Additional Mathematics
Kertas 1
Ogos 2014
1 ¼ Jam

Name : ………………..…………… Form : …………..……

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2014
PERCUBAAN SIJIL PELAJARAN MALAYSIA

ADDITIONAL MATHEMATICS

Kertas 1

1 jam 15 minit

JANGAN BUKA KERTAS SOALAN 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.*

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

Kertas soalan ini mengandungi **26** halaman bercetak.

BLANK PAGE
HALAMAN KOSONG

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

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 $(a^m)^n = a^{nm}$

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

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

$= \int_a^b y\, dx$ or

$= \int_a^b x\, dy$

5 Volume generated

$= \int_a^b \pi y^2\, dx$ or

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

GEOMETRY

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

2 Midpoint

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

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

4 $\hat{r} = \dfrac{xi + yj}{\sqrt{x^2 + y^2}}$

5 A point dividing a segment of a line

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

6 Area of triangle $=$

$\dfrac{1}{2}\left|(x_1y_2 + x_2y_3 + x_3y_{1_1}) - (x_2y_1 + x_3y_2 + x_1y_3)\right|$

[Lihat halaman sebelah

STATISTIC

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

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

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

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

12 Mean $\mu = np$

13 $\sigma = \sqrt{npq}$

14 $z = \dfrac{x-\mu}{\sigma}$

TRIGONOMETRY

1 Arc length, $s = r\theta$

2 Area of sector, $L = \dfrac{1}{2}r^2\theta$

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

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

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

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

7 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2\cos^2 A - 1$
$= 1 - 2\sin^2 A$

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

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

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

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

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

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

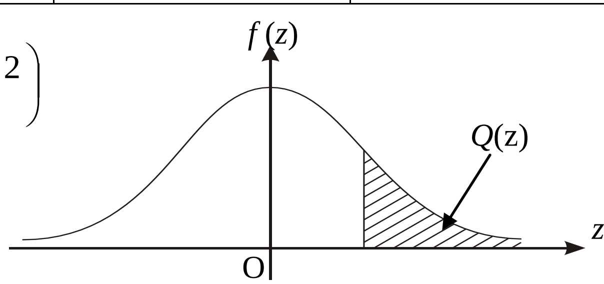
14 Area of triangle $= \dfrac{1}{2}ab\sin C$

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

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

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



Example / *Contoh*:

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

For Examiner's Use

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

1. Diagram 1 shows the relation between set A and set B.

Rajah 1 *menunjukkan hubungan antara set* A *dan set* B.

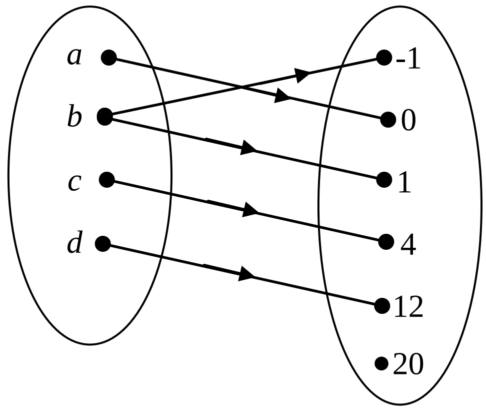


Diagram 1
Rajah 1

(*a*) State the range of the relation.

Nyatakan julat bagi hubungan itu.

(*b*) The relation is not a function. Give your reason.

Hubungan itu bukan suatu fungsi. Beri sebab anda.

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

Answer/*Jawapan* :

(*a*)

(*b*)

1

2

For Examiner's Use

2. The function h is defined as $h^{-1}(x) = \frac{7x}{x-3}, x \neq m.$

Fungsi h ditakrifkan oleh $h^{-1}(x) = \frac{7x}{x-3}, x \neq m.$

Find

Cari

(*a*) the value of m

nilai bagi m

(*b*) $h(6)$

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

Answer/*Jawapan* :

(*a*)

(*b*)

2

3

3 The following information refers to the functions g and fg.

Maklumat berikut adalah berkaitan dengan fungsi g *dan* fg.

$$g(x) = 3x - 1$$
$$fg(x) = 6x + 8$$

Find $f(x)$.

Cari $f(x)$.

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

Answer/*Jawapan* :

3

3

For Examiner's Use

4. Given that *m* and *n* are the roots of quadratic equations $x^2 + 6x + 7 = 0$, form the quadratic equation which has the roots $4m$ and $4n$.

Diberi bahawa m dan n adalah punca-punca bagi persamaan kuadratik $x^2 + 6x + 7 = 0$, *bentukkan persamaan kuadratik yang mempunyai punca-punca* $4m$ *dan* $4n$.

[3 *marks*]

[3 *markah*]

Answer/*Jawapan* :

4

3

For Examiner's Use

5. Diagram 5 shows the graph of quadratic function $f(x) = -\frac{1}{3}\left[(x+p)^2 + q\right]$

The straight line $y = 3$ is a tangent to the curve.

Rajah 5 *menunjukkan suatu graf fungsi kuadratik* $f(x) = -\frac{1}{3}\left[(x+p)^2 + q\right]$

Garislurus $y = 3$ *ialah tangen kepada lengkung tersebut.*

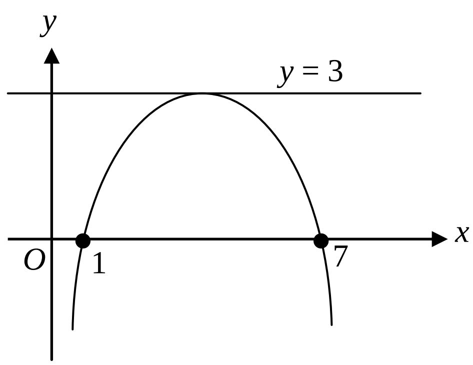


Diagram 5
Rajah 5

Calculate the value of p and of q.

Hitung nilai bagi p *dan bagi* q.

[3 *marks*]

[3 *markah*]

Answer/*Jawapan* :

5

3

For Examiner's Use

6 Given that $h(x) = 10 - x - 2x^2$.
Find the range of values of x for $h(x) \geq 4$.

Diberi bahawa $h(x) = 10 - x - 2x^2$.
Cari julat nilai-nilai x untuk $h(x) \geq 4$.

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

Answer/*Jawapan* :

6

3

7. Given that $4\left(2^{p+1}\right) = \left(\frac{1}{8}\right)^{2p+6}$, find the value of p.

Diberi $4\left(2^{p+1}\right) = \left(\frac{1}{8}\right)^{2p+6}$, *cari nilai p.*

[3 *marks*]

[3 *markah*]

Answer/*Jawapan* :

7

3

For Examiner's Use

8. Solve the equation
Selesaikan persamaan

$$\log_3(2x-5)=\log_{27}(x+1)^3$$

[4 *marks*]

[4 *markah*]

Answer/*Jawapan* :

8

4

9. If the n^{th} term of an arithmetic progression is $4n + 3$, find the sum of the first 20 terms.
Jika sebutan ke-n bagi suatu janjang aritmetik adalah $4n+3$, *cari hasil tambah* 20 *sebutan pertama.*

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

Answer/*Jawapan* :

9

3

For Examiner's Use

10 In the year 2013 the price of a hand phone decrease 5% each month. Diagram 10 shows the price of a hand phone in January 2013.
Pada tahun 2013 *harga sebuah telefon bimbit menyusut* 5% *setiap bulan. Rajah* 10 *menunjukkan harga sebuah telefon bimbit pada bulan Januari tahun* 2013.

Diagram 10
Rajah 10

David bought a new hand phone a day before Christmas for his mother.
David telah membeli sebuah telefon bimbit baru sehari sebelum Hari Natal untuk dihadiahkan kepada ibunya.
How much David pay for the new handphone?
Berapakah harga yang telah dibayar oleh David untuk membeli telefon baru tersebut?

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

Answer/*Jawapan* :

10

3

For Examiner's Use

11 The sum of the first 8 terms of an arithmetic progression is 192 and the sum of the next 8 terms is 448.
Hasiltambah 8 *sebutan pertama bagi suatu janjang aritmetik adalah* 192 *dan hasiltambah* 8 *sebutan yang berikutnya adalah* 448.

Calculate the values of the first term and the common different.
Hitung sebutan pertama dan beza sepunya.

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

Answer/*Jawapan* :

11

	4

For Examiner's Use

12 Diagram 12 shows a straight line graph of $\frac{1}{y}$ against $\frac{1}{x}$.

Express y in terms of x.

