Name : ……..…… Form : ……..……

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PENDIDIKAN MALAYSIA

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2013
PERCUBAAN SIJIL PELAJARAN MALAYSIA

MATEMATIK TAMBAHAN

Kertas 1

2 Jam

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.*

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

Kertas soalan ini mengandungi **24** halaman bercetak

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

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

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

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

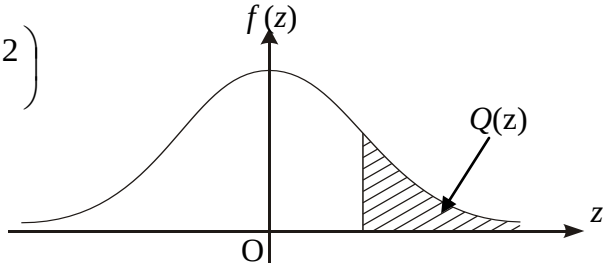
14 Area of triangle $= \dfrac{1}{2}ab\sin C$

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

For Examiner's Use

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

1. Diagram 1 shows the linear function *f*.

Rajah 1 *menunjukkan fungsi linear f.*

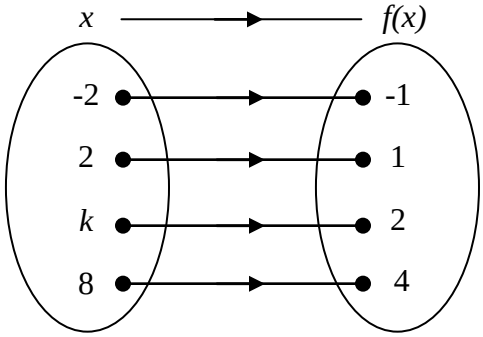


Diagram 1
Rajah 1

(*a*) State the value of *k*.

Nyatakan nilai k.

(*b*) Using the function notation, express f in terms of x.

Menggunakan tata tanda fungsi, ungkapkan f dalam sebutan x.

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

Answer/*Jawapan* :

(*a*)

(*b*)

1

2

---

2. Given the function $g : x \to 7x + 2$, find the value of n such that $g^{-1}(3n - 1) = n$.

Diberi fungsi $g : x \to 7x + 2$, *cari nilai n dengan keadaan* $g^{-1}(3n - 1) = n$.

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

Answer/*Jawapan* :

2

3

For Examiner's Use

3. Given the function $h(x) = px - 3$ and $h^2(x) = 49x + q$, where p and q are constants and $p < 0$.

Find the value of p and of q.

Diberi fungsi $h(x) = px - 3$ *dan* $h^2(x) = 49x + q$, *dengan keadaan p dan q adalah pemalar dan* $p < 0$.

Cari nilai p dan nilai q.

[3 *marks*]

[3 *markah*]

Answer/*Jawapan* :

3

3

4. It is given that m and 2 are the roots of the quadratic equation $5x^2 - (n+1)x + 2 = 0$.

Find the value of m and of n.

Diberi bahawa m *dan* 2 *adalah punca-punca bagi persamaan kuadratik* $5x^2 - (n+1)x + 2 = 0$.

Cari nilai m dan nilai n.

[3 *marks*]

[3 *markah*]

Answer/*Jawapan* :

4

3

For Examiner's Use

5. The straight line $y = 2x - 3$ does not intersects the curve $y = 3x^2 - x - q$.

Find the range of values of q.

Garis lurus $y = 2x - 3$ *tidak menyilang lengkung* $y = 3x^2 - x - q$.

Cari julat nilai q.

[3 *marks*]

[3 *markah*]

Answer/*Jawapan* :

5

3

For Examiner's Use

6 Diagram 6 shows the graph of a quadratic function for $f(x) = 7 - m(x+k)^2$.

Rajah 6 *menunjukkan graf fungsi kuadratik bagi* $f(x) = 7 - m(x+k)^2$.

