

Name :



Form :

PROGRAM PENINGKATAN PRESTASI AKADEMIK SPM 2015
MAJLIS PENGETUA SEKOLAH MALAYSIA (KEDAH)

ADDITIONAL MATHEMATICS**Kertas 1****Ogos 2015****2 jam****Dua jam****JANGAN BUKA MODUL INI SEHINGGA DIBERITAHU**

1. *Tulis nama dan tingkatan anda pada ruangan yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*
5. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

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

Modul ini mengandungi **23** halaman bercetak dan **1** halaman kosong.

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

ALGEBRA

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

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

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

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

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

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

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

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

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

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

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

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

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

CALCULUS

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

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

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

4 Area under a curve

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

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

5 Volume generated

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

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

GEOMETRY

$$1 \quad \text{Distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

2 Midpoint

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

$$3 \quad |\vec{r}| = \sqrt{x^2 + y^2}$$

$$4 \quad \hat{r} = \frac{x\vec{i} + y\vec{j}}{\sqrt{x^2 + y^2}}$$

5 A point dividing a segment of a line

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

6 Area of triangle

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

STATISTICS

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

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

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

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

$$5 \quad m = L + \left[\frac{\frac{1}{2}N - F}{f_m} \right] C$$

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

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

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

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

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

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

$$12 \quad \text{Mean } \mu = np$$

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

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

TRIGONOMETRY

$$1 \quad \text{Arc length, } s = r\theta$$

$$2 \quad \text{Area of sector, } A = \frac{1}{2}r^2\theta$$

$$3 \quad \sin^2 A + \cos^2 A = 1$$

$$4 \quad \sec^2 A = 1 + \tan^2 A$$

$$5 \quad \operatorname{cosec}^2 A = 1 + \cot^2 A$$

$$6 \quad \sin 2A = 2 \sin A \cos A$$

$$7 \quad \begin{aligned} \cos 2A &= \cos^2 A - \sin^2 A \\ &= 2 \cos^2 A - 1 \\ &= 1 - 2 \sin^2 A \end{aligned}$$

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

$$9 \quad \sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$10 \quad \cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

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

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

$$13 \quad a^2 = b^2 + c^2 - 2bc \cos A$$

$$14 \quad \text{Area of triangle} = \frac{1}{2} ab \sin C$$

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

- 1 Function f maps elements in set A to elements in set B . Given that the function $f : x \rightarrow 3x - 4$ and $A = \{-1, 0, 1, 2\}$,

Fungsi f memetakan unsur-unsur dalam set A kepada unsur-unsur dalam set B . Diberi fungsi sebagai $f : x \rightarrow 3x - 4$ dan $A = \{-1, 0, 1, 2\}$.

State/nyatakan

- (a) the range of the function $f(x)$.
julat bagi fungsi $f(x)$.
- (b) the object has unchanged under function $f(x)$.
objek yang tidak berubah dibawah fungsi $f(x)$.

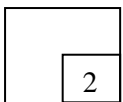
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[2 markah]

Answer/Jawapan:

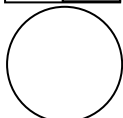
(a)

(b)

1



2



- 2 Given function $h: x \rightarrow kx + m$, $k > 0$ and $h^2: x \rightarrow 4x - 15$. Find the values of k and m .

Diberi fungsi $h: x \rightarrow kx + m$, $k > 0$ dan $h^2: x \rightarrow 4x - 15$. Cari nilai bagi k dan m .

[3 marks]

[3 markah]

Answer/Jawapan:

2

3

- 3 Given that function $f(x) = \frac{3}{x-p}$, $x \neq p$ and $g(x) = 2 - 5x$.

Diberi fungsi $f(x) = \frac{3}{x-p}$, $x \neq p$ dan $g(x) = 2 - 5x$.

