

SULIT

NO. KAD PENGENALAN

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ANGKA GILIRAN

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**LEMBAGA PEPERIKSAAN
KEMENTERIAN PELAJARAN MALAYSIA**

SIJIL PELAJARAN MALAYSIA 2013

3472/1

ADDITIONAL MATHEMATICS

Kertas 1

Nov./Dis.

2 jam

Dua jam

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tulis nombor kad pengenalan dan angka giliran anda pada petak 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>		
Kod Pemeriksa:		
Soalan	Markah Penuh	Markah Diperoleh
1	2	
2	2	
3	2	
4	4	
5	3	
6	4	
7	3	
8	3	
9	2	
10	4	
11	3	
12	4	
13	4	
14	3	
15	4	
16	3	
17	4	
18	3	
19	4	
20	3	
21	2	
22	3	
23	3	
24	4	
25	4	
Jumlah	80	

Kertas soalan ini mengandungi 28 halaman bercetak.

[Lihat halaman sebelah

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

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

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

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

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

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

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

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

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

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

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

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

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

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

CALCULUS KALKULUS

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

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

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

4 Area under a curve
Luas di bawah lengkung

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

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

5 Volume of revolution
Isi padu kisanan

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

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

STATISTICS
STATISTIK

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

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

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

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

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

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

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

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

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

$$12 \quad \text{Mean / Min} , \mu = np$$

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

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

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

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

GEOMETRY
GEOMETRI

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

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

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

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

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*

$$= \frac{1}{2} | (x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3) |$$

[Lihat halaman sebelah
SULIT

TRIGONOMETRY
TRIGONOMETRI

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1 Arc length, $s = r\theta$
<i>Panjang lengkok, $s = j\theta$</i></p> | <p>8 $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$
$\sin(A \pm B) = \sin A \text{ kos } B \pm \text{ kos } A \sin B$</p> |
| <p>2 Area of sector, $A = \frac{1}{2} r^2 \theta$
<i>Luas sektor, $L = \frac{1}{2} j^2 \theta$</i></p> | <p>9 $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$
$\text{kos}(A \pm B) = \text{kos } A \text{ kos } B \mp \sin A \sin B$</p> |
| <p>3 $\sin^2 A + \cos^2 A = 1$
$\sin^2 A + \text{kos}^2 A = 1$</p> | <p>10 $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$</p> |
| <p>4 $\sec^2 A = 1 + \tan^2 A$
$\text{sek}^2 A = 1 + \tan^2 A$</p> | <p>11 $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$</p> |
| <p>5 $\text{cosec}^2 A = 1 + \cot^2 A$
$\text{kosek}^2 A = 1 + \text{kot}^2 A$</p> | <p>12 $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$</p> |
| <p>6 $\sin 2A = 2 \sin A \cos A$
$\sin 2A = 2 \sin A \text{ kos } A$</p> | <p>13 $a^2 = b^2 + c^2 - 2bc \cos A$
$a^2 = b^2 + c^2 - 2bc \text{ kos } A$</p> |
| <p>7 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2 \cos^2 A - 1$
$= 1 - 2 \sin^2 A$</p> <p>$\text{kos } 2A = \text{kos}^2 A - \sin^2 A$
$= 2 \text{ kos}^2 A - 1$
$= 1 - 2 \sin^2 A$</p> | <p>14 Area of triangle / <i>Luas segi tiga</i>
$= \frac{1}{2} ab \sin C$</p> |

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

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

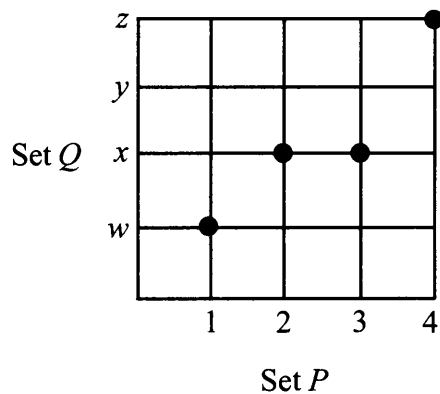


Diagram 1
Rajah 1

State

Nyatakan

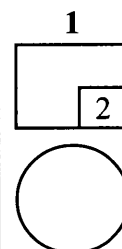
- (a) the range of the relation,
julat hubungan itu,
- (b) the type of the relation between set P and set Q .
jenis hubungan antara set P dan set Q .