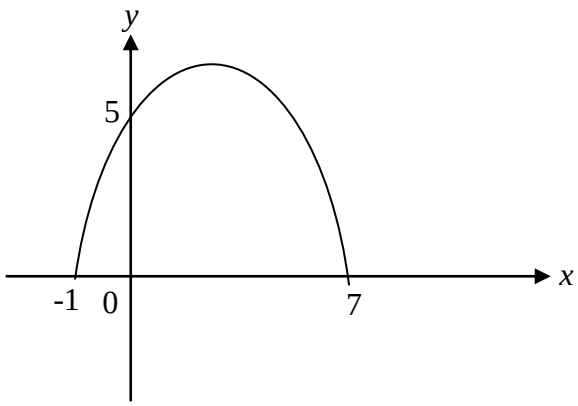


Diagram 6
Rajah 6

Find

Cari

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

(*b*) the value of *m*,
nilai m,

(c) the coordinates of the maximum point.
koordinat bagi titik maksimum.

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

Answer/*Jawapan* :

(*a*)

(*b*)

(*c*)

6

4

For Examiner's Use

7. Solve the equation $5^{x+3} = 1+100(5^x)$.

Selesaikan persamaan $5^{x+3} = 1+100(5^x)$.

[3 *marks*]

[3 *markah*]

Answer/*Jawapan* :

7

3

8. Solve the equation $\log_3(x-2)+2 = 2\log_9 x$.

Selesaikan persamaan $\log_3(x-2)+2 = 2\log_9 x$.

[4 *marks*]

[4 *markah*]

Answer/*Jawapan* :

8

4

For Examiner's Use

9. Three consecutive terms of an arithmetic progression are $m-1, m+3$ and $2m+1$. Find the common difference of the progression.

Tiga sebutan berturutan bagi suatu janjang aritmetik ialah $m-1, m+3$ dan $2m+1$. *Cari beza sepunya janjang itu.*

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

Answer/*Jawapan* :

9

3

10 The first term of a geometric progression is a and the sum of the second term and third term is $\frac{6}{25}a$.

Sebutan pertama suatu janjang geometri ialah a *dan hasil tambah sebutan kedua dan sebutan ketiga ialah* $\frac{6}{25}a$.

(*a*) Calculate the common ratio, where $r > 0$,
Kira nisbah sepunya, di mana $r > 0$,

(*b*) If the value of a is 10, find the sum to infinity of the progression
Jika nilai a ialah 10, *cari hasil tambah ketakterhinggaan janjang tersebut*.

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

Answer/*Jawapan* :

(*a*)

(*b*)

10

4

For Examiner's Use

11 Given an arithmetic progression $-9, -5, -1, ...$, state the four consecutive terms in this progression which sum up to 100.

Diberi suatu janjang aritmetik $-9, -5, -1, ...$, *nyatakan empat sebutan berturutan dalam janjang ini yang mana hasil tambahnya ialah* 100.

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

Answer/*Jawapan* :

11

4

12 The variables x and y are related by the equation $y = 8x - x^3$. Diagram 12 shows the straight line obtained by plotting $\frac{y}{x}$ against x^2.

Pembolehubah x dan y dihubungkan oleh persamaan $y = 8x - x^3$. *Rajah* 12 *menunjukkan graf garis lurus diperolehi dengan memplotkan* $\frac{y}{x}$ *melawan* x^2.

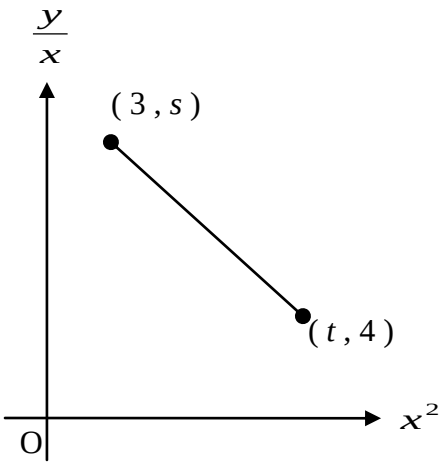


Diagram 12

Rajah 12

Find the value of s and of t.

