

# MODUL PINTAS TINGKATAN LIMA

**2 JAM**

**ARAHAN :**

1. Jangan Buka Kertas Peperiksaan Ini Sehingga Diberitahu.
2. Tulis nombor kad pengenalan, angka giliran, nama, tingkatan anda pada petak yang disediakan.
3. Kertas peperiksaan ini adalah dalam dwibahasa.
4. Soalan dalam bahasa Melayu mendahului soalan yang sepadan dalam bahasa Inggeris.
5. Calon dibenarkan menjawab keseluruhan soalan atau sebahagian soalan sama ada dalam bahasa Melayu atau bahasa Inggeris.
6. Calon dikehendaki membaca maklumat di halaman belakang kertas peperiksaan ini.

Untuk Kegunaan Pemeriksa				
Kod Pemeriksa				
Bahagian	Soalan	Soalan Dijawab	Markah Penuh	Markah Diperoleh (Untuk Kegunaan Pemeriksa)
A	1		7	
	2		4	
	3		5	
	4		7	
	5		7	
	6		6	
	7		4	
	8		4	
	9		5	
	10		4	
	11		6	
	12		5	
B	13		8	
	14		8	
	15		8	
<b>Jumlah</b>				

NO. KAD PENGENALAN         -   -

ANGKA GILIRAN

NAMA : .....

TINGKATAN : .....

Kertas peperiksaan ini mengandungi 27 halaman bercetak dan 1 halaman tidak bercetak.

3472/1

MATEMATIK TAMBAHAN

Kertas 1

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

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

**SENARAI RUMUS**  
**LIST OF FORMULAE**

- |   |   |
|---|---|
| 1 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$  | 15 $\operatorname{cosec}^2 A = 1 + \cot^2 A$<br>$\operatorname{cosec}^2 A = 1 + \cot^2 A$                 |
| 2 $\log_a b = \frac{\log_c b}{\log_c a}$  | 16 $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$<br>$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$ |
| 3 $T_n = a + (n-1)d$  | 17 $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$<br>$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$ |
| 4 $T_n = ar^{n-1}$  | 18 $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$  |
| 5 $S_n = \frac{n}{2} [2a + (n-1)d]$   | 19 $\sin 2A = 2 \sin A \cos A$<br>$\sin 2A = 2 \sin A \cos A$   |
| 6 $S_n = \frac{a(r^n - 1)}{r - 1} = \frac{a(1 - r^n)}{1 - r}, r \neq 1$               | 20 $\cos 2A = \cos^2 A - \sin^2 A$<br>$= 2 \cos^2 A - 1$<br>$= 1 - 2 \sin^2 A$                            |
| 7 $Z = \frac{X - \mu}{\sigma}$  | 21 $\cos 2A = \cos^2 A - \sin^2 A$<br>$= 2 \cos^2 A - 1$<br>$= 1 - 2 \sin^2 A$                            |
| 8 $P(X=r) = {}^n C_r p^r q^{n-r}, p+q=1$  | 22 $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$  |
| 9 ${}^n P_r = \frac{n!}{(n-r)!}$  | 23 $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$   |
| 10 ${}^n C_r = \frac{n!}{(n-r)! r!}$  | 24 Luas segi tiga / Area of triangle<br>$= \frac{1}{2} ab \sin C$   |
| 11 $I = \frac{Q_1}{Q_0} \times 100$   |   |
| 12 $\bar{I} = \frac{\sum W_i I_i}{\sum W_i}$  |   |
| 13 $\sin^2 A + \cos^2 A = 1$<br>$\sin^2 A + \cos^2 A = 1$                             |   |
| 14 $\operatorname{sek}^2 A = 1 + \tan^2 A$<br>$\operatorname{sec}^2 A = 1 + \tan^2 A$ |   |

**Bahagian A**  
**Section A**

[64 markah]

[64 marks]

Jawab semua soalan.

Answer all questions.

1 (a) Diberi  $\frac{p^2}{3} \left(\frac{3}{y^4}\right)^p \left(\frac{y}{2}\right)^{p+6} = \frac{q}{y^3}$ , cari nilai bagi  $p$  dan  $q$ .

Given  $\frac{p^2}{3} \left(\frac{3}{y^4}\right)^p \left(\frac{y}{2}\right)^{p+6} = \frac{q}{y^3}$ , find the values of  $p$  and  $q$ .