[2 marks]
[2 markah]

Answer / *Jawapan:*

(a)

(b)



[Lihat halaman sebelah
SULIT

2 Given the functions $f : x \rightarrow 5x + 6$ and $g : x \rightarrow 2x - 1$, find $gf(x)$.

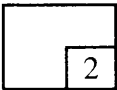
[2 marks]

Diberi fungsi $f : x \rightarrow 5x + 6$ dan $g : x \rightarrow 2x - 1$, cari $gf(x)$.

[2 markah]

Answer / Jawapan:

2



3 It is given that the function $f(x) = p - 3x$, where p is a constant.

Find the value of p such that $f(p) = 4$.

[2 marks]

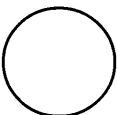
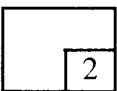
Diberi bahawa fungsi $f(x) = p - 3x$, dengan keadaan p ialah pemalar.

Cari nilai p dengan keadaan $f(p) = 4$.

[2 markah]

Answer / Jawapan:

3



4 It is given that quadratic equation $x(x-5) = 4$.

Diberi bahawa persamaan kuadrat $x(x-5) = 4$.

(a) Express the equation in the form $ax^2 + bx + c = 0$.

Ungkapkan persamaan itu dalam bentuk $ax^2 + bx + c = 0$.

(b) State the sum of roots of the equation.

Nyatakan hasil tambah punca bagi persamaan itu.

(c) Determine the type of roots of the equation.

Tentukan jenis punca bagi persamaan itu.

[4 marks]

[4 markah]

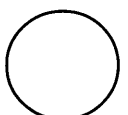
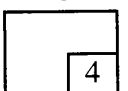
Answer / Jawapan:

(a)

(b)

(c)

4



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SULIT

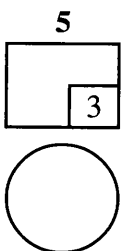
- 5 The graph of a quadratic function $f(x) = px^2 - 2x - 3$, where p is a constant, does not intersect the x -axis.

Find the range of values of p . [3 marks]

Graf fungsi kuadratik $f(x) = px^2 - 2x - 3$, dengan keadaan p ialah pemalar, tidak bersilang dengan paksi- x .

Cari julat nilai p . [3 markah]

Answer / Jawapan:



- 6 Diagram 6 shows the graph of a quadratic function $f(x) = -(x-2)^2 + 3k$, where k is a constant.

Rajah 6 menunjukkan graf fungsi kuadratik $f(x) = -(x-2)^2 + 3k$, dengan keadaan k ialah pemalar.

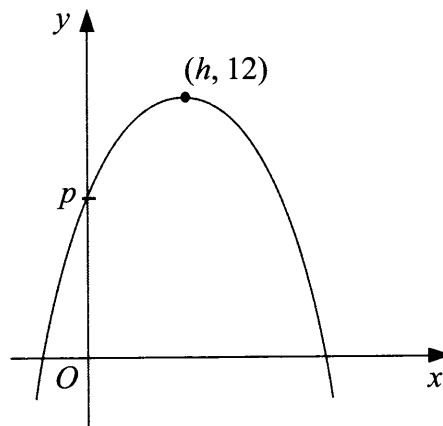


Diagram 6
Rajah 6

Given $(h, 12)$ is the maximum point of the graph,
Diberi $(h, 12)$ ialah titik maksimum graf itu,

- (a) state the value of h and of k ,
nyatakan nilai h dan nilai k ,
- (b) find the value of p .
cari nilai p .

