Nama : ..... Kelas : .....

SULIT
3472/1
Matematik
Tambahan
Kertas 1
Ogos/September
2015
2 jam

3472/1

MAKTAB RENDAH SAINS MARA

PEPERIKSAAN SIJIL PENDIDIKAN MRSM 2015

MATEMATIK TAMBAHAN
Kertas 1
Dua jam

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tulis* **nama** *dan* **kelas** *anda pada ruang 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 buku soalan ini.*

Soalan	Markah Penuh	Markah Diperolehi
1	2	
2	2	
3	3	
4	4	
5	3	
6	3	
7	3	
8	4	
9	3	
10	2	
11	3	
12	3	
13	4	
14	2	
15	3	
16	4	
17	3	
18	4	
19	3	
20	3	
21	3	
22	4	
23	4	
24	4	
25	4	
Jumlah	80	

Kertas soalan ini mengandungi 23 halaman bercetak dan 1 halaman tidak bercetak

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

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

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

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

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

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

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

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

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

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

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

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

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

CALCULUS / *KALKULUS*

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

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

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

4 Area under a curve

Luas di bawah lengkung

$= \int_a^b y\,dx$ or (*atau*)

$= \int_a^b x\,dy$

5 Volume generated

Isi padu janaan

$= \int_a^b \pi y^2\,dx$ or (*atau*)

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

STATISTICS / *STATISTIK*

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

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

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

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

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

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

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

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

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

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* , $\mu = np$

13 $\sigma = \sqrt{npq}$

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

GEOMETRY / *GEOMETRI*

1 Distance / *Jarak*

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

2 Midpoint / *Titik tengah*

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

3 A point dividing a segment of a line
Titik yang membahagi suatu tembereng garis

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

4 Area of triangle / *Luas segi tiga*

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

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

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

TRIGONOMETRY / *TRIGONOMETRI*

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

2 Area of sector, $A = \frac{1}{2}r^2\theta$
Luas 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 Diagram 1 shows the relation between x and y.
Rajah 1 *menunjukkan hubungan antara* x *dan* y.

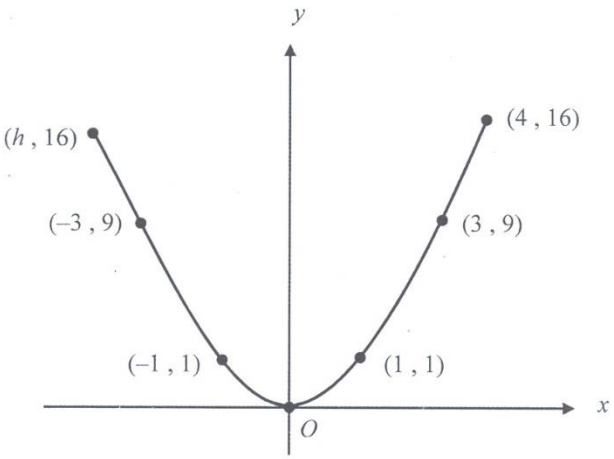


Diagram 1
Rajah 1

State
Nyatakan

(*a*) the value of h,
nilai h,

(*b*) the range of the relation.
julat hubungan itu.

[2 *marks*]
[2 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

1
2

2 Given $f: x \to 3x + 10$ and $fg: x \to 1 - 9x^3$, find g. [2 *marks*]

Diberi $f: x \to 3x + 10$ *dan* $fg: x \to 1 - 9x^3$, *cari* g. [2 *markah*]

Answer / *Jawapan*:

2

2

3 It is given that $f^{-1}(x) = 2x + 3$.

Diberi bahawa $f^{-1}(x) = 2x + 3$.

Find

Cari

(*a*) $f(x)$,

(*b*) the value of m if $f(m) = f^{-1}(1)$.

nilai m jika $f(m) = f^{-1}(1)$.

[3 *marks*]

[3 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

3

3

For Examiner's Use

4 Diagram 4 shows a front view of a tunnel.

Rajah 4 menunjukkan pandangan hadapan sebuah terowong.

Diagram 4
Rajah 4

The curve of the tunnel is represented by the equation of $y = -x^2 + 5$.

The width of the road is 6 meters.

Find the maximum height, in meter, of the tunnel. [4 *marks*]

Lengkung bagi terowong itu diwakili oleh persamaan $y = -x^2 + 5$.