[4 markah]

[4 marks]

(b) Nilaikan  $(\log_{\sqrt{y}} 8)(\log_x y)(\log_2 x)$ .

Evaluate  $(\log_{\sqrt{y}} 8)(\log_x y)(\log_2 x)$ .

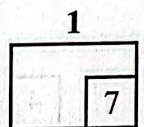
[3 markah]

[3 marks]

Jawapan / Answer :

(a)

(b)



[ Lihat halaman sebelah

2 Selesaikan persamaan serentak  $2y = 5 - x$  dan  $|x + y| = 4$ .

Solve the simultaneous equations  $2y = 5 - x$  and  $|x + y| = 4$ .

[4 markah]

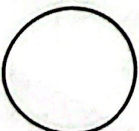
[4 marks]

Jawapan / Answer :

[4 markah]  
[4 marks]

[4 markah]  
[4 marks]

2	
1	4



- 3 Aiman mengumpul koleksi Lego setiap bulan. Bilangan koleksi Lego yang dikumpulkannya bertambah pada setiap bulan mengikut jangjang geometri. Jumlah koleksi Legonya pada empat bulan pertama ialah sepuluh kali jumlah koleksi Legonya pada dua bulan pertama.

Jika  $r$  mewakili nisbah sepunya, tunjukkan bahawa  $r^4 - 10r^2 + 9 = 0$ . Seterusnya, cari nilai positif  $r$ .

*Aiman collects a Lego collection every month. The number of Lego collections he collects increases every month according to geometric progression. His total Lego collection in the first four months was ten times his total Lego collection in the first two months.*

*If  $r$  represents a common ratio, show that  $r^4 - 10r^2 + 9 = 0$ . Next, find the positive value of  $r$ .*

[5 markah]

[5 marks]

Jawapan / Answer :

3

	5



[ Lihat halaman sebelah

4 (a) Buktikan bahawa  $\cos 3\alpha = 4 \cos^3 \alpha - 3 \cos \alpha$ .

*Prove that  $\cos 3\alpha = 4 \cos^3 \alpha - 3 \cos \alpha$ .*

[4 markah]

[4 marks]

(b) Selesaikan persamaan  $\cos 2\alpha = 5 \cos \alpha - 3$ , dengan keadaan  $0^\circ < \alpha < 180^\circ$ .

*Solve the equation  $\cos 2\alpha = 5 \cos \alpha - 3$ , where  $0^\circ < \alpha < 180^\circ$ .*

[3 markah]

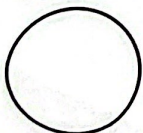
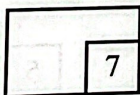
[3 marks]

Jawapan / Answer :

(a)

(b)

4



- 5 Persamaan lokus bagi titik bergerak  $R$  diberi oleh  $x^2 + y^2 - 14x + 8y + 40 = 0$ .  
Tunjukkan bahawa

*The equation of locus of a moving point  $R$  is given by  $x^2 + y^2 - 14x + 8y + 40 = 0$ .  
Show that*

- (a) lokus  $R$  bersilang dengan paksi- $x$  pada dua titik berbeza,  
*the locus  $R$  intersects the  $x$ -axis at two different points,*

[3 markah]

[3 marks]

- (b) garis lurus  $y = x - 2$  bukan tangen kepada lokus  $R$ .  
*the straight line  $y = x - 2$  is not tangent to the locus  $R$ .*

[4 markah]

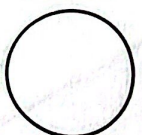
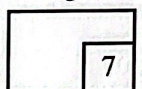
[4 marks]

Jawapan / Answer :

(a)

(b)

5



[ Lihat halaman sebelah

6 (a) Fungsi songsangan  $f^{-1}$  ditakrifkan oleh  $f^{-1} : x \rightarrow \frac{5}{2x-1}, x \neq m$ .

The inverse function  $f^{-1}$  is defined by  $f^{-1} : x \rightarrow \frac{5}{2x-1}, x \neq m$ .

Cari

Find

(i) nilai  $m$ ,  
the value of  $m$ ,

(ii)  $f(x)$ .

[3 markah]

[3 marks]

(b) Diberi bahawa  $g : x \rightarrow px - q, f^{-1} : x \rightarrow \frac{2x-3}{3}$  dan  $gf^{-1} : x \rightarrow -3x + 6$ .

