , find the value of  $k$  if  $f^{-1}(4) = k$ .

[2 marks]

Diberi fungsi  $f(x) = \frac{x}{1+x}$ ,  $x \neq -1$ , cari nilai  $k$  jika  $f^{-1}(4) = k$ .

[2 markah]



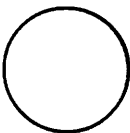
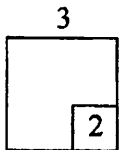
Answer / Jawapan :  $k = \dots\dots\dots$

- 3 If one of the roots of the quadratic equation  $x^2 - kx - 10 = 0$  is 2, calculate the value of  $k$ .

[2 marks]

Jika satu punca bagi persamaan kuadratik  $x^2 - kx - 10 = 0$  ialah 2, hitung nilai bagi  $k$ .

[2 markah]



Answer / Jawapan :  $k = \dots\dots\dots$

For  
examiner's  
use

- 4 The quadratic equation  $3px^2 - 2x - 5 = 0$  does not intersect the  $x$ -axis. Find the range of values of  $p$ . [3 marks]

*Persamaan kuadratik  $3px^2 - 2x - 5 = 0$  tidak bersilang pada paksi- $x$ . Cari julat bagi nilai  $p$ . [3 markah]*

Answer / Jawapan : .....

4

3
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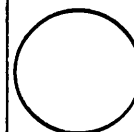
- 5 Find the range of values of  $x$  if  $x(x + 3) < 10$ . [3 marks]

*Cari julat nilai  $x$  jika  $x(x + 3) < 10$ . [3 markah]*

Answer / Jawapan : .....

5

3
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For  
examiner's  
use

6 In Diagram 6,  $(-4, k)$  is a turning point of the curve  $y = a(x + h)^2 + 18$ .

Dalam Rajah 6,  $(-4, k)$  adalah titik pusingan bagi lengkung  $y = a(x + h)^2 + 18$ .

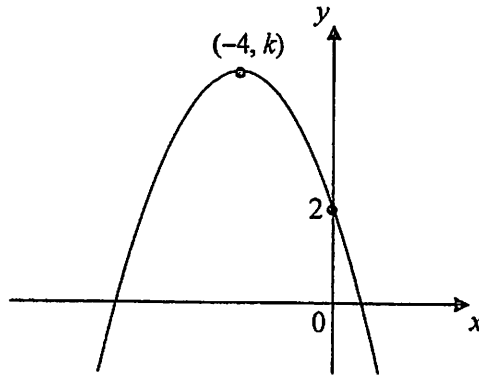


Diagram 6 / Rajah 6

Determine the value of  $a$ ,  $h$  and  $k$ .

Tentukan nilai  $a$ ,  $h$  dan  $k$ .

[3 marks]  
[3 markah]

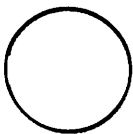
6

3

Answer / Jawapan :  $a = \dots\dots\dots$

$h = \dots\dots\dots$

$k = \dots\dots\dots$





For  
examiner's  
use

7 In Diagram 7, the straight line  $PR$  has the gradient of 2.  $PR$  intersects the  $x$ -axis at point  $P$  and intersects the  $y$ -axis at point  $Q$ .

Dalam Rajah 7, garis lurus  $PR$  mempunyai kecerunan 2.  $PR$  menyalang paksi- $x$  di titik  $P$  dan menyalang paksi- $y$  di titik  $Q$ .

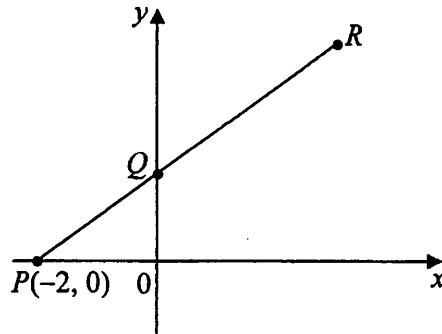


Diagram 7 / Rajah 7

Given that  $3PQ = QR$ , find

Diberi bahawa  $3PQ = QR$ , cari

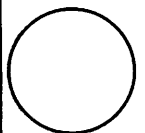
- (a) the coordinates of  $Q$ ,  
koordinat  $Q$ ,
- (b) the coordinates of  $R$ .  
koordinat  $R$ .