Lebar jalan tersebut adalah 6 meter.

Cari ketinggian maksimum, dalam meter bagi terowong itu. [4 *markah*]

Answer / *Jawapan*:

4

4

5 Given the straight line $y - 3x = 1$ intersects the curve $y = 2x^2 - x + m$ at two points, find the range of values of m. [3 *marks*]

Diberi garis lurus $y - 3x = 1$ *bersilang dengan lengkung* $y = 2x^2 - x + m$ *pada dua titik, cari julat nilai* m. [3 *markah*]

Answer / *Jawapan*:

5
3

6 Find the range of values of x that satisfy both inequalities below :

Cari julat nilai x *yang memenuhi kedua-dua ketaksamaan di bawah* :

$$x(x + 1) \geq 2$$
$$-1 < x + 2 < 5$$

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

Answer / *Jawapan*:

6
3

For Examiner's Use

7 Solve the equation:

Selesaikan persamaan:

$$\left(16^{x}\right)\left(3^{2x-3}\right)=2^{6}$$

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

Answer / *Jawapan*:

7
3

8 Solve the equation:

Selesaikan persamaan:

$$4-\log_{x}(x+5)=\log_{x}(x-1)+\log_{\sqrt{x}}(x)$$

[4 *marks*]
[4 *markah*]

Answer / *Jawapan*:

8
4

9 The first term of an arithmetic progression is –8. Given that the sum of the first 30 terms of the progression is 1065, find the 40^{th} term. [3 *marks*]

Sebutan pertama bagi suatu janjang aritmetik ialah –8. *Diberi bahawa hasil tambah bagi* 30 *sebutan pertama bagi janjang tersebut ialah* 1065, *cari sebutan ke* 40. [3 *markah*]

Answer / *Jawapan*:

9

3

10 Given that three consecutive terms of a geometric progression are $3k$, $2k$, $7 - k$. Find the value of k. [2 *marks*]

Diberi tiga sebutan berturutan suatu janjang geometri ialah $3k$, $2k$, $7 - k$. *Cari nilai* k. [2 *markah*]

Answer / *Jawapan*:

10

2

For Examiner's Use

11 Given that $0 \cdot 053333...$ is a recurring decimal number.
Express the number as a fraction in its simplest form. [3 *marks*]

Diberi bahawa $0 \cdot 053333...$ *ialah nombor perpuluhan jadi semula.*
Ungkapkan nombor tersebut dalam bentuk pecahan termudah. [3 *markah*]

Answer / *Jawapan*:

11
3

---

12 Diagram 12 shows the straight line obtained by plotting $\log_{10} y$ against $\log_{10} x$.
Rajah 12 *menunjukkan garis lurus yang diperoleh dengan memplot* $\log_{10} y$ *melawan* $\log_{10} x$.

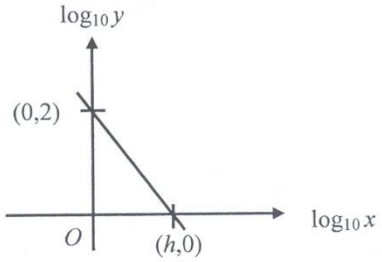


Diagram 12
Rajah 12

Given the variables x and y are related by equation $y = \frac{k}{x^3}$, find the value of h and of k.
[3 *marks*]

Diberi pembolehubah x dan y dihubungkan oleh persamaan $y = \frac{k}{x^3}$, *cari nilai h dan nilai k.* [3 *markah*]

Answer / *Jawapan*:

12
3

13 Diagram 13 shows the world geographic reference system map. The location of town X is 60° North and 150° West. The location of town Y is 40° South and 150° East. The location of town Z is h° North and k° West.

Rajah 13 *menunjukkan peta sistem rujukan geografi dunia. Lokasi bagi bandar X ialah* 60° *Utara dan* 150° *Barat. Lokasi bagi bandar Y ialah* 40° *Selatan dan* 150° *Timur. Lokasi bagi bandar Z ialah h° Utara dan k° Barat.*