Find
Cari

- (a) $g^{-1}(x)$,
(b) the value of p if $g g^{-1}(p-3) = f(p-4)$.
nilai p jika $g g^{-1}(p-3) = f(p-4)$.

[3 marks]

[3 markah]

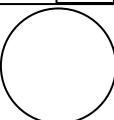
Answer/Jawapan:

(a)

(b)

3

3



4

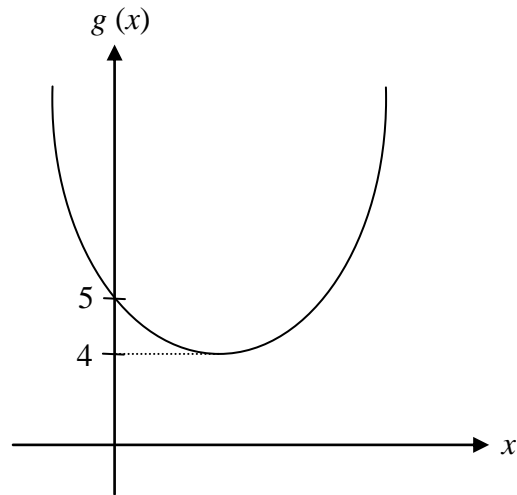


Diagram 4
Rajah 4

Diagram 4 shows the graph of the quadratic function $g(x) = (x+p)^2 + q$.

Rajah 4 menunjukkan graf fungsi kuadratik $g(x) = (x+p)^2 + q$.

- (a) State the value of q .
Nyatakan nilai bagi q .

- (b) Find the value of p .
Cari nilai bagi p .

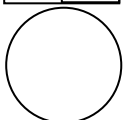
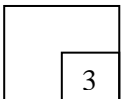
[3marks]
[3markah]

Answer/Jawapan:

(a)

(b)

4



5 Find the range of values of x for $2x(x-5) - 12 > 9(1-x)$.

[3 marks]

Cari julat nilai x bagi $2x(x-5) - 12 > 9(1-x)$.

[3 markah]

Answer/Jawapan:

5

5
3

6

Given $\frac{1}{2}$ is a root of the quadratic equation $x^2 + kx - 2k + 5 = 0$, where k is a constant. Find

Diberi $\frac{1}{2}$ ialah satu punca bagi persamaan kuadratik $x^2 + kx - 2k + 5 = 0$, dengan keadaan k ialah pemalar. Cari

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

(b) the product of roots of the equation.
hasil darab punca-punca bagi persamaan tersebut .

[3 marks]

[3 markah]

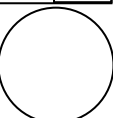
Answer/Jawapan:

(a)

(b)

6

6
3



- 7 Solve the equation :
Selesaikan persamaan :

$$4^{x-1} = 80 - 4^x$$

Answer/*Jawapan:*

[3 marks]
[3 markah]

7



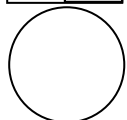
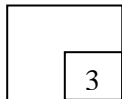
- 8 Given $\log_3 a = 17$ and $\log_3 b = 8$, find the value of $\log_9 \frac{a^2}{b}$.

Diberi $\log_3 a = 17$ dan $\log_3 b = 8$, cari nilai bagi $\log_9 \frac{a^2}{b}$.

Answer/*Jawapan:*

[3 marks]
[3 markah]

8



- 9 John was looking for a shop lot to start his business. There are two shop lots offered for rent. The yearly rental for shop lot A is RM 9 000 with 20% yearly increment. While the rental for shop lot B is RM 20 000 per year without increment.

State the different of the total rental for 10 years between shop lot A and shop lot B.
(Round off your answer to the nearest ringgit)

John decided to choose the shop lot which offered lower total rental for 10 years. Which shop lot should John choose ?

[4 marks]

John ingin menyewa sebuah kedai untuk memulakan perniagaannya. Terdapat dua buah kedai menawarkan sewa. Sewa tahunan bagi kedai A ialah RM 9 000 dengan peningkatan 20% setiap tahun. Manakala sewa bagi kedai B ialah RM 20 000 per tahun tanpa peningkatan.