Cari nilai s *dan nilai* t.

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

Answer/*Jawapan* :

For Examiner's Use

13.

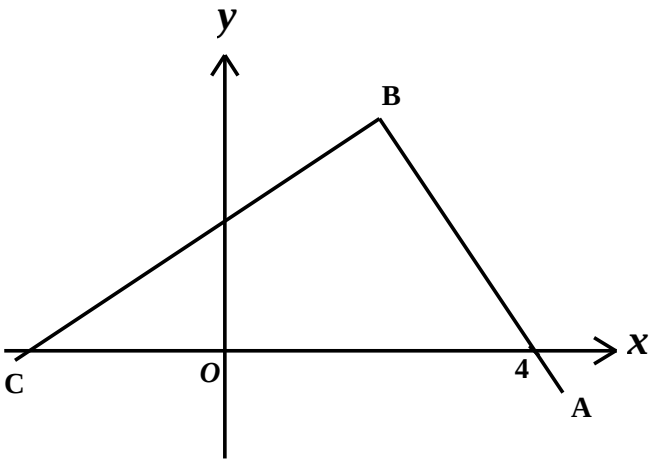


Diagram 13

Rajah 13

Diagram 13 shows the straight line *BC* and the straight line *BA* which intersects at point *B*. The equation of the straight line *BC* is $3y-2x=5$ and $\angle ABC=90°$. The straight line *AB* intersects the *x*-axis at point (4,0).

Rajah 13 *menunjukkan garis lurus BC dan garis lurus BA yang bersilang pada titik B. Persamaan garis lurus BC ialah* $3y-2x=5$ *dan* $\angle ABC=90°$. *Garis lurus AB bersilang dengan paksi-x pada titik* (4,0).

Find

Cari

(*a*) the *x*-intercept of straight line *BC*,

pintasan-x bagi garis lurus BC,

(*b*) the equation of the straight line *AB*.

persamaan garis lurus AB.

[3 *marks*]
[3 *marka*h]

Answer/*Jawapan:*

(*a*)

(*b*)

13

3

14. Find the possible values of *p* if the area of the triangle with the vertices $A(p,-p)$, $B(1,0)$ and $C(-3,6)$ is 10 unit^2.

Cari nilai-nilai yang mungkin bagi p jika luas segi tiga yang mempunyai bucu – bucu $A(p,-p)$, $B(1,0)$ *dan* $C(-3,6)$ *ialah* 10 unit^2.

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

Answer/*Jawapan* :

For Examiner's Use

14

3

15. Given that point $A\ (1,2)$ and point $B\ (4,-2)$. If $\overrightarrow{OC} = 2\overrightarrow{OB} - \overrightarrow{OA}$, find

Diberi bahawa titik A dan titik B adalah $(1,2)$ *dan* $(4,-2)$. *Jika* $\overrightarrow{OC} = 2\overrightarrow{OB} - \overrightarrow{OA}$, *cari*

(*a*) the coordinates of point *C*,
koordinat titik C,

(*b*) $\left|\overrightarrow{OC}\right|$

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

Answer/*Jawapan* :

(*a*)

(*b*)

15

3

For Examiner's Use

16.

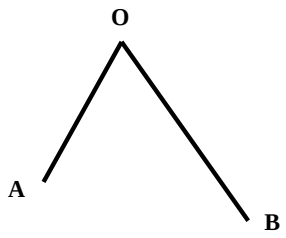


Diagram 16

Rajah 16

Diagram 16 shows two straight lines OA and OB which intersects at point *O*.

Given that $\overrightarrow{OA} = \underset{\sim}{a}$ and $\overrightarrow{OB} = \underset{\sim}{b}$.