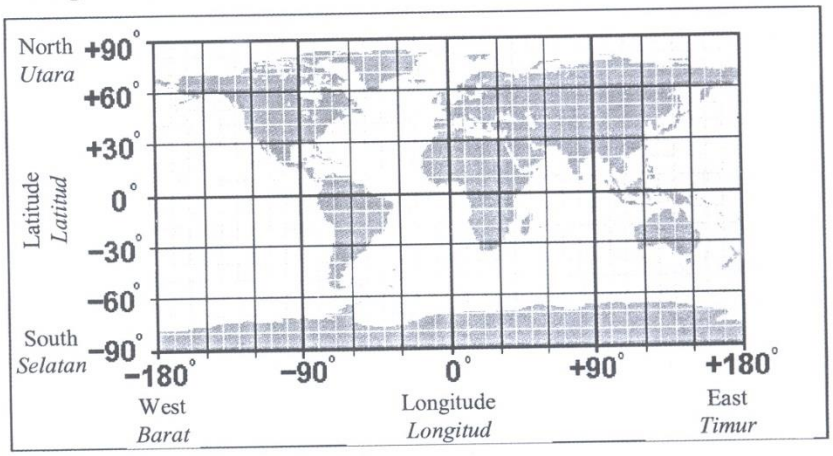


Diagram 13
Rajah 13

It is given that town X, Z and Y is a straight line on the map where $4XZ = ZY$.

Find the value of h and of k. [4 *marks*]

Diberi bahawa bandar X, Z dan Y adalah satu garis lurus di atas peta itu dengan keadaan $4XZ = ZY$.

Cari nilai h dan nilai k. [4 *markah*]

Answer / *Jawapan*:

13

4

For Examiner's Use

14 Given that $\underline{x} = \begin{pmatrix} h \\ k \end{pmatrix}$, $\underline{y} = \begin{pmatrix} -k \\ h \end{pmatrix}$ and the unit vector in the direction of $2\underline{x}$ is $\frac{2}{3}\begin{pmatrix} h \\ k \end{pmatrix}$

where h and k are constants.

Find $|3\underline{y}|$. [2 *marks*]

Diberi $\underline{x} = \begin{pmatrix} h \\ k \end{pmatrix}$, $\underline{y} = \begin{pmatrix} -k \\ h \end{pmatrix}$ *dan vektor unit dalam arah* $2\underline{x}$ *adalah* $\frac{2}{3}\begin{pmatrix} h \\ k \end{pmatrix}$ *di mana*

h dan k adalah pemalar.

Cari $|3\underline{y}|$. [2 *markah*]

Answer / *Jawapan*:

14

2

15 The following information refers to two vectors, $\overrightarrow{OQ}$ and $\overrightarrow{OR}$.

Maklumat berikut adalah merujuk kepada dua vektor, $\overrightarrow{OQ}$ *dan* $\overrightarrow{OR}$.

$$\overrightarrow{OQ} = 9\underline{i} + 4\underline{j}$$
$$\overrightarrow{OR} = 6\underline{i} - \underline{j}$$

It is given that Q is the midpoint of PR. Find $\overrightarrow{OP}$ in terms of $\underline{i}$ and $\underline{j}$. [3 *marks*]

Diberi Q adalah titik tengah PR. Cari $\overrightarrow{OP}$ *dalam sebutan* $\underline{i}$ *dan* $\underline{j}$. [3 *markah*]

Answer / *Jawapan*:

15

3

16 In Diagram 16, *OPS* is an isoceles triangle and *OQR* is a sector of a circle with centre *O*.
Dalam Rajah 16, *OPS adalah sebuah segi tiga sama kaki dan OQR adalah sebuah sektor bulatan dengan pusat O.*

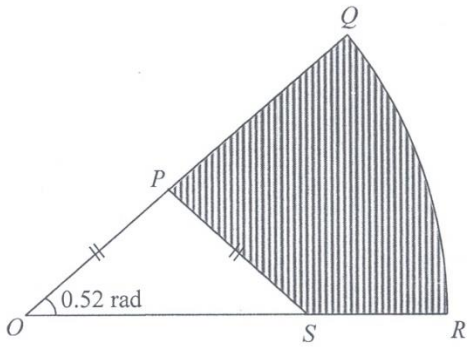


Diagram 16
Rajah 16

Given that $OP : PQ = 2 : 3$ and the length of the arc QR is 13 cm.
Find the area, in cm^2, of the shaded region. [4 *marks*]
Diberi bahawa $OP : PQ = 2 : 3$ *dan panjang lengkok QR ialah* 13 cm.
Cari luas, dalam cm^2, *rantau berlorek.* [4 *markah*]

Answer / *Jawapan*:

16

4

For Examiner's Use

17 Diagram 17 shows the growth of a pearl that is cultured in an oyster. The pearl will grow in the shape of a sphere with the radius of r mm.