*Nyatakan perbezaan jumlah sewa untuk 10 tahun antara kedai A dengan kedai B.
(Bundarkan jawapan anda kepada ringgit terdekat)*

John merancang untuk memilih kedai yang menawarkan jumlah sewa yang lebih rendah untuk 10 tahun. Kedai manakah yang harus John pilih ?

[4 markah]

Answer/Jawapan:

- 10** It is given that $29, 22, 15, k, \dots - 76$ is an arithmetic progression.
Diberi $29, 22, 15, k, \dots - 76$ adalah suatu jangjang aritmetik.

Find
Cari

- (a) the value of k ,
nilai k ,
- (b) the number of term of the progression .
bilangan sebutan bagi jangjang tersebut .

[3 marks]
[3 markah]

Answer/Jawapan:

(a)

(b)

10



- 11** Given the value of the sum to infinity of a geometric progression is five times of the first term of the progression. Find the common ratio of the progression.

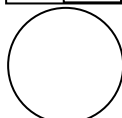
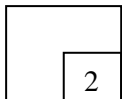
[2 marks]

Diberi hasil tambah ketakterhinggaan bagi suatu jangjang geometri adalah sama dengan lima kali sebutan pertama jangjang tersebut . Cari nilai nisbah sepunya bagi jangjang tersebut.

[2 markah]

Answer/Jawapan:

11



- 12 In Diagram 12, OST and OUV are sector of two circles with centre O . The ratio of the area of sector OUV to the area of shaded region is $1 : 8$.

Dalam Rajah 12, OST dan OUV ialah sektor bagi dua bulatan berpusat O . Nisbah bagi luas sektor OUV kepada luas kawasan berlerek ialah $1 : 8$.

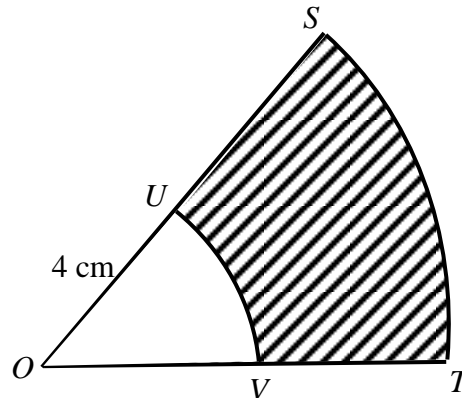


Diagram 12
Rajah 12

Given that $OU = 4$ cm and the area of sector OUV is 6 cm², find

Diberi $OU = 4$ cm dan luas sektor OUV ialah 6 cm², cari

- (a) $\angle SOT$ in radians,
 $\angle SOT$ dalam radian,
- (b) the length of SU .
panjang SU .

[4 marks]
[4 markah]

Answer/Jawapan:

(a)

(b)

For
examiner's
use only

- 13** Given that $A(-4, 6)$, $B(-1, 0)$, $C(10, 2)$ and D are the vertices of a parallelogram.

Find the coordinates of point D .

[3 marks]

Diberi bahawa $A(-4, 6)$, $B(-1, 0)$, $C(10, 2)$ dan D ialah bucu-bucu bagi sebuah segi empat selari. Cari koordinat bagi titik D .

[3 markah]

Answer/Jawapan:

13

3

- 14** Given that the equation of a locus P with centre $A(h, k)$ and diameter 13 cm is $x^2 + y^2 - 5x - 12y = 0$. Find the coordinate of point A .

Diberi persamaan lokus P berpusat $A(h, k)$ dan berdiameter 13 cm ialah

$x^2 + y^2 - 5x - 12y = 0$. Cari koordinat titik A .