Cari nilai  $p$  dan nilai  $q$ .

Given that  $g : x \rightarrow px - q, f^{-1} : x \rightarrow \frac{2x-3}{3}$  and  $gf^{-1} : x \rightarrow -3x + 6$ .

Find the value of  $p$  and of  $q$ .

[3 markah]

[3 marks]

Jawapan / Answer :

(a) (i)

(ii)



(b)  $\frac{p}{2} + \frac{q}{2} = 2x + \frac{p}{2}$  ...  
 ...  
 ...



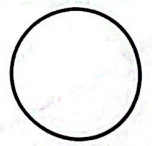
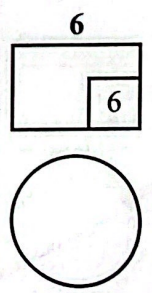
Diagram 1

(v) Logikakan persamaan  $4y = 2x + \frac{p}{2}$  dalam bentuk linear yang digunakan untuk memperolehi garis lurus seperti yang ditunjukkan dalam Rajah 1.  
 Express the equation  $4y = 2x + \frac{p}{2}$  in the linear form used to obtain the straight line graph as shown in Diagram 1.

[1 markah]  
 [1 markah]

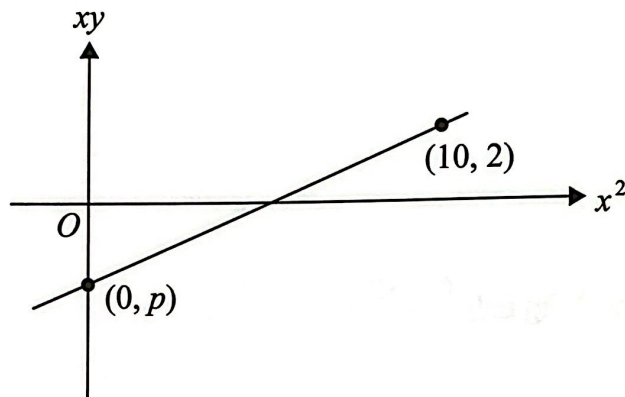
(vi) Cari nilai p dan nilai q.  
 Find the value of p and of q.

[3 markah]  
 [3 markah]



- 7 Pemboleh ubah  $x$  dan  $y$  dihubungkan oleh persamaan  $4y = 2x + \frac{q}{x}$ , dengan keadaan  $q$  ialah pemalar. Rajah 1 menunjukkan graf garis lurus yang diperoleh dengan memplot  $xy$  melawan  $x^2$ .

*The variables  $x$  and  $y$  are related by equation  $4y = 2x + \frac{q}{x}$ , such that  $q$  is a constant. Diagram 1 shows a straight line graph obtained by plotting  $xy$  against  $x^2$ .*



Rajah 1  
Diagram 1

- (a) Ungkapkan persamaan  $4y = 2x + \frac{q}{x}$  dalam bentuk linear yang digunakan untuk memperoleh graf garis lurus seperti yang ditunjukkan dalam Rajah 1.

*Express the equation  $4y = 2x + \frac{q}{x}$  in the linear form used to obtain the straight line graph as shown in Diagram 1.*

[1 markah]

[1 mark]

- (b) Cari nilai  $p$  dan nilai  $q$ .  
*Find the value of  $p$  and of  $q$ .*

[3 markah]

[3 marks]

Jawapan / Answer :

(a)



(b)

Diagram 2

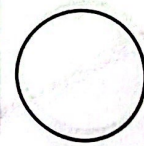
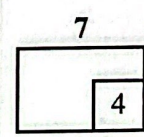
Langkah 1: Dalam segitiga  
Ekspress  $\vec{OT}$  in terms of

(a)  $\vec{m}$  dan  $\vec{n}$   
 $\vec{m}$  dan  $\vec{n}$

(b)  $\vec{m}$  dan  $\vec{n}$   
 $\vec{m}$  dan  $\vec{n}$

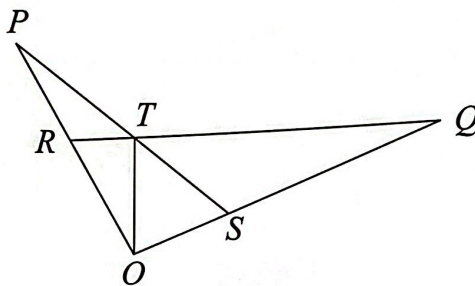
Jawapan / Answer :