If $(p-2)\underset{\sim}{a} + (p-q+4)\underset{\sim}{b} = 0$, find the value of p and of q.

Rajah 16 *menunjukkan dua garis lurus* OA *dan* OB *yang bersilang pada titik O.*

Diberi bahawa $\overrightarrow{OA} = \underset{\sim}{a}$ *dan* $\overrightarrow{OB} = \underset{\sim}{b}$.

Jika $(p-2)\underset{\sim}{a} + (p-q+4)\underset{\sim}{b} = 0$, *cari nilai bagi p dan q.*

[3 *marks*]

[3 *markah*]

Answer/*Jawapan* :

16

3

17.

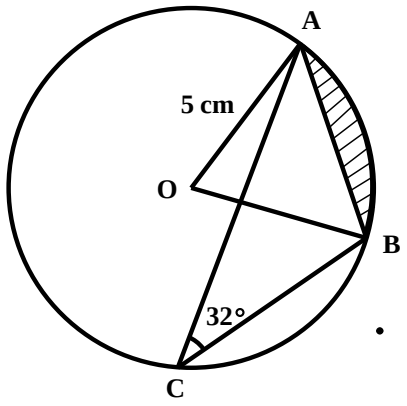


Diagram 17

Rajah 17

Diagram 17 shows a circle with centre *O*. It is given that $\angle ACB = 32°$ and $OA = 5$ cm.

Rajah 17 *menunjukkan sebuah bulatan berpusat O. Diberi bahawa* $\angle ACB = 32°$ *dan* $OA = 5$ cm.

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

Find

Cari

(*a*) $\angle AOB$ in radian

$\angle AOB$ *dalam radian,*

(b) the area, in cm^2, of the shaded region

luas, dalam cm^2, *kawasan berlorek.*

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

Answer/*Jawapan* :

(*a*)

(*b*)

17

4

For Examiner's Use

18. Solve the equation $\sin 2x = \sin x$ for $0^\circ \le x \le 180^\circ$.
Selesaikan persamaan $\sin 2x = \sin x$ for $0^\circ \le x \le 180^\circ$.

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

Answer/*Jawapan* :

18

3

19. Point A lies on the curve $y = (5-2x)^2$. It is given that the gradient of the normal at point A is $\frac{1}{4}$.
Find the coordinates of A.

Titik A terletak pada lengkung $y = (5-2x)^2$. *Diberi bahawa kecerunan normal pada titik A ialah* $\frac{1}{4}$.

Cari koordinat A.

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

Answer/*Jawapan* :

19

3

20. It is given that $y = \frac{u}{3}$, where $u = 2 - mx$. If $\frac{dy}{dx} = 1$, find the value of m.

Diberi bahawa $y = \frac{u}{3}$, *dengan keadaan* $u = 2 - mx$. *Jika* $\frac{dy}{dx} = 1$, *cari nilai m.*

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

Answer/*Jawapan* :

For Examiner's Use

20

3

21. Given that $\int_1^3 k(x)\,dx = 6$ and $\int_3^5 k(x)\,dx = 4$.

Find the value of m if $\int_1^5 [m - k(x)]dx = 2$.

Diberi $\int_1^3 k(x)\,dx = 6$ *dan* $\int_3^5 k(x)\,dx = 4$.

Cari nilai m jika $\int_1^5 [m - k(x)]dx = 2$.

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

Answer/*Jawapan* :

21

3

For Examiner's Use

22. A set of data consists of $y_1, y_2, y_3, y_4, y_5, y_6$ and y_7. The mean of this set of data is 6 and standard deviation is 3.

Satu set data terdiri daripada $y_1, y_2, y_3, y_4, y_5, y_6$ dan y_7. *Min bagi set data ini ialah* 6 *dan sisihan piawai ialah* 3.