[4 marks]  
[4 markah]

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

(b) .....

7
4



For  
examiner's  
use

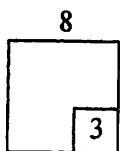
8 Given a triangle  $PQR$ , where  $P(2, 2)$ ,  $Q(4, -1)$  and  $R(1, k)$ .  
If the area of triangle  $PQR = 7.5 \text{ unit}^2$ , find the possible values of  $k$ .

*Diberi sebuah segitiga  $PQR$ , dengan keadaan  $P(2, 2)$ ,  $Q(4, -1)$  dan  $R(1, k)$ .*

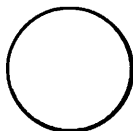
*Jika luas segitiga  $PQR = 7.5 \text{ unit}^2$ , cari nilai-nilai yang mungkin bagi  $k$ .*

[3 marks]

[3 markah]



Answer / Jawapan :  $k = \dots\dots\dots$



- 9 Diagram 9 shows a circle with center  $O$ . Given that  $\theta = 68^\circ$  and the length of minor arc  $AB = 6$  cm.  
*Rajah 9 menunjukkan sebuah bulatan berpusat  $O$ . Diberi bahawa  $\theta = 68^\circ$  dan panjang lengkok minor  $AB = 6$  cm.*

*For  
examiner's  
use*

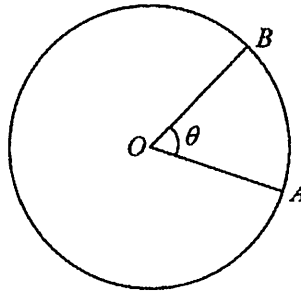


Diagram 9 / *Rajah 9*

(Use / *Guna*  $\pi = 3.142$ )  
Find / *Cari*

- (a)  $\theta$  in radian,  
 *$\theta$  dalam radian,*
- (b) the radius of the circle.  
*jejari bulatan itu.*

[3 marks]  
[3 markah]

Answer / *Jawapan* : (a)  $\theta = \dots\dots\dots$   
(b)  $\dots\dots\dots$

9

3

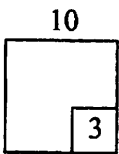
For  
examiner's  
use

10 Three consecutive terms of an arithmetic progression are 95, 110, 125,...  
Given that the 40<sup>th</sup> term is 620, find the first term.

[3 marks]

Tiga sebutan berturutan suatu jantang aritmetik adalah 95, 110, 125,...  
Diberi bahawa sebutan ke-40 ialah 620, cari sebutan pertama.

[3 markah]



Answer / Jawapan : .....

11 The first three terms of a geometric progression are  $p - 2, p$  and  $p + 4$ .

Tiga sebutan pertama suatu jantang geometri adalah  $p - 2, p$  dan  $p + 4$ .

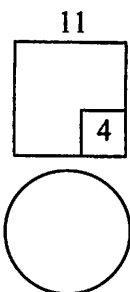
Find  
Cari

(a) the value of  $p$ ,  
nilai  $p$ ,

(b) the common ratio.  
nisbah sepunya.

[4 marks]

[4 markah]



Answer / Jawapan : (a)  $p =$  .....

(b) .....

12 Simplify  $\frac{8(2^{n-2})}{4^{2n-3}}$ .

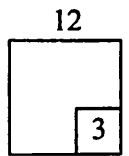
[3 marks]

For  
examiner's  
use

Permudahkan  $\frac{8(2^{n-2})}{4^{2n-3}}$ .

[3 markah]

Answer / Jawapan : .....

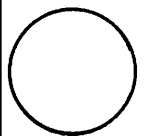
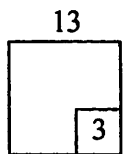


13 Solve the equation  $2^{k+2} - 2^k = 24$ .  
Selesaikan persamaan  $2^{k+2} - 2^k = 24$ .

[3 marks]

[3 markah]

Answer / Jawapan : .....



For  
examiner's  
use

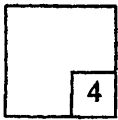
14 Given that  $\log_3 y + 2\log_9 x = 2$ , express  $y$  in terms of  $x$ .