(a)



- 8 Rajah 2 menunjukkan dua buah segi tiga  $OPS$  dan  $ORQ$  dengan keadaan titik  $R$  berada pada  $OP$  dan titik  $S$  berada pada  $OQ$ . Garis lurus  $PS$  dan  $RQ$  bersilang pada titik  $T$ . Diberi bahawa  $\vec{OP} = 10\vec{b}$ ,  $\vec{OQ} = 8\vec{a}$ ,  $OR : RP = 1 : 1$ ,  $OS : SQ = 1 : 3$ ,  $\vec{RT} = m\vec{RQ}$  dan  $\vec{ST} = n\vec{SP}$ , dengan keadaan  $m$  dan  $n$  ialah pemalar.

Diagram 2 shows two triangles  $OPS$  and  $ORQ$  where point  $R$  lies on  $OP$  and point  $S$  lies on  $OQ$ . The straight lines  $PS$  and  $RQ$  intersect at point  $T$ . It is given that  $\vec{OP} = 10\vec{b}$ ,  $\vec{OQ} = 8\vec{a}$ ,  $OR : RP = 1 : 1$ ,  $OS : SQ = 1 : 3$ ,  $\vec{RT} = m\vec{RQ}$  and  $\vec{ST} = n\vec{SP}$ , where  $m$  and  $n$  are constants.



Rajah 2  
Diagram 2

Ungkapkan  $\vec{OT}$  dalam sebutan  
Express  $\vec{OT}$  in terms of

- (a)  $m$ ,  $\vec{a}$  dan  $\vec{b}$ ,  
 $m$ ,  $\vec{a}$  and  $\vec{b}$ ,

[2 markah]  
[2 marks]

- (b)  $n$ ,  $\vec{a}$  dan  $\vec{b}$ .  
 $n$ ,  $\vec{a}$  and  $\vec{b}$ .

[2 markah]  
[2 marks]

Jawapan / Answer :

- (a)

(b)



Given the area of the pizza slice is  $150 \text{ cm}^2$ , find  
the area of the remaining pizza.

(a) Find the angle subtended in the pizza slice, in radians.

(b) Find the perimeter of the remaining pizza, in cm.

Given  $\pi = 3.142$

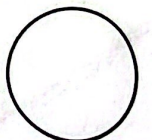
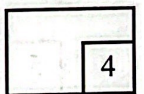
Let  $\pi = 3.142$

Answer:

(i)

(ii)

8



[ Lihat halaman sebelah

- 9 Sepotong piza dipotong daripada piza bersaiz besar dengan diameter 36 cm seperti yang ditunjukkan dalam Rajah 3.

*A slice of pizza was cut out of a large sized pizza with diameter 36 cm as shown in the Diagram 3.*



Rajah 3  
Diagram 3

Diberi luas sepotong piza ialah  $150 \text{ cm}^2$ , cari

*Given the area of the pizza slice is  $150 \text{ cm}^2$ , find*

- (a) sudut yang dicangkum dalam sepotong piza, dalam radian,  
*the angle subtended in the pizza slice, in radians,*

[2 markah]  
[2 marks]

- (b) perimeter bagi piza yang tertinggal, dalam cm.  
*the perimeter of the remaining pizza, in cm.*

[3 markah]  
[3 marks]

Gunakan  $\pi = 3.142$ .

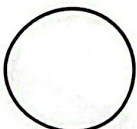
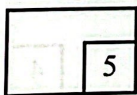
*Use  $\pi = 3.142$ .*

Jawapan / Answer :

(a)

(b)

9



- 10 (a) Diberi bahawa  $y = 2x^2 - 6$ , cari julat nilai  $x$  apabila  $x + y < 0$ .  
Given that  $y = 2x^2 - 6$ , find the range of values of  $x$  when  $x + y < 0$ .

[2 markah]  
[2 marks]

- (b) Persamaan kuadratik  $mx^2 - 2nx + 5 = 0$ , dengan keadaan  $m$  dan  $n$  ialah pemalar, mempunyai dua punca yang sama.  
Ungkapkan  $n$  dalam sebutan  $m$ .

The quadratic equation  $mx^2 - 2nx + 5 = 0$ , where  $m$  and  $n$  are constants, has two equal roots.