Rajah 17 *menunjukkan pembesaran sebutir mutiara yang dikulturkan di dalam tiram. Mutiara itu akan membesar membentuk suatu sfera dengan jejari* r mm.

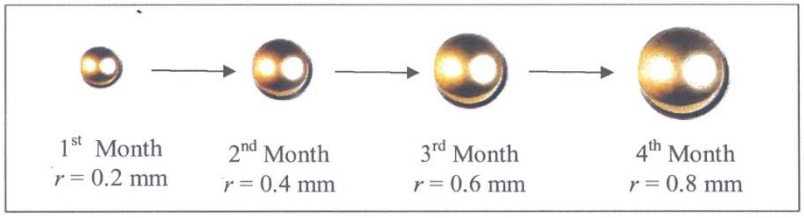


Diagram 17
Rajah 17

Given that the radius increases at a constant rate, find the rate of change of the surface area of the pearl when $r = 6$ mm.

Give your answer in term of π. [3 *marks*]

[Surface area of a sphere , $A = 4\pi r^2$]

Diberi bahawa jejari bertambah dengan kadar malar, cari kadar perubahan luas permukaan mutiara itu ketika $r = 6$ mm.

Beri jawapan dalam sebutan π. [3 *markah*]

[*Luas permukaan sfera* , $A = 4\pi r^2$]

Answer / *Jawapan*:

17

3

18 Solve the equation $8 \tan x - \cot x - 2 = 0$ for $0° \leq x \leq 360°$. [4 *marks*]

Selesaikan persamaan $8 \tan x - \text{kot } x - 2 = 0$ *bagi* $0° \leq x \leq 360°$. [4 *markah*]

Answer / *Jawapan*:

18

4

19 The equation of a curve is given as $y = x^3 - 7x + 6$.

Find the equation of the tangent to the curve at the point where the curve intersects the y-axis. [3 *marks*]

Persamaan bagi satu lengkung diberi sebagai $y = x^3 - 7x + 6$.

Cari persamaan bagi tangen kepada lengkung itu pada titik di mana lengkung itu menyilang paksi-y. [3 *markah*]

Answer / *Jawapan*:

19

3

For Examiner's Use

20 It is given that $y = \frac{x^2}{x-2}$ and $\frac{dy}{dx} = \frac{1}{2}f(x)$. If $\int_0^k f(x)\,dx = -9$, find the possible values of k.

[3 *marks*]

Diberi bahawa $y = \frac{x^2}{x-2}$ *dan* $\frac{dy}{dx} = \frac{1}{2}f(x)$. *Jika* $\int_0^k f(x)\,dx = -9$, *cari nilai-nilai yang mungkin bagi k.* [3 *markah*]

Answer / Jawapan:

20

3

21 A bag contains 6 red balls and 2 yellow balls. If 3 balls are drawn at random from the bag without replacement, calculate the probability that exactly 2 red balls are drawn.

[3 *marks*]

Sebuah beg mengandungi 6 *biji bola merah dan* 2 *biji bola kuning. Jika* 3 *biji bola diambil secara rawak dari beg itu tanpa dikembalikan, hitung kebarangkalian bahawa tepat* 2 *biji bola merah diambil.* [3 *markah*]

Answer / *Jawapan*:

21

3

22 Diagram 22 shows the shaded region bounded by a curve $2y = x^2 + k$, y-axis and $y = 1$.

Rajah 22 menunjukkan kawasan berlorek yang dilingkungi oleh persamaan lengkung $2y = x^2 + k$, *paksi-y dan* $y = 1$.

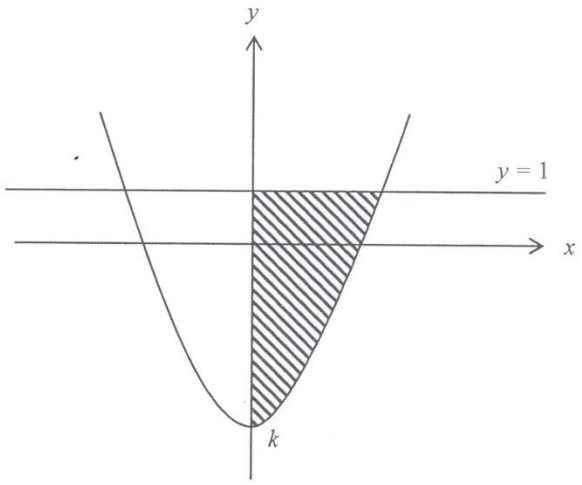


Diagram 22

Rajah 22

Given that the volume generated when the shaded region is rotated through 360° about y-axis is 4π.