[4 marks]
[4 markah]

Answer/ Jawapan:

(a)

(b)

7 Given $a = \frac{1}{x^3}$, find

Diberi $a = \frac{1}{x^3}$, cari

(a) $\log_x a$,

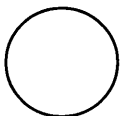
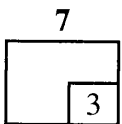
(b) $2\log_a x$.

[3 marks]
[3 markah]

Answer / Jawapan:

(a)

(b)



8 Solve the equation:

Selesaikan persamaan:

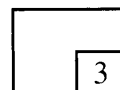
$$\log_3 2 + \log_3 (x - 4) = 1$$

[3 marks]

[3 markah]

Answer / Jawapan:

8



9 The first three terms of an arithmetic progression are h , 8 and k .

Find the value of $h+k$.

[2 marks]

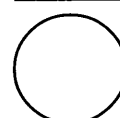
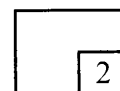
Tiga sebutan pertama suatu jangjang aritmetik ialah h , 8 dan k .

Cari nilai $h+k$.

[2 markah]

Answer / Jawapan:

9



- 10 In an arithmetic progression, the common difference is -5 .
Given the sum of the first 10 terms of the progression is 45, find

Dalam suatu jangjang aritmetik, beza sepunya ialah -5 .

Diberi hasil tambah 10 sebutan pertama jangjang itu ialah 45, cari

- (a) the first term of the progression,
sebutan pertama jangjang itu,
- (b) the tenth term of the progression.
sebutan kesepuluh jangjang itu.

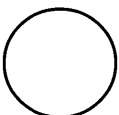
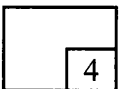
[4 marks]
[4 markah]

Answer / Jawapan:

(a)

(b)

10



- 11 The following information refers to the sum of the terms of a geometric progression.
Maklumat berikut merujuk kepada hasil tambah sebutan-sebutan suatu jangjang geometri.

$$0.363636... = 0.36 + v + w + ...$$

where v and w are constants.
dengan keadaan v dan w ialah pemalar.

Determine

Tentukan

- (a) the value of v and of w ,
nilai v dan nilai w ,
- (b) the common ratio of the progression.
nisbah sepunya jangjang itu.

[3 marks]

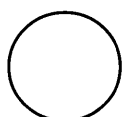
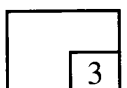
[3 markah]

Answer/ *Jawapan:*

(a)

(b)

11



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SULIT

- 12 The variables x and y are related by the equation $y = 1000p^x$, where p is a constant. Diagram 12 shows the straight line graph obtained by plotting $\log_{10} y$ against x .

Pembolehkan x dan y dihubungkan oleh persamaan $y = 1000p^x$, dengan keadaan p ialah pemalar. Rajah 12 menunjukkan graf garis lurus yang diperolehi dengan memplot $\log_{10} y$ melawan x .

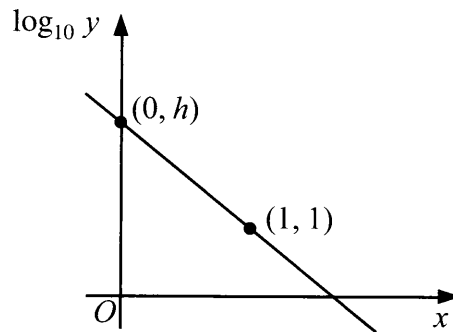


Diagram 12
Rajah 12

- (a) Express the equation $y = 1000p^x$ in linear form used to obtain the straight line graph shown in Diagram 12.

Ungkapkan persamaan $y = 1000p^x$ dalam bentuk linear yang digunakan untuk memperolehi graf garis lurus seperti ditunjukkan dalam Rajah 12.