Express  $n$  in terms of  $m$ .

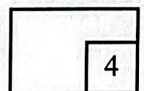
[2 markah]  
[2 marks]

Jawapan / Answer :

(a)

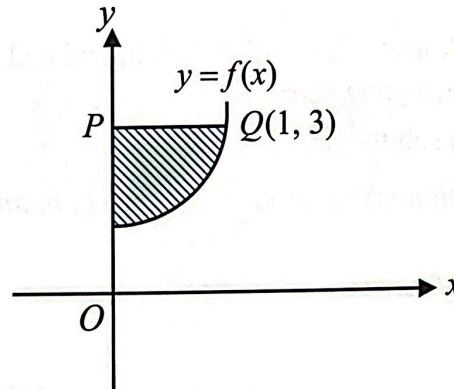
(b)

10



[ Lihat halaman sebelah

- 11 Rajah 4 menunjukkan sebahagian daripada lengkung  $y = f(x)$ , yang melalui  $Q(1, 3)$ .  
Garis lurus  $PQ$  adalah selari dengan paksi- $x$ .  
*Diagram 4 shows part of the curve  $y = f(x)$ , which passes through  $Q(1, 3)$ . The straight line  $PQ$  is parallel to the  $x$ -axis.*



Rajah 4  
Diagram 4

Lengkung itu mempunyai fungsi kecerunan  $2x$ .  
*The curves has a gradient function of  $2x$ .*

Cari  
*Find*

- (a) persamaan lengkung itu,  
*the equation of the curve,*

[3 markah]  
[3 marks]

- (b) luas rantau berlerek.  
*the area of the shaded region.*

[3 markah]  
[3 marks]

Jawapan / *Answer* :

- (a)



(b) ...

...

...

...

...

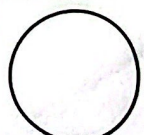
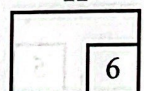
...

...

...

(a)

(b)



- 12 Kebarangkalian seorang murid berbasikal ke sekolah ialah  $p$ . Suatu sampel 7 orang murid dipilih secara rawak.

*The probability of a student cycling to school is  $p$ . A sample of 7 students is selected at random.*

- (a) Jika kebarangkalian bagi kesemua 7 orang murid itu berbasikal ke sekolah ialah 0.04398, cari nilai  $p$ .

*If the probability of all the 7 students cycling to school is 0.04398, find the value of  $p$ .*

[2 markah]

[2 marks]

- (b) Cari kebarangkalian bahawa kurang daripada 3 orang murid berbasikal ke sekolah.

*Find the probability that less than 3 students cycle to school.*

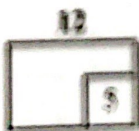
[3 markah]

[3 marks]

Jawapan / Answer :

(a)

(b)



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**Bahagian B**

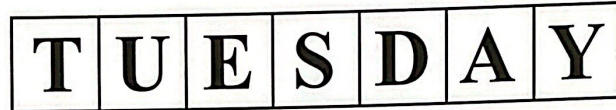
**Section B**

[16 markah]

[16 marks]

Jawab mana-mana **dua** soalan daripada bahagian ini.  
*Answer any two questions from this section.*

- 13 (a) Rajah 5 menunjukkan tujuh keping kad huruf.  
*Diagram 5 shows seven pieces of letter cards.*



Rajah 5  
*Diagram 5*

Lima keping kad dipilih secara rawak untuk membentuk satu kod. Cari bilangan cara untuk menyusun semua huruf itu dalam sebaris jika  
*Five pieces of cards are chosen at random to form a code. Find the number of ways to arrange all the letters in a row if*

- (i) semua huruf vokal mesti bersebelahan,  
*all the vowels must be next to each other,*
- (ii) sekurang-kurangnya 3 huruf konsonan disusun bersebelahan.  
*at least 3 consonant letters are arranged side by side.*

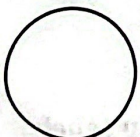
[5 markah]  
[5 marks]

- (b) Diberi  ${}^n P_r = {}^{n-2} P_r$ , ungkapkan  $n$  dalam sebutan  $r$ .  
*Given  ${}^n P_r = {}^{n-2} P_r$ , express  $n$  in terms of  $r$ .*

[3 markah]  
[3 marks]