Find the value of k. [4 *marks*]

Diberi bahawa isipadu yang dijana apabila kawasan berlorek diputarkan melalui 360° *pada paksi- y ialah* 4π.

Cari nilai k. [4 *markah*]

Answer/ *Jawapan:*

22

4

For Examiner's Use

23 Diagram 23 show a notice by the Deputy Principal of Academic Affairs to all form four students.

Rajah 23 *menunjukkan satu notis kepada semua pelajar tingkatan empat oleh Timbalan Pengetua Hal Ehwal Akademik.*

Attention to all form four students

We are happy to inform you that a book fair will be held at our school. Below are the details of the book fair:

Day : Saturday
Date : 14th November 2015
Venue : Dewan Perdana
Participants : Mutiara Book Store, Kristal Book Store.

All form four students are required to buy 3 different novels.

Regards,
- Deputy Principal of Academic Affairs -

Diagram 23

Perhatian kepada semua pelajar tingkatan empat

Sukacita dimaklumkan satu pesta buku akan diadakan di sekolah kita. Berikut adalah butiran pesta buku tersebut:

Hari : *Sabtu*
Tarikh : 14 *November* 2015
Tempat : Dewan Perdana
Peserta : Mutiara Book Store, Kristal Book Store.

Semua pelajar tingkatan empat diwajibkan membeli 3 novel yang berbeza.

Yang benar,
-Timbalan Pengetua Hal Ehwal Akademik -

Rajah 23

Given that there are 6 Malay and 4 English novels available at the book fair, find the number of ways of choosing the novels if

Diberi bahawa terdapat 6 *novel Bahasa Malaysia dan* 4 *novel Bahasa Inggeris di pesta buku itu, cari bilangan cara untuk memilih novel-novel tersebut jika*

(*a*) there is no restriction,
tiada syarat dikenakan,

(*b*) at least one of the novels is in Malay.
sekurang-kurangnya sebuah novel Bahasa Malaysia.

[4 *marks*]
[4 *markah*]

Answer / *Jawapan*:

(*a*)

(*b*)

23

4

24 A test consists of 20 multiple-choice questions. Each question is provided with m possible responses of which only one is correct. A student chooses to guess the answer for all the questions. Given that the mean of the number of correct answers is 4.

Suatu ujian yang mengandungi 20 *soalan aneka pilihan. Setiap soalan disertakan dengan* m *pilihan jawapan dimana hanya satu jawapan sahaja yang betul. Seorang pelajar memilih untuk meneka jawapan bagi semua soalan. Diberi bahawa min bagi bilangan jawapan yang betul adalah* 4.

Find

Cari

(*a*) the value of m,
nilai bagi m,

(*b*) the standard deviation of the distribution.
sisihan piawai bagi taburan itu.

[4 *marks*]
[4 *markah*]

Answer/ *Jawapan:*

(*a*)

(*b*)

For Examiner's Use

25 The marks in a Geography test for a group of students are normally distributed.
Diagram 25 shows the graph of the marks, where AB is the axis of symmetry of the graph.
Markah ujian Geografi bagi sekumpulan pelajar bertabur secara normal. Rajah 25 menunjukkan graf bagi markah tersebut, di mana AB ialah paksi simetri bagi graf itu.

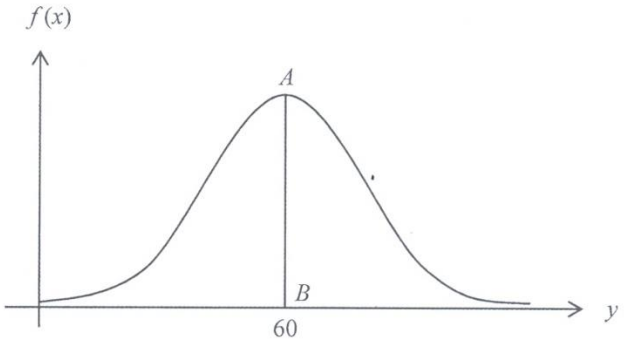


Diagram 25
Rajah 25

The standard deviation of the marks is 2·5. If 2·28% of the students obtained marks less than k, find the value of k. [4 *marks*]
Sisihan piawai bagi markah ialah 2·5. Jika 2·28% daripada pelajar memperoleh markah kurang daripada k, cari nilai k. [4 *markah*]