Rajah 12 *menunjukkan graf garislurus* $\frac{1}{y}$ *melawan* $\frac{1}{x}$.

Ungkapkan y *dalam sebutan* x.

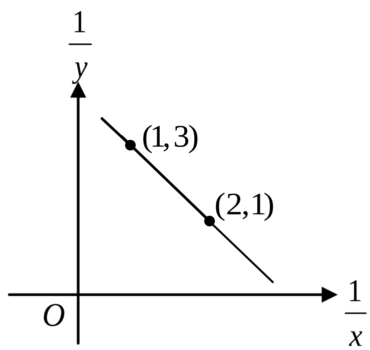


Diagram 12
Rajah 12

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

Answer/*Jawapan* :

12

3

For Examiner's Use

13.

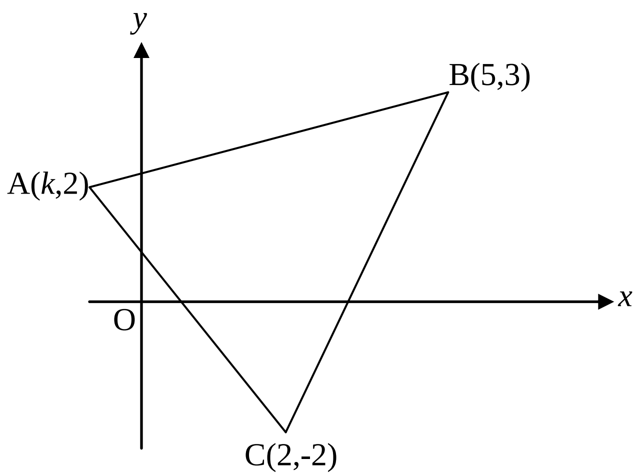


Diagram 13
Rajah 13

Diagram 13 shows the triangle *ABC*. Given that the area of the triangle is 13.5 unit^2, find the value of *k*.

Rajah 13 *menunjukkan segitiga ABC. Diberi luas segitiga itu ialah* 13.5 *unit*^{2}, *cari nilai bagi k.*

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

Answer/*Jawapan:*

13

3

For Examiner's Use

14. Given that $M(6,4)$ is the midpoint of the line segment that joins the point $P(4,8)$ and point *R*. Find the equation of the straight line that passes through the point *R* and is perpendicular to the straight line *PR*.

Diberi bahawa $M(6,4)$ *adalah titik tengah tembereng garis yang menghubungkan titik* $P(4,8)$ *dan titik R .Cari persamaan garislurus yang melalui titik R dan berserenjang dengan garislurus PR.*

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

Answer/*Jawapan* :

14

4

For Examiner's Use

15. Diagram 15 shows the vector $\overrightarrow{OP}$, $\overrightarrow{OR}$ and $\overrightarrow{OQ}$ drawn on a grid of equal squares with sides of 1 unit.
Rajah 15 *menunjukkan vector* $\overrightarrow{OP}$, $\overrightarrow{OR}$ *dan* $\overrightarrow{OQ}$ *dilukis pada grid segiempat sama yang sama besar bersisi* 1 *unit*.

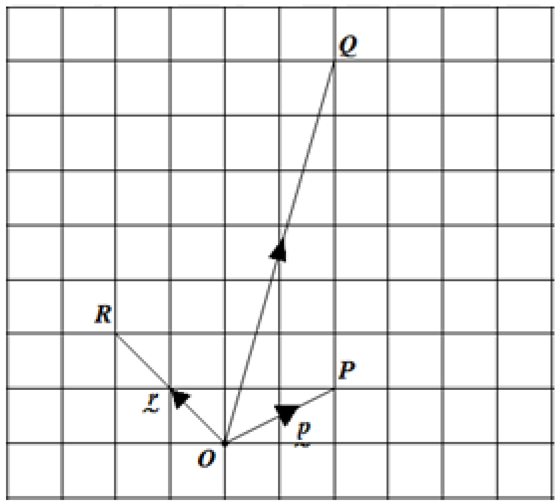


Diagram 15
Rajah 15

Determine
Tentukan

(a) $\overrightarrow{OQ}$ in terms of $\underset{\sim}{p}$ and $\underset{\sim}{r}$.

(b) $\left|\overrightarrow{OQ}\right|$

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

Answer/*Jawapan* :

(*a*)

(*b*)

15

2

For Examiner's Use

16. It is given that $\underset{\sim}{a} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$ and $\underset{\sim}{b} = \begin{pmatrix} 2 \\ h+1 \end{pmatrix}$. If $\underset{\sim}{a}$ is parallel to $\underset{\sim}{b}$, find

Diberi bahawa $\underset{\sim}{a} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$ *dan* $\underset{\sim}{b} = \begin{pmatrix} 2 \\ h+1 \end{pmatrix}$. *Jika* $\underset{\sim}{a}$ *selari dengan* $\underset{\sim}{b}$, *cari*

(*a*) the value of *h*

nilai bagi h

(*b*) the unit vector in the direction of $\underset{\sim}{b}$.

vector unit dalam arah $\underset{\sim}{b}$.

[4 *marks*]

[4 *markah*]

Answer/*Jawapan* :

(*a*)

(*b*)

16

4

For Examiner's Use

17.

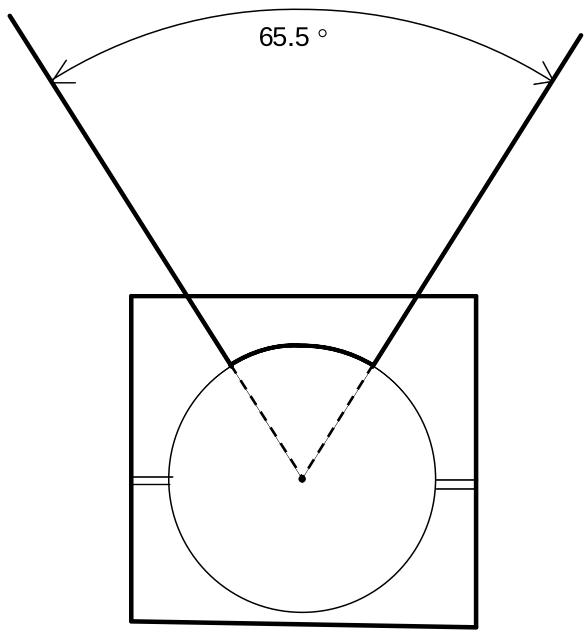


Diagram 17
Rajah 17

Diagram 17 shows shot pull field dimension for high school. For category A, student must throw 5 m far from centre to get 1 point and 7 m far from centre for 3 points. Find the area, in m^2 for 1 point.

Rajah 17 *menunjukkan dimensi ukuran padang lontar peluru bagi sekolah menengah. Bagi kategori A, pelajar mesti mendapat jarak* 5 m *dari pusat balingan untuk* 1 *mata dan* 7 m *dari pusat balingan untuk* 3 *mata. Cari luas kawasan, dalam* m^2, *untuk* 1 *mata*.

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

Answer/*Jawapan* :

17

4

For Examiner's Use

18. Given $\sin\theta = \sqrt{1-h^2}$ and θ is obtuse angle.
Diberi $\sin\theta = \sqrt{1-h^2}$ *dan* θ *ialah sudut cakah.*

Find
Cari
(*a*) $\cot\theta$

(*b*) $\sin 2\theta$

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

Answer/*Jawapan* :

(*a*)

(*b*)

18

3

19. Given $y = \dfrac{3x^2-4}{x}$ and $\dfrac{dy}{dx} = 3h(x)$, find $\displaystyle\int_{-2}^{1} h(x)dx$

Diberi $y = \dfrac{3x^2-4}{x}$ *dan* $\dfrac{dy}{dx} = 3h(x)$, *cari* $\displaystyle\int_{-2}^{1} h(x)dx$

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

Answer/*Jawapan* :

19

3

For Examiner's Use

20. Given $y = 3x^2 - 4x + 5$, find
Diberi $y = 3x^2 - 4x + 5$, *cari*

(*a*) the value of x when y is minimum.
nilai x apabila nilai y adalah minimum

(*b*) the minimum value of y.
nilai minimum bagi y.