Jawapan / *Answer* :

- (a) (i)



(a) (ii)

Diberi bahwa  $x = \sqrt{1 + \frac{4x^2}{9}}$   
It is given that  $x = \sqrt{1 + \frac{4x^2}{9}}$

(a) (ii)

(i)

(ii)

(iii)

[3 marks]  
[3 marks]

(b) Find the length and the width, in cm, of the piece of aluminium so that the volume of the cylinder is maximum.  
Carilah panjang dan lebar dalam cm, kepingan aluminium itu supaya isi tabung silinder itu adalah maksimum.  
sebuah tabung dengan diameter 18 cm.  
pekerjanya dengan menggunakan sekeping aluminium yang berbentuk silinder yang terbuka pada kedua-dua

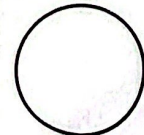
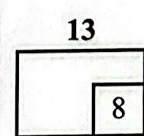
(b) Find the length and the width, in cm, of the piece of aluminium so that the volume of the cylinder is maximum.  
Carilah panjang dan lebar dalam cm, kepingan aluminium itu supaya isi tabung silinder itu adalah maksimum.  
sebuah tabung dengan diameter 18 cm.  
pekerjanya dengan menggunakan sekeping aluminium yang berbentuk silinder yang terbuka pada kedua-dua

[3 marks]  
[3 marks]

Jawapan / Answer :

(i)

(ii)



14 (a) Diberi bahawa  $x = t^2 + 3$  dan  $\frac{dy}{dt} = 14t^3$ .

*It is given that  $x = t^2 + 3$  and  $\frac{dy}{dt} = 14t^3$ .*

Cari

*Find*

(i)  $\frac{dx}{dt}$ ,

(ii)  $\frac{dy}{dx}$ , dalam sebutan  $x$ .

$\frac{dy}{dx}$ , *in terms of  $x$ .*

[3 markah]

[3 marks]

(b) Farah ingin menghasilkan sebuah silinder yang terbuka pada kedua-dua hujungnya dengan menggunakan sekeping aluminium yang berbentuk segi empat tepat dengan perimeter 18 cm.

Cari panjang dan lebar, dalam cm, kepingan aluminium itu supaya isi padu silinder itu adalah maksimum.

*Farah wants to produce an open cylinder at both ends using a rectangular piece of aluminium with a perimeter of 18 cm.*

*Find the length and the width, in cm, of the piece of aluminium so that the volume of the cylinder is maximum.*

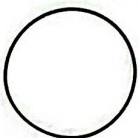
[5 markah]

[5 marks]

Jawapan / Answer :

(a) (i)

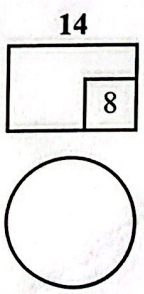
(ii)



(b)

$x^2 - 4x + 4 = 0$   
 $(x - 2)^2 = 0$   
 $x - 2 = 0$   
 $x = 2$

The roots are  $x = 2$  and  $x = 2$ .  
 The roots are  $x = 2$  and  $x = 2$ .



Untuk  
Kegunaan  
Pemeriksa

- 15 (a) Diberi  $ax^2 + bx + c = 0$ . Terbitkan rumus kuadratik dengan menggunakan kaedah penyempurnaan kuasa dua.

*Given  $ax^2 + bx + c = 0$ . Derive the quadratic formula by using completing the square method.*

[5 markah]

[5 marks]

- (b) Dengan menggunakan rumus kuadratik yang diterbitkan daripada 15(a), tentukan punca-punca bagi persamaan kuadratik  $x^2 - 4x + 5 = 0$ .

Berikan jawapan anda dalam sebutan nombor khayalan,  $i$  dengan  $i = \sqrt{-1}$ .