Answer / Jawapan:

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

25

4

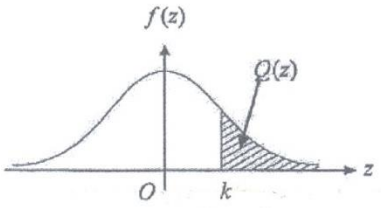
THE UPPER TAIL PROBABILITY $Q(z)$ FOR THE NORMAL DISTRIBUTION N(0,1)
KEBARANGKALIAN HUJUNG ATAS Q(z) BAGI TABURAN NORMAL N(0,1)

z	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
											Minus / Tolak								
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*
$P(X > k) = Q(k)$
$P(X > 2.1) = Q(2.1) = 0.0179$

PAPER 1 MARA 2015

1. (a) $h = -4$ #

(b) $0 \leq y \leq 16$ #

2. $f(g(x)) = 1 - 9x^3$

$3g(x) + 10 = 1 - 9x^3$

$g(x) = \frac{-9 - 9x^3}{3}$

$g(x) = -3x^3 - 3$ #

3. (a) $f(x) = y$

$f^{-1}(y) = x$

$2y + 3 = x$

$f(x) = \frac{x - 3}{2}$ #

(b) $\frac{m-3}{2} = 2(1) + 3$

$m = 13$ #

4. $y = -x^2 + 5$ y-int $= 5$

when $x = 3$ $y = -4$

∴ the maximum height

$= 4 + 5$

$= 9m$ #

5. $1 + 3x = 2x^2 - x + m$

$2x^2 - 4x + m - 1 = 0$

$(-4)^2 - 4(2)(m-1) > 0$

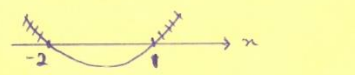
$16 - 8m + 8 > 0$

$8m < 24$

$m < 3$ #

6. $x^2 + x - 2 \geq 0$

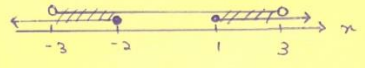
$(x+2)(x-1) \geq 0$



$x \leq -2$, $x \geq 1$

$-1 < x + 2 < 5$

$-3 < x < 3$



$-3 < x \leq -2$, $1 \leq x < 3$

7. $(16^x)(3^{2x-3}) = 2^6$

$4^{2x}(3^{2x})\left(\frac{1}{3^3}\right) = 2^6$

$12^{2x} = 1728$

$12^{2x} = 12^3$

$2x = 3$

$x = \frac{3}{2}$ #

8. $4 - \log_x(x+5) = \log_x(x-1) + \log_{\sqrt{x}} x$

$\log_x(x-1) + \frac{\log_x x}{1/2} + \log_x(x+5) = 4$

$\log_x (x-1)(x+5) = 2$

$x^2 + 4x - 5 = x^2$

$4x - 5 = 0$

$x = \frac{5}{4}$ #

9. AP: $a = -8$ $S_{30} = 1065$

$15(-16 + 29d) = 1065$

$d = 3$

$T_{40} = -8 + 39(3)$

$= 109$ #

10. $\frac{2k}{3k} = \frac{7-k}{2k}$

$4k^2 = 21k - 3k^2$

$7k^2 - 21k = 0$

$7k(k-3) = 0$

$\therefore k = 3$ #

11. $0.05 + 0.003 + 0.0003 + \ldots$

$a = 0.003$

$r = 0.1$

$0.05\dot{3} = \frac{5}{100} + \frac{0.003}{0.9}$

$= \frac{1}{20} + \frac{1}{300}$

$= \frac{4}{75}$ #

12. $y = \frac{k}{x^3}$

$\log_{10} y = \log_{10} k - 3\log_{10} x$

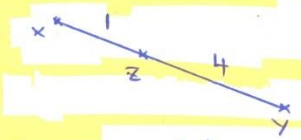
$\log_{10} k = 2$

$k = 100$ *

$0 = 2 - 3h$

$h = \frac{2}{3}$ *

13. $4XZ = ZY$ $\quad X(60, -150)$ $\quad Y(-40, 150)$



$\left(\frac{-40 + 4(60)}{5}, \frac{150 + 4(-150)}{5}\right) = Z$

$Z\ (40°N, 90°W)$

$h = 40$

$k = 90$