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

Answer/*Jawapan* :

(*a*)

(*b*)

20

3

For Examiner's Use

21. Given that $\int_1^3 h(x)dx = 5$, find the value of k, if $\int_1^3 kx\,dx - \int_3^1 2h(x)\,dx = 18$

Diberi bahawa $\int_1^3 h(x)dx = 5$, *cari nilai k, jika* $\int_1^3 kx\,dx - \int_3^1 2h(x)\,dx = 18$

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

Answer/*Jawapan* :

21

3

22. The mean and standard deviation of five numbers are 6 and 3 respectively.

Min dan sisihan piawai bagi lima nombor adalah 6 *dan* 3 *masing-masing.*

Find
Cari

(*a*) the sum of squares of the numbers.

hasil tambah kuasadua bagi nombor-nombor tersebut.

(*b*) the new value of variance if every number is multiplied by 2 and then 3 is added to it.
nilai varian yang baru jika setiap nombor didarab dengan 2 *dan kemudian* 3 *ditambah kepadanya.*

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

Answer/*Jawapan* :

(*a*)

22

3

(*b*)

For Examiner's Use

23. En. Lee has a pets shop. He want to display five cages with different pets as shown in Diagram 23.

En. Lee mempunyai sebuah kedai binatang peliharaan. Di hadapan kedainya dipamerkan lima sangkar yang diisi dengan haiwan yang berbeza seperti pada Rajah 23*.*

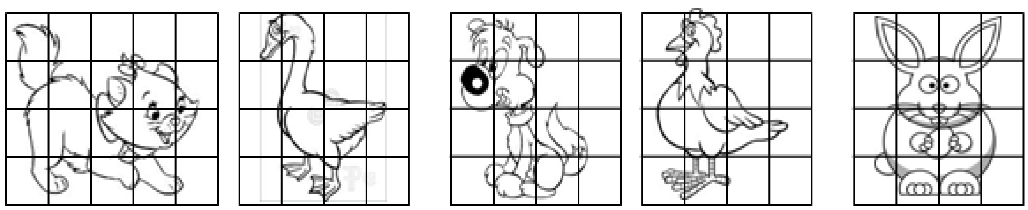


Diagram 23
Rajah 23

Cat and dog cage's cannot be side by side.

Sangkar anjing dan sangkar kucing tidak boleh bersebelahan.

How many ways to arrange the cages?

Berapakah bilangan cara untuk menyusun sangkar-sangkar tersebut?

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

Answer/*Jawapan* :

23

3

For Examiner's Use

24. Table 24 shows the number of Mathematics and Science books in two racks, P and Q.

Jadual 24 *menunjukkan bilangan buku Matematik dan buku Sains di atas dua rak iaitu P dan Q.*

Rack *Rak*	Mathematics book *Buku Matematik*	Sciences book *Buku Sains*
P	3	h
Q	5	8

Table 24
Jadual 24

(*a*) A book is chosen at random from rack P. The probability of choosing Science book is $\frac{4}{5}$.

Find the value of h.

[2 *marks*]

Sebuah buku dipilih secara rawak daripada rak P. Kebarangkalian untuk memilih buku Sains ialah $\frac{4}{5}$.

Cari nilai h .

[2 *markah*]

(*b*) Two books are chosen at random among Mathematics book.

Find the probability that both books are from the same rack.

[2 *marks*]

Dua buah buku dipilih secara rawak di kalangan buku Matematik.

Cari kebarangkalian bahawa kedua-dua buah buku adalah daripada rak yang sama.

[2 *markah*]

Answer/*Jawapan* :

(*a*)

(*b*)

24

4

For Examiner's Use

25. Diagram 25 shows a standard normal distribution graph.
Rajah 25 *menunjukkan graf taburan normal piawai*.

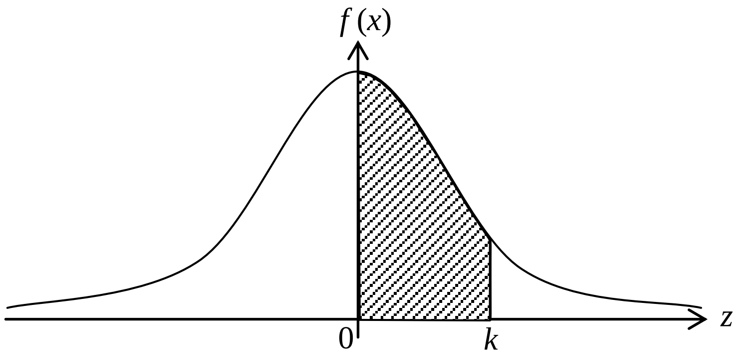


Diagram 25
Rajah 25

It is given that the area of shaded region is 0.3494.

(*a*) Find the value of $P(z > k)$.

Cari nilai $P(z > k)$.

[1 *marks*]
[1 *markah*]

(*b*) X is a continuous random variable which is normally distributed with a mean of μ and a standard deviation of 3.5.

If the value of X is 56 and the z-score is k, find the value of μ.

X ialah pembolehubah rawak yang bertabur secara normal dengan min, μ *dan sisihan piawai* 3.5.

Jika nilai X ialah 56 *dan skor-z ialah k, cari nilai* μ.

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

Answer/*Jawapan* :

(*a*)

(*b*)

25

4

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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 3 to 5.
   Satu senarai rumus disediakan di halaman 3 *hingga* 5.

9. You may use a non-programmable scientific calculator.
   Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

10. Hand in this question paper to the invigilator at the end of the examination.
    Serahkan kertas soalan ini kepada pengawas peperiksaan di akhir peperiksaan.

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2014
PERCUBAAN SIJIL PELAJARAN MALAYSIA

ADDITIONAL MATHEMATICS

Kertas 2

2 jam 30 minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *This question paper consists of three sections*: Section **A**, **Section B** *and* **Section C.**
2. *Answer* **all** *questions in* **Section A, four** *questions from* **Section B** *and* **two** *questions from* **Section C.**
3. *Give only* **one** *answer / solution to each question.*
4. *Show your working. It may help you to get marks.*
5. *The diagrams in the questions provided are not drawn to scale unless stated.*
6. *The marks allocated for each question and sub-part of a question is shown in brackets.*
7. *A list of formulae and normal distribution table is provided on pages* 2 *to* 4.
8. *You may use a non-programmable scientific calculator.*

Kertas soalan ini mengandungi **21** halaman bercetak.

BLANK PAGE

HALAMAN KOSONG

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

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 $(a^m)^n = a^{nm}$

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

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 = $\int_a^b y\,dx$ or

$= \int_a^b x\,dy$

5 Volume generated

$= \int_a^b \pi y^2\,dx$ or

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

GEOM ETRY

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

2. Midpoint

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

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

4. $\hat{r} = \dfrac{xi + yj}{\sqrt{x^2 + y^2}}$

5. A point dividing a segment of a line

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

6. Area of triangle =

$\dfrac{1}{2}\left|(x_1y_2 + x_2y_3 + x_3y_{1_1}) - (x_2y_1 + x_3y_2 + x_1y_3)\right|$

STATISTIC

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 $I = \dfrac{P_1}{P_0} \times 100$

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

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

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

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

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

12 Mean , $\mu = np$

13 $\sigma = \sqrt{npq}$

14 $z = \dfrac{x-\mu}{\sigma}$

TRIGONOMETRY

1 Arc length, $s = r\theta$

2 Area of sector , $A = \dfrac{1}{2}r^2\theta$

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

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

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

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

7 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2\cos^2 A - 1$
$= 1 - 2\sin^2 A$

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

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

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

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

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

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

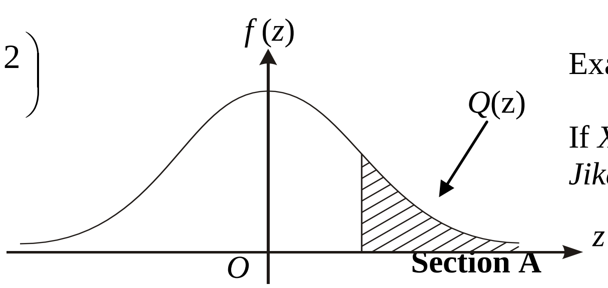
14 Area of triangle $= \dfrac{1}{2}ab \sin C$

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

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

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



Section A

Example / *Contoh*:

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

***Bahagian* A**

[40 *marks*]
[40 *markah*]

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

1 Solve the following simultaneous equations:

Selesaikan persamaan serentak berikut:

$5y - 4x = 5xy$
$3x + 2y = 6$

Give your answer correct to two decimal places.

Beri jawapan anda betul kepada dua tempat perpuluhan.

[5 *marks*]
[5 *markah*]

2 The quadratic function $h(x) = -2x^2 + 4x - m$ can be express in the form of $h(x) = 7 - 6k - (x - 2k)^2$ where k and m are constants.