*By using the quadratic formula derived from 15(a), determine the roots of the quadratic equation  $x^2 - 4x + 5 = 0$ .*

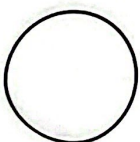
*Give your answer in terms of imaginary number,  $i$  with  $i = \sqrt{-1}$ .*

[3 markah]

[3 marks]

Jawapan / Answer :

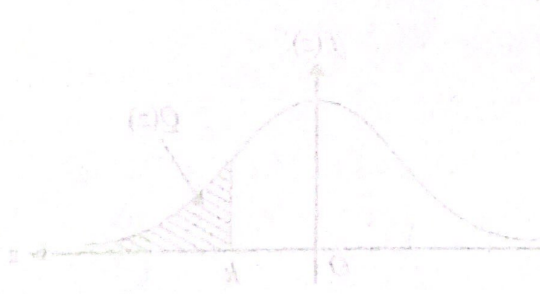
(a)





(b)

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5518	0.5558	0.5598	0.5638	0.5677	0.5717	0.5757
0.2	0.5797	0.5837	0.5877	0.5917	0.5957	0.5997	0.6037	0.6077	0.6117	0.6157
0.3	0.6197	0.6237	0.6277	0.6317	0.6357	0.6397	0.6437	0.6477	0.6517	0.6557
0.4	0.6597	0.6637	0.6677	0.6717	0.6757	0.6797	0.6837	0.6877	0.6917	0.6957
0.5	0.6997	0.7037	0.7077	0.7117	0.7157	0.7197	0.7237	0.7277	0.7317	0.7357
0.6	0.7397	0.7437	0.7477	0.7517	0.7557	0.7597	0.7637	0.7677	0.7717	0.7757
0.7	0.7797	0.7837	0.7877	0.7917	0.7957	0.7997	0.8037	0.8077	0.8117	0.8157
0.8	0.8197	0.8237	0.8277	0.8317	0.8357	0.8397	0.8437	0.8477	0.8517	0.8557
0.9	0.8597	0.8637	0.8677	0.8717	0.8757	0.8797	0.8837	0.8877	0.8917	0.8957
1.0	0.8997	0.9037	0.9077	0.9117	0.9157	0.9197	0.9237	0.9277	0.9317	0.9357
1.1	0.9397	0.9437	0.9477	0.9517	0.9557	0.9597	0.9637	0.9677	0.9717	0.9757
1.2	0.9797	0.9837	0.9877	0.9917	0.9957	1.0000				

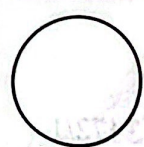


Contoh Example  
 $\mu = 10, \sigma = 2$   
 $P(X < 14) = Q(2) = 0.9772$   
 $P(X > 14) = 1 - Q(2) = 0.0228$   
 $P(X < 10) = Q(0) = 0.5000$   
 $P(X > 10) = 1 - Q(0) = 0.5000$

Bagi a neg of gura indugant  
 for negat a ras relation  
 $Q(-z) = 1 - Q(z)$   
 $Q\left(\frac{z}{\sigma}\right) = \frac{1}{\sigma} \int_{-\infty}^z f(x) dx$

**KERTAS PEPERIKSAAN TAMAT**  
**END OF QUESTION PAPER**

15  
 8



**KEBARANGKALIAN HUJUNG ATAS  $Q(z)$  BAGI TABURAN NORMAL  $N(0, 1)$**   
**THE UPPER TAIL PROBABILITY  $Q(z)$  FOR THE NORMAL DISTRIBUTION  $N(0, 1)$**