- (b) Find the value of h and of p .

Cari nilai h dan nilai p .

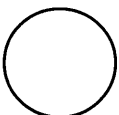
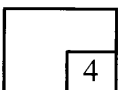
[4 marks]
[4 markah]

Answer / Jawapan:

(a)

(b)

12



13 Diagram 13 shows a straight line AB .

Rajah 13 menunjukkan satu garis lurus AB .

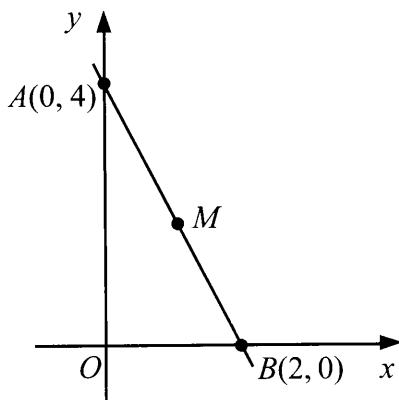


Diagram 13
Rajah 13

Given M is the midpoint of AB , find

Diberi M ialah titik tengah AB , cari

(a) the coordinates of M ,

koordinat M ,

(b) the equation of the straight line which is perpendicular to AB and passing through M .

persamaan garis lurus yang berserenjang dengan AB dan melalui M .

[4 marks]

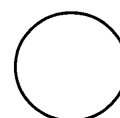
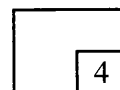
[4 markah]

Answer / *Jawapan:*

(a)

(b)

13



[Lihat halaman sebelah
SULIT

14 The point B is $(5, 0)$. A point $P(x, y)$ moves such that $PB = 3$.

Find the equation of the locus of P .

[3 marks]

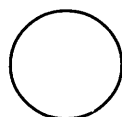
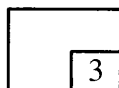
Titik B ialah $(5, 0)$. Titik $P(x, y)$ bergerak dengan keadaan $PB = 3$.

Cari persamaan lokus bagi P .

[3 markah]

Answer / Jawapan:

14



15 Given $\underline{u} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ and $\underline{v} = \begin{pmatrix} 6 \\ k-1 \end{pmatrix}$, find

Diberi $\underline{u} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ dan $\underline{v} = \begin{pmatrix} 6 \\ k-1 \end{pmatrix}$, cari

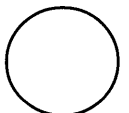
- (a) the unit vector in the direction of \underline{u} ,
vektor unit dalam arah \underline{u} ,
- (b) the value of k such that \underline{u} and \underline{v} are parallel.
nilai k dengan keadaan \underline{u} dan \underline{v} adalah selari.

[4 marks]
[4 markah]

Answer/ Jawapan:

(a)

(b)



16 Diagram 16 shows two vectors \vec{OA} and \vec{OB} on a Cartesian plane.

Rajah 16 menunjukkan dua vektor \vec{OA} dan \vec{OB} pada satah Cartesian.

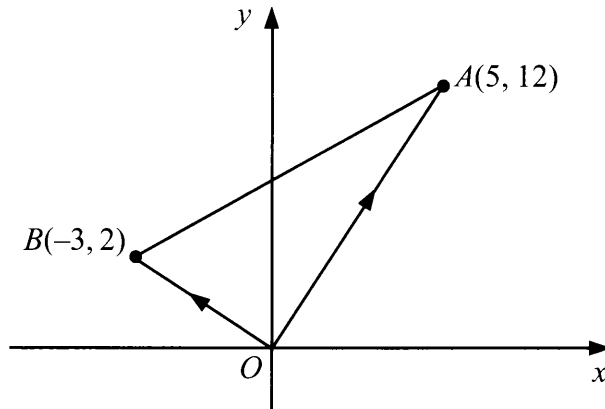


Diagram 16
Rajah 16

(a) State \vec{OA} in the form of $x\mathbf{i} + y\mathbf{j}$.