14. unit vector $2\underset{\sim}{x}$ = unit vector $\underset{\sim}{x}$

$|\underset{\sim}{x}| = \sqrt{h^2 + k^2} = \frac{3}{2}$

$|\underset{\sim}{y}| = \sqrt{(-k)^2 + h^2} = \frac{3}{2}$

$\therefore |3\underset{\sim}{y}| = 3 \times \frac{3}{2}$

$= \frac{9}{2}$ *

15. $Q(9, 4)$, $R(6, -1)$

$\frac{x + 6}{2} = 9 \qquad \frac{y - 1}{2} = 4$

$x = 12 \qquad y = 9$

$\overrightarrow{OP} = 12\underset{\sim}{i} + 9\underset{\sim}{j}$ *

16. $r(0.52) = 13$

$r = 25$ cm

$A_{SR} = \frac{1}{2}(25)^2(0.52) - \frac{1}{2}(10)^2 \sin 120.42°$ $\quad (2.102\,r)$

$= 162.5 - 43.12$

$= 199.38\ cm^2$ *

17. $\frac{dr}{dt} = 0.2 \qquad \frac{dA}{dt} = \frac{dA}{dr} \times \frac{dr}{dt}$

$A = 4\pi r^2$

$\frac{dA}{dr} = 8\pi r$

$\frac{dA}{dt} = 8\pi(6) \times 0.2$

$= 9.6\pi$ *

18. $8\tan x - \cot x - 2 = 0$

$8\tan x - \frac{1}{\tan x} - 2 = 0$

$8\tan^2 x - 2\tan x - 1 = 0$

$(4\tan x + 1)(2\tan x - 1) = 0$

$\tan x = -\frac{1}{4}$ $\qquad$ $\tan x = \frac{1}{2}$

$AA = 14.04°$ $\quad \frac{+}{*}$ $\qquad$ $AA = 26.57°$ $\quad \frac{+}{*}$

$x = 26.57°, 165.96°, 206.57°, 345.96°$ *

19. $y = x^3 - 7x + 6$

$\frac{dy}{dx} = 3x^2 - 7$

when $x = 0$ $\quad \therefore m_T = 3(0)^2 - 7$

$= -7$

$\therefore y - 6 = -7(x - 0)$

$y = -7x + 6$ *

20. $\int \frac{1}{2} f(x)\,dx = \frac{x^2}{x-2}$

$\int_0^k f(x)\,dx = -9$

$\left[\frac{2x^2}{x-2}\right]_0^k = -9$

$\frac{2k^2}{k-2} = -9$

$2k^2 + 9k - 18 = 0$

$(2k-3)(k+6) = 0$

$k = \frac{3}{2}$, $k = -6$ *

21. $RRR' + RR'R + R'RR$

$\frac{6}{8}\left(\frac{5}{7}\right)\left(\frac{2}{6}\right) + \frac{6}{8}\left(\frac{2}{7}\right)\left(\frac{5}{6}\right) + \frac{2}{8}\left(\frac{6}{7}\right)\left(\frac{5}{6}\right)$

$= \frac{180}{336} = \frac{15}{28}$ *

22. $V = \pi\int_k^1 2y - k\,dy$

$\pi\left[y^2 - ky\right]_k^1 = 4\pi$

$\left[1-k\right] - \left[k^2 - k^2\right] = 4$

$1 - k = 4$

$k = -3$ *

23. (a) ${}^{10}C_3 = 120$ *

(b) $120 - {}^{4}C_3$

$= 120 - 4$

$= 116$ *

24. (a) $n = 20$

$p = \frac{1}{m}$

$20\left(\frac{1}{m}\right) = 4$

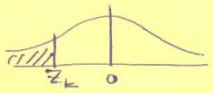
$\therefore m = 5$ *

(b) $\sigma = \sqrt{20\left(\frac{1}{5}\right)\left(\frac{4}{5}\right)}$

$= 1.789$ *

25. $X \sim N(60, 2.5^2)$

$P(x < k) = 0.0228$



$\frac{k-60}{2.5} = -2.0$

$k = 55$ *