[4 marks]

Diberi  $\log_3 y + 2\log_9 x = 2$ , ungkapkan  $y$  dalam sebutan  $x$ .

[4 markah]

14



Answer / Jawapan : .....

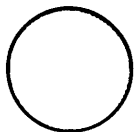
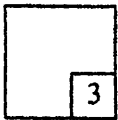
15 Given that  $\log_3 5 = m$  and  $\log_3 2 = n$ . Express  $\log_3 \frac{15}{4}$  in terms of  $m$  and  $n$ .

[3 marks]

Diberi  $\log_3 5 = m$  dan  $\log_3 2 = n$ . Ungkapkan  $\log_3 \frac{15}{4}$  dalam sebutan  $m$  dan  $n$ .

[3 markah]

15



Answer / Jawapan : .....

16 A set of quiz score  $x_1, x_2, x_3, x_4, x_5, x_6$  has mean 6 and standard deviation 2. If every score is multiply by 3 and then minus 2, find from the new set of the score,

For  
examiner's  
use

*Satu set skor kuiz  $x_1, x_2, x_3, x_4, x_5, x_6$  mempunyai min 6 dan sisihan piawai 2. Jika setiap skor didarab 3 dan kemudian ditolak 2, cari daripada set skor yang baru*

(a) the mean,

*min,*

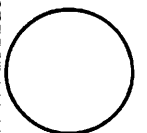
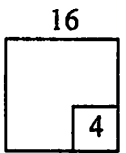
(b) the variance.

*varians.*

[4 marks]

[4 markah]

Answer / Jawapan :  $k = \dots\dots\dots$



For  
examiner's  
use

- 17 A set of data consists of four numbers. The sum of the numbers is 40 and the sum of the squares of the numbers is 454.

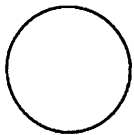
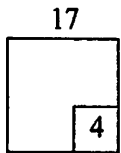
*Satu set data mengandungi empat nombor. Hasil tambah bagi nombor-nombor itu ialah 40 dan hasil tambah bagi kuasa dua nombor-nombor itu ialah 454.*

Find, for the four numbers

*Cari, bagi empat nombor itu*

- (a) the mean,  
*min,*
- (b) the standard deviation.  
*sisihan piawai.*

[4 marks]  
[4 markah]



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

(b) .....



18 Given that  $y = x(2x - 3)^4$ , find  $\frac{dy}{dx}$ .

[3 marks]

Diberi bahawa  $y = x(2x - 3)^4$ , cari  $\frac{dy}{dx}$ .

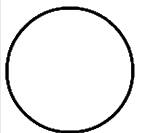
[3 markah]

For  
examiner's  
use

Answer / Jawapan : .....

18

3
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For  
examiner's  
use

19 Given that  $\int_1^3 f(x)dx = 10$ , find

Diberi bahawa  $\int_1^3 f(x)dx = 10$ , cari

(a)  $\int_1^3 4f(x) dx$ ,

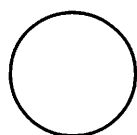
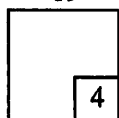
(b) the value of  $k$  such that  $\int_1^3 [f(x) - kx] dx = 4$ .

nilai  $k$  supaya  $\int_1^3 [f(x) - kx] dx = 4$ .

[4 marks]

[4 markah]

19



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

(b)  $k =$  .....

20 The following information refers to the vectors  $\mathbf{u}$  and  $\mathbf{v}$ .

*Maklumat berikut adalah berkaitan dengan vektor  $\mathbf{u}$  dan vektor  $\mathbf{v}$ .*

$$\mathbf{u} = \begin{pmatrix} 2 \\ 3 \end{pmatrix}, \quad \mathbf{v} = \begin{pmatrix} 1 \\ m \end{pmatrix}$$

Find the values of  $m$  if  $|2\mathbf{u} - \mathbf{v}| = 5$

*Cari nilai-nilai  $m$  jika  $|2\mathbf{u} - \mathbf{v}| = 5$ .*

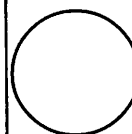
[3 marks]

[3 markah]

*For  
examiner's  
use*

Answer / Jawapan :  $m = \dots\dots\dots$

20
3



For  
examiner's  
use

21 Given that the gradient function of a curve at the point (2, 7) is  $\frac{dy}{dx} = 3x^2 - 2$ .

Find the equation of the curve.