Nyatakan \vec{OA} dalam bentuk $x\mathbf{i} + y\mathbf{j}$.

(b) Express \vec{AB} in the form of $\begin{pmatrix} x \\ y \end{pmatrix}$.

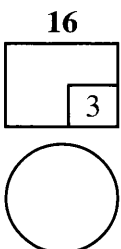
Ungkapkan \vec{AB} dalam bentuk $\begin{pmatrix} x \\ y \end{pmatrix}$.

[3 marks]
[3 markah]

Answer / Jawapan:

(a)

(b)



17 Diagram 17 shows the sector OPQ with centre O .

Rajah 17 menunjukkan sebuah sektor OPQ dengan pusat O .

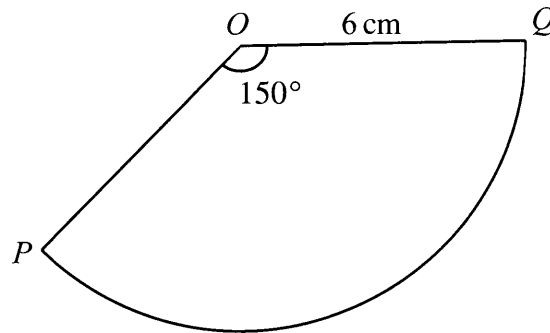


Diagram 17
Rajah 17

Find

Cari

[Use / Guna $\pi = 3.142$]

- (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 .

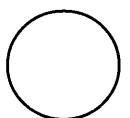
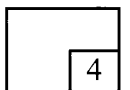
[4 marks]
[4 markah]

Answer / Jawapan:

(a)

(b)

17



[Lihat halaman sebelah
SULIT

18 Given $\cos \theta = k$, where k is a constant and $0^\circ \leq \theta \leq 90^\circ$.

Diberi kos $\theta = k$, dengan keadaan k ialah pemalar dan $0^\circ \leq \theta \leq 90^\circ$.

Find in terms of k

Cari dalam sebutan k

(a) $\sec \theta$,

$\sec \theta$,

(b) $\sin 2\theta$.

[3 marks]

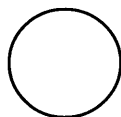
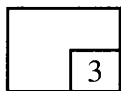
[3 markah]

Answer / Jawapan:

(a)

(b)

18



- 19 The point $P(1, -5)$ lies on the curve $y = 3x^2 - 8x$.
Titik $P(1, -5)$ terletak pada lengkung $y = 3x^2 - 8x$.

Find

Cari

- (a) the gradient of the tangent to the curve at point P ,
kecerunan tangen kepada lengkung itu di titik P ,
- (b) the equation of the normal to the curve at point P .
persamaan normal kepada lengkung itu di titik P .

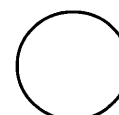
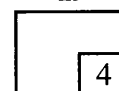
[4 marks]
[4 markah]

Answer / *Jawapan:*

(a)

(b)

19



[Lihat halaman sebelah
SULIT

- 20 Given $\frac{dv}{dt} = 8t - 3$ and $v = 20$ when $t = 2$, express v in terms of t . [3 marks]

Diberi $\frac{dv}{dt} = 8t - 3$ dan $v = 20$ apabila $t = 2$, ungkapkan v dalam sebutan t .

Answer / Jawapan: [3 markah]

20

3

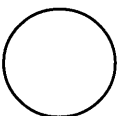
- 21 Given $\frac{d}{dx}[f(x)] = 2g(x)$, find $\int g(x)dx$. [2 marks]

Diberi $\frac{d}{dx}[f(x)] = 2g(x)$, cari $\int g(x)dx$. [2 markah]

Answer / Jawapan:

21

2



22 A set of data consists of twelve positive numbers.

It is given that $\sum(x - \bar{x})^2 = 600$ and $\sum x^2 = 1032$.