Calculate

Hitung

(*a*) the sum of squares of the data,

hasil tambah kuasadua bagi data tersebut,

(*b*) the variance for the new data,

varian untuk data baru,

$3y_1 + 4, 3y_2 + 4, 3y_3 + 4, 3y_4 + 4, 3y_5 + 4, 3y_6 + 4$ and $3y_7 + 4$.

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

Answer/*Jawapan* :

(*a*)

(*b*)

22

3

For Examiner's Use

23. Ten students from History Club at particular school interested to take parts in History Quiz.
Sepuluh orang pelajar daripada Kelab Sejarah dari sekolah tertentu berminat untuk menyertai Kuiz Sejarah.

(*a*) How many ways the selection can be made if only five students are qualified.
Berapa carakah pemilihan boleh dibuat jika hanya lima orang pelajar yang layak.

(*b*) The five selected students are arranged in a row for a group photograph. Find the number of ways to arrange them if two of them want to sit next to each other.
Lima orang pelajar yang terpilih disusun sebaris untuk sesi bergambar.Cari bilangan cara menyusun mereka jika dua daripada mereka hendak duduk bersebelahan antara satu sama lain.

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

Answer/*Jawapan* :

(*a*)

(*b*)

23

3

For Examiner's Use

24. Table 24 shows the number of boy and girl students in class 5 Beta and 5 Delta at SMK Sri Bunga in the year 2013.

Jadual 24 *menunjukkan bilangan pelajar lelaki dan pelajar perempuan daripada Kelas* 5 *Beta dan* 5 *Delta di SMK Sri Bunga pada tahun* 2013.

Class *Kelas*	Number of students *Bilangan pelajar*	
	Boy *Lelaki*	Girl *Perempuan*
5 Beta	20	10
5 Delta	17	13

Table 24
Jadual 24

A fair dice is tossed to choose a student in Treasure Hunt Competition. If a number which is more than 4 is obtained, a student from 5 Beta will be chosen.

Sebiji dadu adil di lambung untuk memilih seorang pelajar dalam pertandingan mencari harta karun. Sekiranya nombor yang lebih besar daripada 4 *muncul, seorang pelajar daripada kelas* 5 *Beta akan dipilih.*

Calculate the probability that

Hitung kebarangkalian bahawa

(*a*) a boy student from 5 Beta is chosen,
seorang pelajar lelaki daripada 5 *Beta akan dipilih,*

(*b*) a girl student is chosen.
seorang pelajar perempuan akan dipilih.

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

Answer/*Jawapan* :

(*a*)

(*b*)

24

4

For Examiner's Use

25. In a shooting training, the probability that each shot fired by Syahmi hits a target is $\frac{1}{2}$.

Dalam satu latihan menembak, kebarangkalian setiap tembakan yang dilepaskan oleh Syahmi kena sasaran ialah $\frac{1}{2}$.

If Syahmi fires *n* shots, the probability that at least one shot hits the target is $\frac{63}{64}$.

Find the value of *n.*

Jika Syahmi melepaskan n tembakan, didapati kebarangkalian sekurang-kurangnya satu tembakan kena sasaran ialah $\frac{63}{64}$.

Cari nilai n. [3 *marks*]
[3 *markah*]

Answer/*Jawapan* :

25

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. A booklet of four-figure mathematical tables is provided.
   Sebuah buku sifir matematik empat angka disediakan.

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

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

Matematik Tambahan
Kertas 2
Ogos 2013
2 ½ Jam

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH
DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PENDIDIKAN MALAYSIA

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2013
PERCUBAAN SIJIL PELAJARAN MALAYSIA

MATEMATIK TAMBAHAN

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 diagram in the questions provided are not drawn to scale unless stated.*
6. *The marks allocated for each question and sub-part of a question are shown in brackets.*
7. *A list of formulae and normal distribution table is provided on pages* 2 *to* 4*.*
8. *A booklet of four-figure mathematical tables is provided.*
9. *You may use a non-programmable scientific calculator.*