z										Minus / Tolak									
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641	4	8	12	16	20	24	28	32	36
0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247	4	8	12	16	20	24	28	32	36
0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859	4	8	12	15	19	23	27	31	35
0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483	4	7	11	15	19	22	26	30	34
0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121	4	7	11	15	18	22	25	29	32
0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776	3	7	10	14	17	20	24	27	31
0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451	3	7	10	13	16	19	23	26	29
0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148	3	6	9	12	15	18	21	24	27
0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867	3	5	8	11	14	16	19	22	25
0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611	3	5	8	10	13	15	18	20	23
1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379	2	5	7	9	12	14	16	19	21
1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170	2	4	6	8	10	12	14	16	18
1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985	2	4	6	7	9	11	13	15	17
1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823	2	3	5	6	8	10	11	13	14
1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681	1	3	4	6	7	8	10	11	13
1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559	1	2	4	5	6	7	8	10	11
1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455	1	2	3	4	5	6	7	8	9
1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367	1	2	3	4	4	5	6	7	8
1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294	1	1	2	3	4	4	5	6	6
1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233	1	1	2	2	3	4	4	5	5
2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183	0	1	1	2	2	3	3	4	4
2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143	0	1	1	2	2	2	3	3	4
2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110	0	1	1	1	2	2	2	3	3
2.3	0.0107	0.0104	0.0102								0	1	1	1	1	2	2	2	2
			0.00990		0.00964	0.00939	0.00914				3	5	8	10	13	15	18	20	23
								0.00889	0.00866	0.00842	2	5	7	9	12	14	16	16	21
2.4	0.00820	0.00798	0.00776	0.00755	0.00734						2	4	6	8	11	13	15	17	19
						0.00714	0.00695	0.00676	0.00657	0.00639	2	4	6	7	9	11	13	15	17
2.5	0.00621	0.00604	0.00587	0.00570	0.00554	0.00539	0.00523	0.00508	0.00494	0.00480	2	3	5	6	8	9	11	12	14
2.6	0.00466	0.00453	0.00440	0.00427	0.00415	0.00402	0.00391	0.00379	0.00368	0.00357	1	2	3	5	6	7	9	9	10
2.7	0.00347	0.00336	0.00326	0.00317	0.00307	0.00298	0.00289	0.00280	0.00272	0.00264	1	2	3	4	5	6	7	8	9
2.8	0.00256	0.00248	0.00240	0.00233	0.00226	0.00219	0.00212	0.00205	0.00199	0.00193	1	1	2	3	4	4	5	6	6
2.9	0.00187	0.00181	0.00175	0.00169	0.00164	0.00159	0.00154	0.00149	0.00144	0.00139	0	1	1	2	2	3	3	4	4
3.0	0.00135	0.00131	0.00126	0.00122	0.00118	0.00114	0.00111	0.00107	0.00104	0.00100	0	1	1	2	2	2	3	3	4

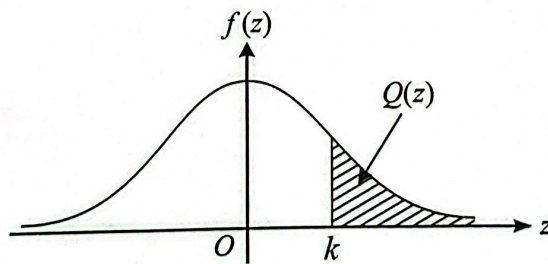
Bagi z negatif guna hubungan:

For negative z use relation:

$$Q(z) = 1 - Q(-z) = P(-z)$$

$$f(z) = \frac{1}{\sqrt{2\pi}} \exp\left(-\frac{1}{2}z^2\right)$$

$$Q(z) = \int_k^{\infty} f(z) dz$$



Contoh / Example:

Jika  $X \sim N(0, 1)$ , maka

If  $X \sim N(0, 1)$ , then

$$P(X > k) = Q(k)$$

$$P(X > 2.1) = Q(2.1) = 0.0179$$

**MAKLUMAT UNTUK CALON  
INFORMATION FOR CANDIDATES**

1. Kertas peperiksaan ini mengandungi dua bahagian: **Bahagian A** dan **Bahagian B**.  
*This question paper consists of two section: Section A and Section B.*
2. Jawab semua soalan dalam **Bahagian A** dan mana-mana **dua** soalan daripada **Bahagian B**.  
*Answer all questions in Section A and any two questions from Section B.*
3. Tulis jawapan anda dalam ruang yang disediakan dalam kertas peperiksaan.  
*Write your answers in the spaces provided in the question paper.*
4. Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.  
*Show your working. It may help you to get marks.*
5. Sekiranya anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baharu.  
*If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.*
6. Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.  
*The diagrams in the questions provided are not drawn to scale unless stated.*
7. Markah yang diperuntukkan bagi setiap soalan dan ceraian soalan ditunjukkan dalam kurungan.  
*The marks allocated for each question and sub-part of a question are shown in brackets.*
8. Satu senarai rumus disediakan di halaman 2.  
*A list of formulae is provided on page 2.*
9. Jadual Kebarangkalian Hujung Atas  $Q(z)$  Bagi Taburan Normal  $N(0, 1)$  disediakan di halaman 26.  
*The Upper Tail Probability  $Q(z)$  For The Normal Distribution  $N(0, 1)$  Table is provided on page 26.*
10. Anda dibenarkan menggunakan kalkulator saintifik.  
*You may use a scientific calculator.*
11. Serahkan kertas peperiksaan ini kepada pengawas peperiksaan di akhir peperiksaan.  
*Hand in this question paper to the invigilator at the end of the examination.*