[3 marks]

[3 markah]

Answer/Jawapan:

14

3

15

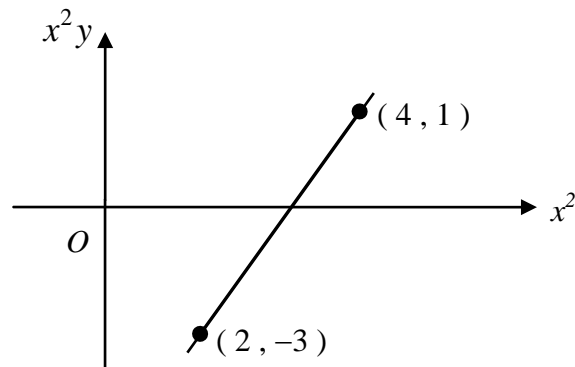


Diagram 15
Rajah 15

Diagram 15 shows a line of best fit obtained by plotting x^2y against x^2 . Express y in terms of x .

Rajah 15 menunjukkan graf garis lurus penyesuaian terbaik yang diperolehi dengan memplot x^2y melawan x^2 . Ungkapkan y dalam sebutan bagi x .

[3 marks]
[3 markah]

Answer/Jawapan:

16

Number of smart phone <i>Bilangan telefon pintar</i>	1	2	3	4
Number of families <i>Bilangan keluarga</i>	30	k	48	16

Table 16
Jadual 16

Table 16 shows the frequency distribution of the number of smart phone in the families of a survey.

Jadual 16 menunjukkan taburan kekerapan bilangan telefon pintar dalam keluarga bagi satu kajian.

- (a) Find the range of the data.
Cari julat bagi data tersebut.
- (b) Find the range of k if
Cari julat bagi k jika
- the mode of the number of smart phone in the families is 2 ,
mod bagi bilangan telefon pintar dalam keluarga ialah 2 ,
 - the median of the number of smart phone in the families is 2.
median bagi bilangan telefon pintar dalam keluarga ialah 2.

[3 marks]
[3 markah]

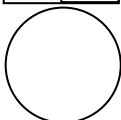
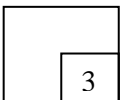
Answer/*Jawapan:*

(a)

(b) (i)

(ii)

16



- 17 The daily profit, P , of a candle factory is given by $P = 45x - \frac{1}{4}x^2$, where x is the number of boxes of candle. How many boxes of candle produced will give maximum profit and what is the maximum profit of the factory?

Keuntungan harian, P , bagi kilang lilin diberi oleh $P = 45x - \frac{1}{4}x^2$, dimana x ialah bilangan kotak lilin. Berapa kotak lilin dihasilkan akan memberi keuntungan maksimum dan berapakah keuntungan maksimum kilang tersebut?

[4 marks]
[4 markah]

Answer/Jawapan:

17

4

- 18 Given that $\int_0^2 f(x)dx = \frac{2}{3}$, find the values

Diberi $\int_0^2 f(x)dx = \frac{2}{3}$, cari nilai bagi.

- (a) $\int_2^0 3f(x)dx$,
(b) $\int_0^2 \left[5 - \frac{1}{2}f(x) \right] dx$.

[4 marks]
[4 markah]

Answer/Jawapan:

(a)

(b)

18

4

19

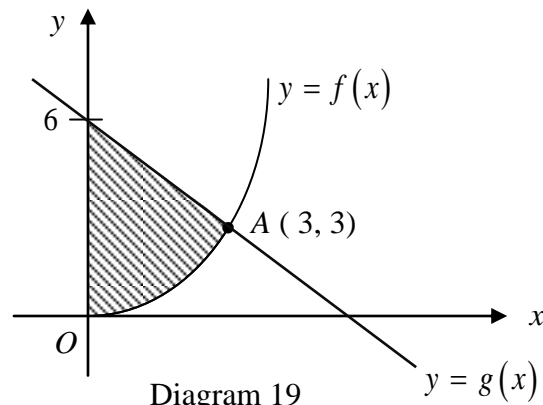


Diagram 19
Rajah 19

Diagram 19 shows the curve $y = f(x)$ and straight line $y = g(x)$ intersect at point $A(3, 3)$. Given $\int_0^3 f(x) dx = 3$, find the area of the shaded region.