Fungsi kuadratik $h(x) = -2x^2 + 4x - m$ *boleh diungkapkan dalam bentuk* $h(x) = 7 - 6k - 2(x - 2k)^2$ *dengan keadaan k dan m adalah pemalar*

(*a*) Express *m* in terms of *k* [3 *marks*]

Ungkapkan m dalam sebutan k. [3 *markah*]

(*b*) Find the values of *k* and *m* [2 *marks*]

Cari nilai k dan nilai m. [2 *markah*]

(*c*) Hence, using the answer from 2(b), find the values of *n* if the straight line $y = nx + 10$ is a tangent to the quadratic function $h(x) = -2x^2 + 4x - m$. [3 *marks*]

Seterusnya, dengan menggunakan jawapan dari 2*(b), cari nilai-nilai bagi n jika garis lurus* $y = nx + 10$ *adalah tangen kepada fungsi kuadratik* $h(x) = -2x^2 + 4x - m$ [3 *markah*]

3 Razilah is a plastic ware entrepreneur. Diagram 3 shows a set of 7 different size of plastic food ware.
Razilah merupakan seorang usahawan bekas makanan plastik. Satu set bekas makanan mempunyai 7 biji berlainan saiz seperti dalam Rajah 3.

Diagram 3
Rajah 3

Razilah wants to upgrade the plastic food ware sets by patching the ribbons around the food ware. She used a piece of ribbons that has length 216π cm cutting to paste on the 7 pieces of plastic food ware. The diameters of each food ware increasing by 1 cm consecutively.

Razilah ingin meningkatkan nilai tambah bekas makanan dengan menampal riben di sekeliling bekas makanan itu. Dia menggunakan reben yang berukuran panjang 216π cm *yang dipotong untuk ditampal pada 7 biji bekas makanan tersebut. Diameter bagi setiap biji bekas makanan plastik tersebut meningkat secara berturutan sebanyak* 1 cm.

Calculate
Hitung

(*a*) the length, in term of π , of the ribbon to paste on the smallest plastic food ware.
panjang riben, dalam sebutan π *,untuk ditampal pada bekas makanan yang paling kecil*.
[3 *marks*]
[3 *markah*]

(*b*) For Raya promotion Razilah add extra number of food ware in each set. If she fixed 48π cm ribbon to paste on the largest food ware , how many food ware are in the promotion set?
Razilah membuat promosi Raya dengan menambah bilangan bekas makanan dalam setiap set. Jika dia menetapkan 48π cm *riben untuk menampal bekas makanan yang paling besar, berapakah bilangan bekas makanan dalam set promosi tersebut?*
[3 *marks*]
[3 *markah*]

4

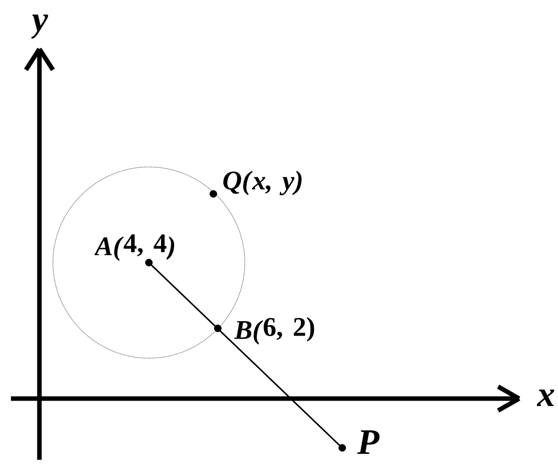


Diagram 4 shows a straight line *AP* and a circle with centre *A* forms from a moving point *Q*. Point *B* lies on *AP* such that $AB : AP = 2 : 7$.

Rajah 4 *menunjukkan garis lurus AP dan satu bulatan yang berpusat di A terbentuk oleh titik Q yang bergerak. Titik B terletak di atas garis lurus AP dengan keadaan* $AB : AP = 2 : 7$.

Find

Cari

(*a*) the equation of straight line *AP* [2 *marks*]

persamaan garis lurus AP. [2 *markah*]

(*b*) the coordinates of *P*. [2 *marks*]

koordinat P [2 *markah*]

(*c*) the equation of the locus of point *Q*. [3 *marks*]

persamaan lokus Q. [3 *markah*]

5 (*a*) Sketch the graph of $y = 3\cos\left(\frac{3}{2}x\right)$ for $0 \le x \le 2\pi$. [3 *marks*]

Lakar graf bagi of $y = 3\cos\left(\frac{3}{2}x\right)$ *untuk* $0 \le x \le 2\pi$. [3 *markah*]

(*b*) Hence, using the same axes, sketch a suitable graph to find the number of solutions to the equation $\frac{x}{3\pi} + \cos\left(\frac{3}{2}x\right) = \frac{2}{3}$ for $0 \le x \le 2\pi$.

State the number of solutions. [3 *marks*]

Seterusnya dengan menggunakan paksi yang sama, lakar satu graf yang sesuai untuk mencari bilangan penyelesaian bagi persamaan $\frac{x}{3\pi} + \cos\left(\frac{3}{2}x\right) = \frac{2}{3}$ untuk $0 \le x \le 2\pi$.

Nyatakan bilangan penyelesaian itu. [3 *markah*]

6 Cikgu Nik wants to analyze the data of Additional Mathematics marks for 5 Bakti in mid year 2014 examination. Table 6 shows the distribution of the marks.

Cikgu Nik ingin menganalisis data markah Matematik Tambahan bagi Kelas 5 *Bakti dalam peperiksaan pertengahan tahun* 2014. *Jadual* 6 *menunjukkan data markah yang telah dikumpulkan* .

Marks *Markah*	Number of students *Bilangan pelajar*
11-20	2
21-30	5
31-40	12
41-50	6
51-60	7

Table 6
Jadual 6

Calculate
Hitung

(*a*) the mean mark of the students, [2 *marks*]
min markah bagi pelajar itu [2 *markah*]

(*b*) the variance of the mark of the students [3 *marks*]
varian markah pelajar itu [3 *markah*]

(*c*) the mark obtained by 75% of the students in the class. [3 *marks*]
markah yang diperolehi oleh 75% *pelajar dalam kelas tersebut* [3 *markah*]

Section B
Bahagian B

[40 *marks*]
[40 *markah*]

Answer any **four** questions from this section.
Jawab mana-mana ***empat*** *soalan daripada bahagian ini.*

7 Use graph paper to answer this questions.
Gunakan kertas graf untuk menjawab soalan ini.

Table 7 shows the values of two variables, *x* and *y*, obtained from an experiment. Variables *x* and *y* are related by the equation $y = qx^p$, where *p* and *q* are constants.

Jadual 7 *menunjukkan nilai-nilai bagi dua pembolehubah,* x *dan* y*, yang diperoleh daripada satu eksperimen. Pembolehubah* x *dan* y *dihubungkan oleh persamaan* $y = qx^p$ *, dengan keadaan* p *and* q *adalah pemalar.*

x	1.2	1.58	2.82	3.98	6.03	7.94
y	0.57	1	3.16	6.30	14.45	25.12

Table 7
Jadual 7

(*a*) Plot $\log_{10} y$ against $\log_{10} x$, using a scale of 2 cm to 0.1 units on $\log_{10} x$ -axis and 2 cm to 0.2 units on $\log_{10} y$ -axis.
Hence, draw the line of best fit. [5 *marks*]

Plot $\log_{10} y$ *melawan* $\log_{10} x$ *dengan menggunakan skala* 2 cm *kepada* 0.1 unit *pada paksi-*$\log_{10} x$ *dan* 2 cm *kepada* 0.2 unit *pada paksi-*$\log_{10} y$.
Seterusnya, lukis garis lurus penyuaian terbaik. [5 *markah*]

(*b*) Use the graph in 7(*a*) to find the value of
Gunakan graf di 7(*a*) *untuk mencari nilai*

(i) *p*,
(ii) *q*,
(iii) *x* when $y = 3$.
x apabila $y = 3$.