Satu set data mengandungi dua belas nombor positif.

Diberi bahawa $\sum(x - \bar{x})^2 = 600$ dan $\sum x^2 = 1032$.

Find

Cari

- (a) the variance,
varians,
- (b) the mean.
min.

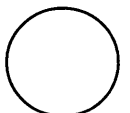
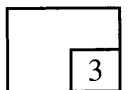
[3 marks]
[3 markah]

Answer / *Jawapan:*

(a)

(b)

22



[Lihat halaman sebelah
SULIT

23 Diagram 23 shows a seven-letter word.

Rajah 23 menunjukkan satu perkataan tujuh huruf.



Diagram 23

Rajah 23

(a) Find the number of different ways to arrange all the letters in a row.

Cari bilangan cara yang berlainan untuk menyusun semua huruf dalam satu baris.

(b) Four letters are to be chosen from the word.

Find the number of ways of choosing the four letters which consists of 3 consonants.

Empat huruf akan dipilih daripada perkataan itu.

Cari bilangan cara untuk memilih empat huruf itu yang terdiri daripada 3 konsonan.

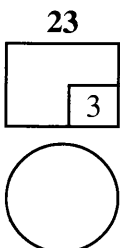
[3 marks]

[3 markah]

Answer / Jawapan:

(a)

(b)



- 24 The probability of student A being chosen as a school librarian is $\frac{3}{4}$ while the probability of student B being chosen is $\frac{5}{6}$.

Kebarangkalian murid A dipilih sebagai pustakawan sekolah ialah $\frac{3}{4}$ manakala kebarangkalian murid B dipilih ialah $\frac{5}{6}$.

Find the probability that

Cari kebarangkalian bahawa

- (a) both of the students are chosen as the school librarians,
kedua-dua murid dipilih sebagai pustakawan sekolah,
- (b) only one student is chosen as a school librarian.
hanya seorang murid dipilih sebagai pustakawan sekolah.

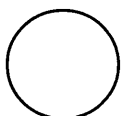
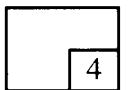
[4 marks]
[4 markah]

Answer / Jawapan:

(a)

(b)

24



[Lihat halaman sebelah
SULIT

- 25 The random variable X represents a binomial distribution with 10 trials and the probability of success is $\frac{1}{3}$.

Pembolehubah rawak X mewakili taburan binomial dengan 10 percubaan dan kebarangkalian berjaya ialah $\frac{1}{3}$.

Find

Cari

- (a) the standard deviation of the distribution,
sisihan piawai taburan itu,
- (b) the probability that at least one trial is success.
kebarangkalian bahawa sekurang-kurangnya satu percubaan adalah berjaya.

[4 marks]

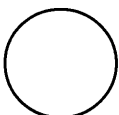
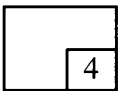
[4 markah]

Answer / *Jawapan:*

(a)

(b)

25



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

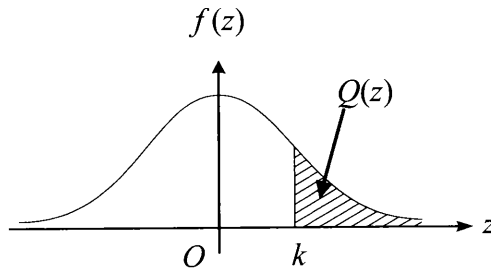
For negative z use relation:

Bagi z negatif guna hubungan:

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

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

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



Example / Contoh:

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

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

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

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

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** to **4**.
Satu senarai rumus disediakan di halaman 2 hingga 4.
9. The Upper Tail Probability $Q(z)$ For The Normal Distribution $N(0,1)$ Table is provided on page **27**.
Jadual Kebarangkalian Hujung Atas $Q(z)$ Bagi Taburan Normal $N(0,1)$ disediakan di halaman 27.
10. You may use a scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik.
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.