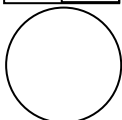
[3 marks]

Rajah 19 menunjukkan lengkung $y = f(x)$ dan garis lurus $y = g(x)$ bersilang pada titik $A(3, 3)$. Diberi $\int_0^3 f(x) dx = 3$, cari luas rantau berlorek.

[3 markah]

Answer/Jawapan:

19



- 20 Diagram 20 shows a triangle PQR . T is a midpoint of PQ . Given $\overline{PR} = 9y$, $\overline{PT} = 3x$ and $2\overline{RS} = \overline{SQ}$. Express in terms of x and y

Rajah 20 menunjukkan sebuah segitiga PQR . T ialah titik tengah bagi PQ . Diberi $\overline{PR} = 9y$, $\overline{PT} = 3x$ dan $2\overline{RS} = \overline{SQ}$. Ungkapkan dalam sebutan x dan y

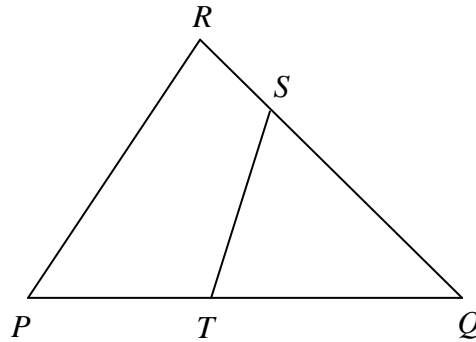


Diagram 20
Rajah 20

(a) \overline{RQ}

(b) \overline{ST}

[4 marks]
[4 markah]

Answer/Jawapan:

(a)

(b)

21

Given that $\overrightarrow{OA} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$, $\overrightarrow{OC} = \begin{pmatrix} k \\ -2 \end{pmatrix}$ and $\overrightarrow{AC} = \begin{pmatrix} 2 \\ -2 \end{pmatrix}$. Find the value of k .

Diberi bahawa $\overrightarrow{OA} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$, $\overrightarrow{OC} = \begin{pmatrix} k \\ -2 \end{pmatrix}$ dan $\overrightarrow{AC} = \begin{pmatrix} 2 \\ -2 \end{pmatrix}$. Cari nilai k .

[2 marks]
[2 markah]

Answer/Jawapan:

21

2

22 Given the equation $y = 3 \cos 2\theta$ for $0 < \theta < 180^\circ$.

Diberi suatu persamaan $y = 3 \cos 2\theta$ bagi $0 < \theta < 180^\circ$.

- (a) State the amplitude.
Nyatakan amplitud.
- (b) Solve the equation $y = 3 \cos 2\theta$ when $y = 2$.
Selesaikan persamaan $y = 3 \cos 2\theta$ apabila $y = 2$.

[4 marks]
[4 markah]

Answer/Jawapan:

(a)

(b)

22

4

- 23** Ali took part in shooting competition at the state level. Each participant will be given the opportunity to shoot of 20 times. It was found that estimates for Ali shoot the target is 4.

Ali mengambil bahagian dalam suatu pertandingan menembak peringkat negeri. Setiap peserta akan diberi peluang menembak sebanyak 20 kali . Didapati bahawa anggaran tembakan Ali kena pada sasaran adalah 4 .

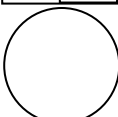
- (a) Find the probability Ali hits the target.
Cari kebarangkalian tembakan Ali kena pada sasaran.
- (b) If Ali was given another 3 chances to shoot, find the probability that 2 shots hit the target.
Jika Ali diberi 3 kali lagi peluang menembak, cari kebarangkalian 2 daripada tembakan tersebut kena pada sasaran.