[5 *marks*]
[5 *markah*]

8 Diagram 8 shows the part of the curve $y = 2x^2 + 3$ and the straight line $y = x + 4$ intersect at point P.

Rajah 8 *menunjukkan sebahagian daripada lengkung* $y = 2x^2 + 3$ *dan garis lurus* $y = x + 4$ *bersilang pada titik P*

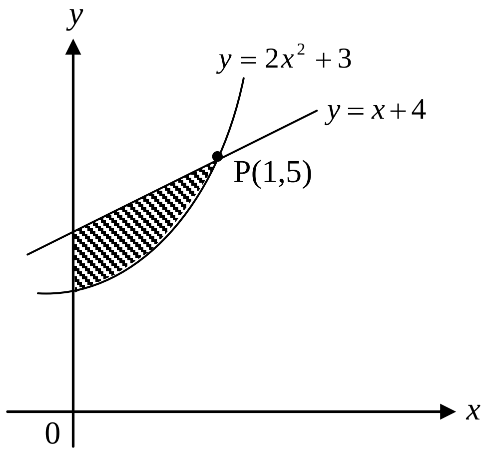


Diagram 8

Rajah 8

Calculate

Hitung

(*a*) the equation of the normal to the curve at point *P* [3 *marks*]
persamaan normal pada lengkung di titik P [3 *markah*]

(*b*) the area of the shaded region. [4 *marks*]
luas kawasan rantau yang berlorek. [4 *markah*]

(*c*) the volume of revolution, in terms of π , when the area bounded by the curve, the *y*-axis and the line $y = 5$ is rotated through 360^o about the *y*-axis.

isipadu kisaran, dalam sebutan π*, apabila rantau yang dibatasi oleh lengkung, paksi-y dan garis lurus y* =5 *diputarkan melalui* 360^o *pada paksi-y.*

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

9

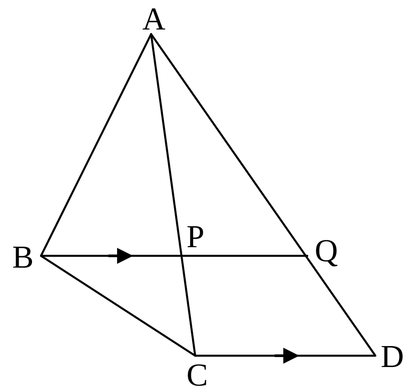


Diagram 9
Rajah 9

In diagram 9, $ABCD$ is a quadrilateral. The point Q lies on AD and straight line AC intersects the straight line BQ at the point P.

Dalam rajah 9, ABCD ialah sebuah sisiempat. Titik Q terletak pada AD dengan garislurus AC bersilang dengan garislurus BQ di titik P.

It is given that $\overrightarrow{AB} = 3\underset{\sim}{x}$, $\overrightarrow{AD} = 8\underset{\sim}{y}$, $\overrightarrow{CD} = \frac{1}{2}\overrightarrow{BQ}$ and $\overrightarrow{AQ} = 3\overrightarrow{QD}$.

Diberi bahawa $\overrightarrow{AB} = 3\underset{\sim}{x}$, $\overrightarrow{AD} = 8\underset{\sim}{y}$, $\overrightarrow{CD} = \frac{1}{2}\overrightarrow{BQ}$ *dan* $\overrightarrow{AQ} = 3\overrightarrow{QD}$.

(*a*) Express in terms of $\underset{\sim}{x}$ and/or $\underset{\sim}{y}$:

Ungkapkan dalam sebutan $\underset{\sim}{x}$ *dan/atau* $\underset{\sim}{y}$:

(i) $\overrightarrow{BQ}$

(ii) $\overrightarrow{AC}$ [3 *marks*]

[3 *markah*]

(*b*) Using $\overrightarrow{AP} = m\overrightarrow{AC}$ and $\overrightarrow{AP} = \overrightarrow{AB} + n\overrightarrow{BQ}$, where m and n are constants, find the value of m and of n. [5 *marks*]

Dengan menggunakan $\overrightarrow{AP} = m\overrightarrow{AC}$ *dan* $\overrightarrow{AP} = \overrightarrow{AB} + n\overrightarrow{BQ}$, *dengan keadaan m dan n adalah pemalar, cari nilai m dan nilai n.* [5 *markah*]

(*c*) Hence, using the value of *m* or value of *n* from (b), find $\overrightarrow{PD}$ [2 *marks*]

Seterusnya, dengan menggunakan nilai m atau nilai n daripada (*b*), *cari* $\overrightarrow{PD}$

[2 *markah*]

10 (*a*) In a survey carried out in certain month it is found that 75% of the students who used the school library are female students.

Dalam satu kajian yang dijalankan pada bulan tertentu, didapati 75% *daripada pelajar yang menggunakan perpustakaan sekolah adalah terdiri daripada pelajar perempuan.*

If 10 students are randomly chosen,

Jika 10 *orang pelajar dipilih secara rawak,*

(i) calculate the mean and variance of choosing female students.

[2 *marks*]

hitung min dan varian bagi memilih pelajar perempuan.

[2 *markah*]

(ii) find the probability at least 9 of them are female students.

[3 marks]

cari kebarangkalian bahawa sekurang-kurangnya 9 *daripada mereka adalah pelajar perempuan.*

[3 *markah*]

(*b*) The mass of durians in a lorry is normally distributed with a mean of 1.5 kg and a variance of 0.64 kg^2. Given that 160 durians have mass between 1.3 kg and 2.5 kg.

Berat buah durian yang dibawa oleh sebuah lori tertabur secara normal dengan min 1.5 kg *dan varian* 0.64 kg^2 . *Didapati* 160 *biji durian mempunyai berat di antara* 1.3 kg *dan* 2.5 kg.

(i) Find the probability for the durians which have mass between 1.3 kg and 2.5 kg.

Cari kebarangkalian bagi durian yang mempunyai berat di antara 1.3 kg *dan* 2.5 kg.

[3 marks]

[3 *markah*]

(ii) Hence, find the total number of durians carried by the lorry.

Seterusnya, cari jumlah durian yang dibawa oleh lori tersebut.

[2 *marks*]

[2 markah]

11

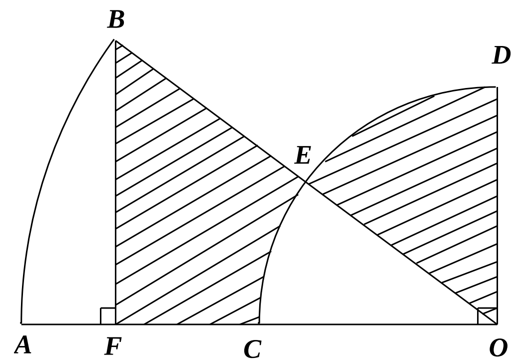


Diagram 11
Rajah 11

Diagram 11 shows a sector *AOB* with centre *O*. *COD* is a quadrant of a circle with centre *O* and radius 4 cm. *C* is the midpoint of *AO* and $BF = 5$ cm.
Rajah 11 *menunjukkan sektor AOB berpusat O. COD ialah sukuan sebuah bualatan berpusat O dan berjejari* 4 *cm. C ialah titik tengah AO dan* $BF = 5$ cm.

[Use/ *Guna* $\pi = 3.142$]

Calculate
Hitung

(*a*) $\angle AOB$, in radian. [2 *marks*]
$\angle AOB$, *dalam radian* [2 *markah*]

(*b*) the perimeter , in cm, of the shaded region. [4 *marks*]
perimeter, dalam cm*, rantau berlorek.* [4 *markah*]

(*c*) the area, in cm^2, of the shaded region. [4 *marks*]
luas, dalam cm^2*, rantau berlorek.* [4 *markah*]

Section C

***Bahagian* C**

[20 *marks*]
[20 *markah*]

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

12 A particle moves along a straight line and passes through a fixed point O with a velocity of 14 ms^{-2} . Its acceleration is given by $a = 5 - 2t$, where t is the time, in seconds.
Satu zarah bergerak sepanjang satu garislurus dan melalui satu titik tetap O dengan halajunya 14 ms^{-2} *Pecutannya diberi oleh* $a = 5 - 2t$ *dengan keadaan t ialah masa, dalam saat*.