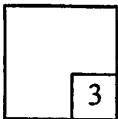
[3 marks]

Diberi fungsi kecerunan bagi suatu lengkung pada titik (2, 7) adalah  $\frac{dy}{dx} = 3x^2 - 2$ .

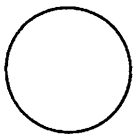
Cari persamaan lengkung itu.

[3 markah]

21



Answer / Jawapan : .....



- 22 Given that  $y = 2x^3 - 3x + 1$ , find the small change in  $y$  when  $x$  decreases from 2.0 to 1.9. [3 marks]

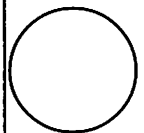
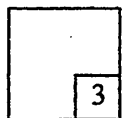
For  
examiner's  
use

Diberi  $y = 2x^3 - 3x + 1$ , cari perubahan hampir bagi  $y$  apabila  $x$  menyusut dari 2.0 kepada 1.9.

[3 markah]

Answer / Jawapan : .....

22



For  
examiner's  
use

23 Diagram 23 shows a part of a graph  $\log_{10} y$  against  $\log_{10} x$ . The variables,  $x$  and  $y$ , are related by the equation  $y = ax^b$ , where  $a$  and  $b$  are constants.

Rajah 23 menunjukkan sebahagian graf  $\log_{10} y$  melawan  $\log_{10} x$ . Pembolehubah  $x$  dan  $y$  dihubungkan oleh persamaan  $y = ax^b$ , dengan keadaan  $a$  dan  $b$  adalah pemalar.

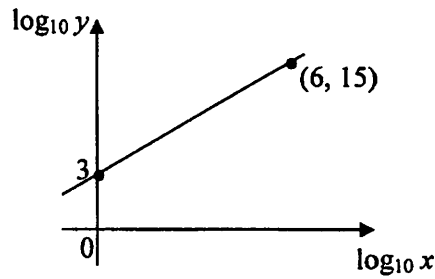


Diagram 23 / Rajah 23

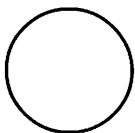
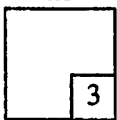
Find the values of  $a$  and  $b$ .

[3 marks]

Cari nilai  $a$  dan nilai  $b$ .

[3 markah]

23



Answer / Jawapan :  $a = \dots\dots\dots$

$b = \dots\dots\dots$

24 Given that  $O(0, 0)$ ,  $A(-3, 2)$ ,  $B(8, k)$  and  $C(-1, 5)$ , find  
 Diberi  $O(0, 0)$ ,  $A(-3, 2)$ ,  $B(8, k)$  dan  $C(-1, 5)$ , cari

For  
 examiner's  
 use

(a)  $\vec{AC}$  in the form  $x\mathbf{i} + y\mathbf{j}$ ,

$\vec{AC}$  dalam bentuk  $x\mathbf{i} + y\mathbf{j}$ ,

(b) the value of  $k$  if  $\vec{OB}$  is parallel to  $\vec{AC}$ .

nilai  $k$  jika  $\vec{OB}$  selari dengan  $\vec{AC}$ .

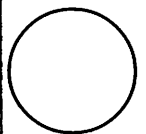
[4 marks]

[4 markah]

Answer / Jawapan : (a)  $\vec{AC} = \dots\dots\dots$

(b)  $k = \dots\dots\dots$

24
4



For  
examiner's  
use

25 Given that  $\cos A = \frac{4}{5}$  and  $180^\circ < A < 360^\circ$ , find the value of

Diberi bahawa  $\cos A = \frac{4}{5}$  dan  $180^\circ < A < 360^\circ$ , cari nilai bagi

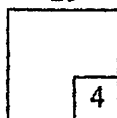
(a)  $\cot A$   
kot  $A$

(b)  $\sec(90^\circ - A)$   
sek  $(90^\circ - A)$

[4 marks]

[4 markah]

25



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

(b) .....

**END OF QUESTION PAPER**  
**KERTAS SOALAN TAMAT**