[3 marks]
[3 markah]

Answer/Jawapan:

(a)

(b)



24 A committee of 5 students is to be form from 5 boys and 7 girls. Find

Satu jawatankuasa terdiri daripada 5 pelajar dapat dibentuk daripada 5 pelajar lelaki dan 7 pelajar perempuan. Cari

(a) the number of ways, the committee can be form if the committee must consists of 3 boys and 2 girls,

bilangan cara jawatankuasa itu dibentuk jika jawatankuasa tersebut mestilah terdiri daripada 3 lelaki dan 2 perempuan,

(b) the number of ways the committee members can be arranged in a row for a group photograph, if the girls need to be sit separately .

bilangan cara menyusun jawatankuasa itu dalam satu sesi bergambar, jika kedua-dua pelajar perempuan itu duduk berasingan.

[4 marks]

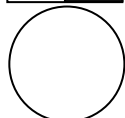
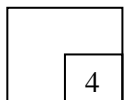
[4 markah]

Answer/Jawapan:

(a)

(b)

24



25

X	0	1	2	3	4	5
P(X=x)	$\frac{1}{243}$	$\frac{10}{243}$	$\frac{40}{243}$	k	$\frac{80}{243}$	$\frac{32}{243}$

Table 25
Jadual 25

Table 25 shows the probability distribution for number of son in a family.

Jadual 25 menunjukkan taburan kebarangkalian bagi bilangan anak lelaki dalam sebuah keluarga.

Find
Cari

- (a) the value of k ,
nilai k ,
- (b) the probability of getting son.
kebarangkalian mendapat anak lelaki.

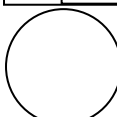
[4 marks]
[4 markah]

Answer/Jawapan:

(a)

(b)

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

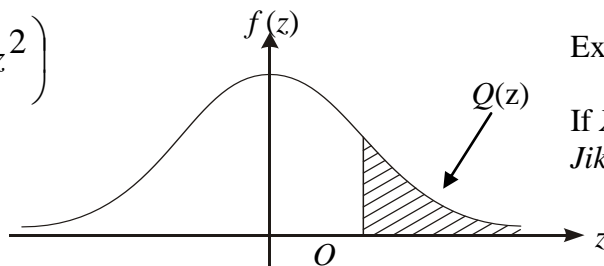


**THE UPPER TAIL PROBABILITY $Q(z)$ FOR THE NORMAL DISTRIBUTION $N(0,1)$
 KEBARANGKALIAN Hujung Atas $Q(z)$ BAGI TABURAN NORMAL $N(0, 1)$**

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

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

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



Example / Contoh:

If $X \sim N(0, 1)$, then $P(X > k) = Q(k)$
 Jika $X \sim N(0, 1)$, maka $P(X > k) = Q(k)$

HALAMAN KOSONG

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **25** questions.
Kertas soalan ini mengandungi 25 soalan.
2. Answer **all** questions.
*Jawab **semua** soalan.*
3. Write your answers in the spaces provided in the question paper.
Tulis jawapan anda dalam ruang yang disediakan dalam kertas soalan.
4. Show your working. It may help you to get marks.
Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.
5. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
Sekiranya anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.
6. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
7. The marks allocated for each question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan.
8. A list of formulae is provided on pages 2 and 3.
Satu senarai rumus disediakan di halaman 2 dan 3.
9. The Upper Tail Probability $Q(z)$ For The Normal Distribution $N(0, 1)$ Table is provided on page **22**.
*Jadual Kebarangkalian Hujung Atas $Q(z)$ Bagi Taburan Normal $N(0, 1)$ disediakan di halaman **22**.*
10. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.
11. Hand in this question paper to the invigilator at the end of the examination.
Serahkan kertas soalan ini kepada pengawas peperiksaan di akhir peperiksaan.