Find
Cari

(*a*) the maximum velocity in ms^{-1} of the particle [3 *marks*]
halaju maksimum, dalam ms^{-1} *zarah itu*. [3 *markah*]

(*b*) the time, in seconds when the particle stops instantaneously. [3 *marks*]
masa, dalam saat, *apabila zarah berhenti seketika* .
[3 *markah*]

(*c*) the total distance, in m, travelled by the particle in the first 9 seconds. [4 *marks*]
jumlah jarak, dalam m, *yang dilalui oleh zarah itu dalam* 9 *saat pertama*.
[4 *markah*]

13 Diagram 13 shows trapezium *ABCD*. *AB* is parallel to *DC* and $\angle ADC$ is obtuse .
Rajah 13 *menunjukkan trapezium ABCD. AB adalah selari dengan DC dan* $\angle ADC$ *ialah sudut cakah.*

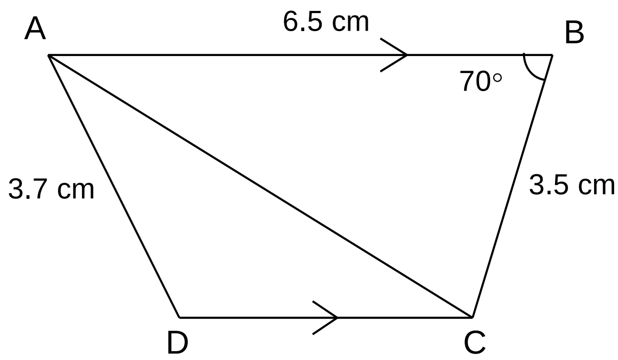


Diagram 13
Rajah 13

Find
Cari

(*a*) the length, in cm, of *AC* [2 *marks*]
panjang dalam cm, *AC* [2 *markah*]

(*b*) $\angle ADC$,

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

(*c*) The straight line *CD* is extended to D' such that $AD = AD'$
Garis lurus CD dipanjangkan di mana $AD = AD'$

(i) Sketch the triangle ACD' [1 *mark*]
Lakarkan segi tiga ACD' [1 *markah*]

(ii) Calculate the area, in cm^2, of $\Delta ADD'$ [3 *marks*]
Hitung luas, dalam cm^2, *bagi* $\Delta ADD'$ [3 *markah*]

14 Norsiah runs an online business. She sells shawls and scarves .In a week, she sells x pieces of shawls and *y* pieces of scarves. The selling price of a shawl is RM 12 and a scarf is RM 5.The selling is based on the following constraints:

Norsiah menjalankan perniagaan atas talian. Dia menjual selindang dan tudung. Dalam seminggu, dia menjual x helai selindang dan y helai tudung. Harga jualan untuk sehelai selindang ialah RM 12 *dan sehelai tudung ialah* RM 5. *Penjualannya adalah berdasarkan kekangan berikut:*

I: The maximum total number of shawls and scarves must be 90.
Jumlah maksimum selindang dan tudung ialah 90.

II: The number of shawls must not exceed two times the number of scarves.
Bilangan selindang mesti tidak melebihi dua kali bilangan tudung.

III: The minimum total sales of both shawls and scarves is RM 600.
Jumlah minimum hasil jualan selindang dan tudung ialah RM 600.

(*a*) Write three inequalities, other than $x \geq 0$ and $y \geq 0$ which satisfy all the above constraints. [3 *marks*]

Tulis tiga ketaksamaan selain daripada $x \geq 0$ *dan* $y \geq 0$ *yang memenuhi semua kekangan di atas .* [3 *markah*]

(*b*) Using a scale of 2 cm to 10 shawls on *x*-axis and 2 cm to 10 scarves on the *y*-axis, construct and shade the region *R* which satisfies all the above constraints.

[3 *marks*]

Menggunakan skala 2 cm *kepada* 10 selindang *pada paksi-x dan* 2 cm *kepada* 10 *tudung , bina dan lorek rantau R yang memenuhi semua kekangan di atas.*

[3 *markah*]

(*c*) Using the graph constructed in 15(*b*), find
Menggunakan graf yang dibina di 15(*b*), *cari*

(i) the minimum number of scarves sold, if 50 shawls sold.
bilangan minimum tudung yang dijual, jika 50 *selendang dijual*.

(ii) the maximum sales of both shawls and scarves.
harga jualan maksimum selindang dan tudung tersebut.

[4 *marks*]

[4 *markah*]

15 Table 15 shows the price indices of four items, *P*, *Q*, *R* and *S*, needed in the production of a type of shoes.
Jadual 15 *menunjukkan indeks harga bagi empat bahan P, Q, R dan S yang diperlukan dalam pengeluaran sejenis kasut.*

Item *Bahan*	Price index in the year 2012 based on the year 2010 *Indeks harga dalam tahun* 2012 *berasaskan tahun* 2010
P	110
Q	136
R	120
S	125

Table 15
Jadual 15

(*a*) Calculate the price of item *S* in the year 2010 if its price in the year 2012 is RM12.00. [2 *marks*]
Hitungkan harga bahan S pada tahun 2010 *jika harganya pada tahun* 2012 *ialah* RM12.00. [2 *markah*]

(*b*) If the price of item *P* increase by 20% from the year 2012 to the year 2014, calculate the price index of item *P* in the year 2014 based on the year 2010. [3 *marks*]

Jika harga bahan P meningkat sebanyak 20% *dari tahun* 2012 *ke tahun* 2014, *hitung indeks harga bahan P pada tahun* 2014 *berasaskan tahun* 2010. [3 *markah*]

(*c*) The composite index for the production cost of the shoes in the year 2012 based on the year 2010 is 121.
Indeks gubahan bagi kos pengeluaran kasut itu pada tahun 2012 *berasaskan tahun* 2010 *ialah* 121.
Calculate
Hitungkan

(i) the price of a pair of shoes in the year 2012 if its price in the year 2010 is RM 90.00 . [2 *marks*]
harga sepasang kasut itu pada tahun 2012 *jika harganya pada tahun* 2010 *ialah* RM 90.00. [2 *markah*]

(ii) the value of *m* if the cost of the items *P*, *Q*, *R* and *S* used are in the ratio $8 : 5 : m : 4$. [3 marks]
nilai bagi m jika kos bahan-bahan P, Q, R dan S yang digunakan adalah mengikut nisbah $8 : 5 : m : 4$. [3 *markah*]

`

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1 This question paper consists of three sections: Section **A, Section B** and **Section C**.
Kertas soalan ini mengandungi tiga bahagian Bahagian A, Bahagian B dan Bahagian C

2 Answer **all** questions in **Section A**, **four** questions from **Section B** and **two** questions from **Section C**.
*Jawab semua soalan dalam **Bahagian A**, mana-mana **empat** soalan daripada **Bahagian B** dan mana-mana **dua** soalan daripada **Bahagian C.***

3 Write you answer on the 'buku jawapan' provided. If the buku jawapan is insufficient, you may ask for 'helaian tambahan' from the invigilator.
Jawapan anda hendaklah ditulis di dalam buku jawapan yang disediakan. Sekiranya buku jawapan tidak mencukupi, sila dapatkan helaian tambahan daripada pengawas peperiksaan.

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 The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.

6 The marks allocated for each question and sub-part of a question are shown in brackets.
Markah yang diperuntukan bagi setiap soalan dan ceraian soalan are shown in brackets.

7 A list of formulae is provided on pages 2 to4.
Satu senarai rumus disediakan di halaman 2 *hingga* 4.

8. Graph paper is provided.
Kertas graf disediakan.

9. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator scientific calculator yang tidak boleh diprogramkan.

9. Tie the ' helaian tambahan' and the graph papers together with the 'buku jawapan' and hand in to the invigilator at the end of the examination.
Ikat helaian tambahan dan kertas graf bersama-sama dengan buku jawapan dan serahkan Kepada pengawas peperiksaan pada akhir peperiksaan.

NO.KAD PENGENALAN

ANGKA GILIRAN

Arahan Kepada Calon

1 Tulis nombor kad pengenalan dan angka giliran anda pada petak yang disediakan.
2 Tandakan (/) untuk soalan yang dijawab.
3 Ceraikan helaian ini dan ikat sebagai muka hadapan bersama-sama dengan buku jawapan.

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

3472/1

Matematik
Tambahan
Kertas 1
2 jam
Ogos 2014

BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN

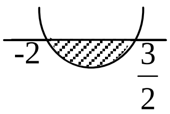
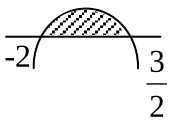
PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2014
PERCUBAAN SIJIL PELAJARAN MALAYSIA

ADDITIONAL MATHEMATICS

Paper 1

MARKING SCHEME

Skema Pemarkahan ini mengandungi **6** halaman bercetak

No.	Solution and Mark Scheme	Sub Marks	Total Marks
1(*a*) (*b*)	$\{-1, 0, 1, 4, 12\}$ one-to-many relation or object *b* has two images	1 1	2
2(*a*) (*b*)	3 -18 B1 : $\frac{7x}{x-3}=6$ or $h(x)=\frac{3x}{x-7}$ or $h(x)=\frac{-3x}{7-x}$	1 2	3
3	$f(x)=2x+10$ B2 : $f(x)=6\left[\frac{x+1}{3}\right]+8$ B1 : $g^{-1}(x)=\frac{x+1}{3}$ OR $f(x)=2x+10$ B2 : $f(y)=6\left[\frac{y+1}{3}\right]+8$ B1 : $x=\frac{y+1}{3}$	3 3	3
4	$x^2+24x+112=0$ B2 : $S.O.R=-24$ *or* $P.O.R=112$ B1 : $m+n=-6$ *or* $mn=7$	3	3
5	$p=-4$ and $q=-9$ B2 : $p=-4$ or $q=-9$ B1 : $f(x)=-\frac{1}{3}(x+p)^2-\frac{1}{3}q$	3	3
6	$-2\le x\le\frac{3}{2}$ B2 : $(2x-3)(x+2)\le 0$ OR  OR  B1 : $2x^2+x-6\le 0$ OR $-2x^2-x+6\ge 0$	3	3

7	$p=-3$ B2 : $p+3=-6p-18$ B1 : $2^2(2^{p+1})=\left(\frac{1}{2^3}\right)^{2p+6}$	3	3
8	$x=6$ B3 : $2x-5=x+1$ B2 : $\log_3(2x-5)^3=\log_3(x+1)^3$ or $\log_3(2x-5)=\log_3(x+1)$ B1 : $\frac{\log_3(x+1)^3}{\log_3 27}$	4	4
9	$S_{20}=900$ B2 : $S_{20}=\frac{20}{2}\left[2(7)+19(4)\right]$ B1 : $T_1=a=4(1)+3=7$ *or* $d=4$	3	3
10	RM 284.40 B2 : $T_{12}=500(0.95)^{11}$ B1 : $r=0.95/\frac{19}{20}$	3	3
11	$a=10$ *and* $d=4$ B3 : $a=10$ *or* $d=4$ B2 : $8a+28d=192$ and $16a+120d=640$ B1 : $S_8=\frac{8}{2}\left[2a+7d\right]=192$ or $S_{16}-S_8=448$ *or* $S_{16}=640$	4	4
12	$y=\frac{x}{-2+5x}$ B2 : $\frac{1}{\mathrm{y}}=-2\left(\frac{1}{x}\right)+5$ B1 : $m=-2$ or $c=5$	3	3

13	$k=-1$ B1 : $5k-22=27$ or $5k-22=-27$ B1 : $\frac{1}{2}\left\|(3k-10+4)-(10+6-2k)\right\|=13.5$	3	3
14	$y=\frac{1}{2}x-4$ or equivalent B3 : $y-0=\frac{1}{2}(x-8)$ B2 : $R(8,0)$ and $m_2=\frac{1}{2}$ B1 : $R(8,0)$ or $m_2=\frac{1}{2}$	4	4
15(a) (b)	$3\underset{\sim}{p}+2\underset{\sim}{r}$ $\sqrt{53}$	1 1	2
16(a) (b)	$h=5$ B1 : $3=\frac{1}{2}(h+1)$ $\frac{1}{\sqrt{10}}\begin{pmatrix}1\\3\end{pmatrix}$, accept $\frac{1}{\sqrt{40}}\begin{pmatrix}2\\6\end{pmatrix}$ B1 : $\sqrt{2^2+6^2}$	2 2	4
17	13.72 B3 : $\frac{1}{2}(7)^2(1.143)-\frac{1}{2}(5)^2(1.143)$ B2 : $\frac{1}{2}(7)^2(1.143)$ or $\frac{1}{2}(5)^2(1.143)$ B1 : 1.143 rad	4	4

18(*a*)	$\cot\theta = -\dfrac{h}{\sqrt{1-h^2}}$ B1 : $\dfrac{\sqrt{1-h^2}}{h}$	2	3
(*b*)	$-2h\sqrt{1-h^2}$	1	
19	1 B2 : $\dfrac{1}{3}\left[\dfrac{3(1)^2-4}{1}\right]-\dfrac{1}{3}\left[\dfrac{3(-2)^2-4}{-2}\right]$ B1 : $\dfrac{1}{3}\int_{-2}^{1} 3h(x)dx$ OR 1 B2 : $\left[x+\dfrac{4x^{-1}}{-3}\right]_{-2}^{1}$ B1 : $h(x)=\dfrac{1}{3}(3+4x^{-2})$	3	3
20(*a*)	$\dfrac{2}{3}$ B1 : $6x-4=0$	2	3
(*b*)	$\dfrac{11}{3}$	1	
21	2 B2 : $\left[\dfrac{kx^2}{2}\right]_1^3-2\left(-5\right)=18$ B1 : $\dfrac{kx^2}{2}$ or -10	3	3
22(*a*)	225 B1 : $\dfrac{\Sigma x^2}{5}-(6)^2=3^2$	2	3
(*b*)	36	1	

23	72 B2 : $5! - 2! \times 4!$ B1 : $5!$ or $2! \times 4!$		3
24(*a*)	12 B1 : $\frac{h}{h+3} = \frac{4}{5}$	2	4
(*b*)	$\frac{13}{28}$ $\left[\text{accept } \frac{26}{56}\right]$ B1 : $\frac{3}{8} \times \frac{2}{7}$ or $\frac{5}{8} \times \frac{4}{7}$	2	
25(*a*)	0.1506	1	4
(*b*)	52.381 B2 : $1.034 = \frac{56-\mu}{3.5}$ B1 : 1.034	3	

3472/2

Matematik
Tambahan
Kertas 2
Ogos 2014

2 ½ jam

BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PELAJARAN MALAYSIA

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2014
PERCUBAAN SIJIL PELAJARAN MALAYSIA

ADDITIONAL MATHEMATICS

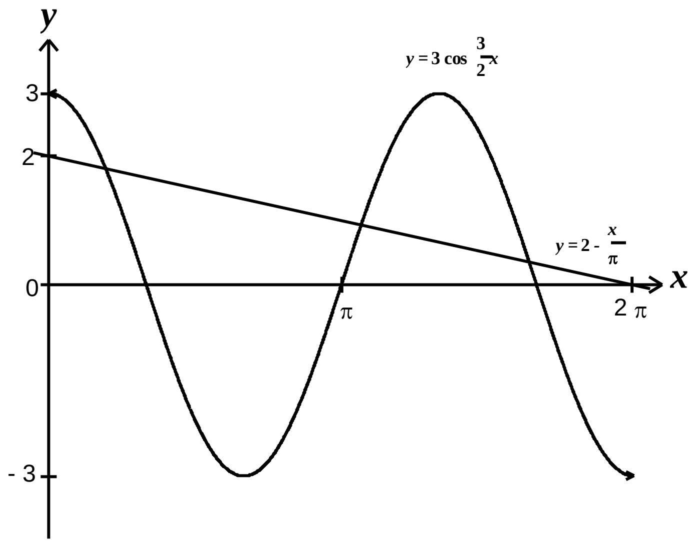
Paper 2

MARKING SCHEME

Skema Pemarkahan ini mengandungi **10** halaman bercetak

No	Solution and Mark Scheme			Sub Marks	Total Marks
1	$x=\frac{6-2y}{3}$		$y=\frac{6-3x}{2}$ P1	5	5
	$5y-4\left(\frac{6-2y}{3}\right)5\left(\frac{6-2y}{3}\right)y$	OR	$5\left(\frac{6-3x}{2}\right)-4x=5x\left(\frac{6-3x}{2}\right)$ K1		
	$10y^2-7y-24=0$		$15x^2-53x+30=0$		
	$y=\frac{-(-7)\pm\sqrt{(-7)^2-4(10)(-24)}}{2(10)}$		$x=\frac{-(-53)\pm\sqrt{(-53)^2-4(15)(30)}}{2(15)}$ K1		
	$y=1.94,\quad -1.24$		$x=0.71,\quad 2.83$ N1		
	$x=0.71,\quad 2.83$		$y=1.94,\quad -1.24//-1.25$ N1		
2(a)	$h(x)=-2(x-1)^2+2-m$		K1	3	8
	$2-m=7-6k$		K1		
	$m=6k-5$		N1		
(b)	$k=\frac{1}{2}\qquad m=-2$		N1, N1	2	
(c)	$-2x^2+(4-n)x-8=0$		K1	3	
	$(4-n)^2-4(-2)(-8)=0$		K1		
	$n=-4,\ 12$		N1		

3(a)	$2\pi r,\quad 2\pi(r+1),\quad 2\pi(r+2),......$ K1 $\frac{7}{2}\left[2(2\pi r)+6(2\pi)\right]=216\pi$ K1 $r=15$ length of ribbon $=30\pi$ N1	3	6
(b)	$30\pi, 32\pi, 34\pi,......$ K1 $d=2\pi$ K1 $48\pi=30\pi+(n-1)(2\pi)$ $n=9$ N1	3	
4 (a)	$m=-1$ K1 $y=-x+8$ N1	2	7
(b)	$\frac{4(5)+x(2)}{7}=6$ or $\frac{4(5)+y(2)}{7}=2$ K1 $P(11,-3)$ N1	2	
(c)	$AB=\sqrt{8}$ K1 $\sqrt{(x-4)^2+(y-4)^2}=\sqrt{8}$ K1 $x^2+y^2-8x-8y+24=0$ N1	3	

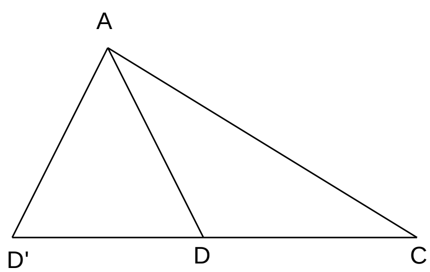
5(*a*)	 Shape of Cosine $0 \le x \le 2\pi$ P1 Period 1.5 cycle P1 Amplitude 3 P1	3	6
(*b*)	$y = 2 - \frac{x}{\pi}$ K1 Draw line $y = 2 - \frac{x}{\pi}$ K1 Number of solutions = 3 N1	3	
6(*a*)	$Mean = \frac{15.5\times2+25.5\times5+35.5\times12+45.5\times6+55.5\times7}{32}$ K1 $= 38.94$ N1	2	8
(*b*)	$Varian = \frac{15.5^2\times2+25.5^2\times5+35.5^2\times12+45.5^2\times6+55.5^2\times7}{32} - (38.94)^2$ K1K1 $= 134.86$ N1	3	

(c)	$Q_3 = 40.5 + \left(\frac{\frac{3}{4}(32) - 19}{6} \right) \times 10$ K1K1 $= 41.33$ N1	3	
7	LAMPIRAN		
8 (a) (b) (c)	$\frac{dy}{dx} = 4x$ K1 $m_N = -\frac{1}{4}$ K1 $y - 5 = -\frac{1}{4}(x-1)$ $y = -\frac{1}{4}x + \frac{21}{4}$ N1 Area$= \frac{1}{2}(4+5)(1) - \int_0^1 2x^2 + 3\,dx$ K1 $= \frac{9}{2} - \left[\frac{2x^3}{3} + 3x \right]_0^1$ K1 $= \frac{9}{2} - \left[\left(\frac{2}{3} + 3 \right) - 0 \right]$ K1 $\frac{5}{6}$ N1 Volume $= \pi \int_3^5 (\frac{y-3}{2}) dy$ $= \pi \left[\frac{y^2}{4} + \frac{3y}{2} \right]_3^5$ K1 $= \pi \left[\left(\frac{5^2}{4} + \frac{3(5)}{2} \right) - \left(\frac{3^2}{4} + \frac{3(3)}{2} \right) \right]$ K1 7π N1	3 4 3	10

9(a) (b) (c)	$\overrightarrow{BQ} = \overrightarrow{BA} + \overrightarrow{AQ}$ Or $\overrightarrow{AC} = \overrightarrow{AD} + \overrightarrow{DC}$ K1 (i) $\overrightarrow{BQ} = -3\underset{\sim}{x} + 6\underset{\sim}{y}$ N1 (ii) $\overrightarrow{AC} = 5\underset{\sim}{y} + \frac{3}{2}\underset{\sim}{x}$ N1 $\overrightarrow{AP} = 5m\underset{\sim}{y} + \frac{3}{2}m\underset{\sim}{x}$ K1 $\overrightarrow{AP} = (3-3n)\underset{\sim}{x} + 6n\underset{\sim}{y}$ K1 Compare and solve $\frac{3}{2}m = 3-3n$ and $5m = 6n$ K1 $m = \frac{3}{4}$ N1 $n = \frac{5}{8}$ N1 $\overrightarrow{PD} = \frac{3}{8}\overrightarrow{BQ} + \overrightarrow{QD}$ or $\overrightarrow{PD} = \frac{1}{4}\overrightarrow{AC} + \frac{1}{2}\overrightarrow{BQ}$ K1 $\overrightarrow{PD} = -\frac{9}{8}\underset{\sim}{x} + \frac{17}{4}\underset{\sim}{y}$ N1	3 5 2	10
10(a) (i) (ii)	$\mu = 10(0.75)$ $= 7.5$ N1 $\sigma^2 = 10(0.75)(0.25)$ $= 1.875$ N1 $P(X \geq 9) = P(X = 9) + P(X = 10)$ $= {}^{10}C_9(0.75)^9(0.25)^1 + {}^{10}C_{10}(0.75)^{10}(0.25)^0$ K1 K1 $= 0.2440$ N1	2 3	10

(b)(i)	$P(1.3 < x < 2.5) = P\left(\frac{1.3-1.5}{0.8} < z < \frac{2.5-1.5}{0.8}\right)$ K1 $= P(-0.25 < z < 1.25)$ K1 $= 0.4931$ N1	3	
(ii)	Total = $\frac{160}{0.4931}$ K1 324 N1	2	
11(*a*)	$\angle AOB = \sin^{-1}\left(\frac{5}{8}\right)$ K1 $\angle AOB = 0.6752$ rad N1	2	10
(*b*)	$FC = \left(\sqrt{8^2-5^2}\right)-4$ K1 $\frown CD = 4(1.571)$ K1 Perimeter $=\left(\left(\sqrt{8^2-5^2}\right)-4\right)+\left(4(1.571)\right)+5+4+8$ K1 = 25.53 cm N1	4	
(*c*)	$\Delta BFO = \frac{1}{2}(5)(6.245)$ K1 $\frac{1}{2}\left(4^4\right)(0.6752)$ Or $\frac{1}{2}\left(4^4\right)(1.571-0.6752)$ K1 Area $=\frac{1}{2}(5)(6.245)-\frac{1}{2}\left(4^2\right)(0.6752)+\frac{1}{2}\left(4^2\right)(1.571-0.6752)$ K1 = 17.38 cm^2 N1	4	

12(a)	$5-2t=0$ K1 $t=\frac{5}{2}$ $v=5t-t^2+14$ K1 $v_{\max}=5\left(\frac{5}{2}\right)-\left(\frac{5}{2}\right)^2+14$ $=20.25$ N1	3	10
(b)	$5t-t^2+14=0$ K1 $t^2-5t-14=0$ $(t+2)(t-7)=0$ K1 $t=7$ N1	3	
(c)	$s=\frac{5t^2}{2}-\frac{t^3}{3}+14t$ K1 $s_7=\frac{5(7)^2}{2}-\frac{(7)^3}{3}+14(7)$ *or* $s_9=\frac{5(9)^2}{2}-\frac{(9)^3}{3}+14(9)$ K1 Total distance $=106\frac{1}{6}+106\frac{1}{6}-85\frac{1}{2}$ K1 $=127\frac{1}{3}$ N1	4	

13(a)	$EC^2 = 6.5^2 + 3.5^2 - 2(6.5)(3.5)\cos 70°$ K1 6.24 cm N1	2	10
(b)	$\dfrac{\sin \angle BAC}{3.5} = \dfrac{\sin 70}{6.24}$ K1 Use $\angle ACD = \angle BAC = 31.81°$ K1 $\angle ADC = 180° - 62.74°$ K1 $117.26°$ N1	4	
(c)(i)	 $\angle AD'C$ must acute angle N1	1	
(ii)	$\angle D'AD = 180° - 2(62.74°)$ K1 $\Delta ADD' = \frac{1}{2}(3.7)(3.7)(\sin 54.52°)$ K1 5.57 cm^2 N1	3	
14	LAMPIRAN		

15(a)	$\frac{12}{Q_{10}} \times 100 = 125$ K1 $Q_{10} = \text{RM } 9.60$ N1	2	10
(b)	Use 120 P1 $\frac{120}{100} \times 110$ K1 $= 132$ N1	3	
(c)	$\frac{Q_{12}}{90} \times 100 = 121$ K1 $Q_{12} = \text{RM}108.90$ N1	2	
(d)	$\frac{110(8) + 136(5) + 120m + 125(4)}{8 + 5 + m + 4} = 121$ K1 $\frac{2060 + 120m}{17 + m} = 121$ K1 $m = 3$ N1	3	

END OF MARKING SCHEME