[Lihat Halaman Sebelah

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 =

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

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

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

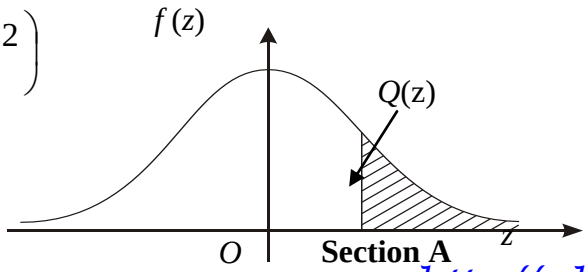
14 Area of triangle $= \dfrac{1}{2}ab\sin C$

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

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

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



Section A

Example / *Contoh*:

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

Bahagian A

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

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

1 Solve the following simultaneous equations:

Selesaikan persamaan serentak berikut:

$h + 2k = 2$

$2k^2 - hk - 7 = 0$

Give your answer correct to 3 decimal places.

Beri jawapan betul kepada 3 *tempat perpuluhan.*

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

2 Given that the axis of symmetry of the quadratic function $f(x) = 2x^2 - px + 5$ is $x = 2$.
Diberi bahawa paksi simetri bagi fungsi kuadratik $f(x) = 2x^2 - px + 5$ *ialah* $x = 2$.

(*a*) Express $f(x) = 2x^2 - px + 5$, in the form of $f(x) = a(x+b)^2 + c$, where *p, a, b and c* are constants. Hence, find the value of *p*. [3 *marks*]

Ungkapkan $f(x) = 2x^2 - px + 5$, *dalam bentuk* $f(x) = a(x+b)^2 + c$, *dengan keadaan p, a, b dan c ialah pemalar. Seterusnya, cari nilai p .* [3 *markah*]

(*b*) (i) State the minimum point,

Nyatakan titik mimimum,

(ii) Hence, sketch the graph of $f(x) = 2x^2 - px + 5$.

Seterusnya, lakarkan graf bagi $f(x) = 2x^2 - px + 5$.

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

3

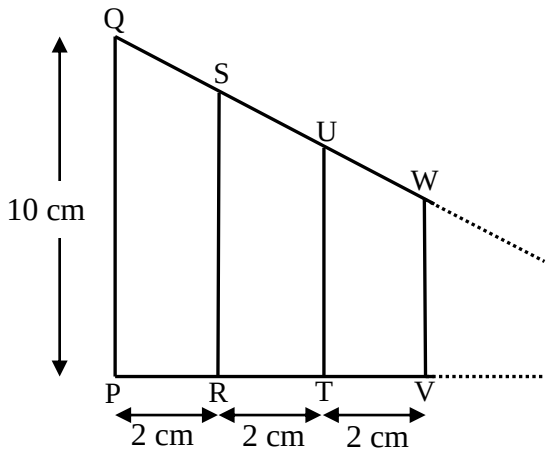


Diagram 3
Rajah 3

Diagram 3 shows a set of trapezium *PQSR*, *RSUT*, *TUWV*,…. .The length of base of each trapezium is 2 cm. The length of *SR* is $\frac{9}{10}$ times the length of *QP*. The length of *UT* is $\frac{9}{10}$ times the length of *SR*. The length of *WV* is $\frac{9}{10}$ times the length of *UT*. Given that

QP = 10 cm.

Rajah 3 *menunjukkan satu set trapezium PQSR, RSUT, TUWV,…. .Panjang tapak setiap trapezium ialah* 2 *cm. Panjang SR ialah* $\frac{9}{10}$ *kali panjang QP. Panjang UT ialah* $\frac{9}{10}$ *kali panjang SR. Panjang WV ialah* $\frac{9}{10}$ *kali panjang UT . Diberi panjang QP* = 10 *cm.*

(*a*) Show that the area of the trapeziums *PQSR, RSUT, TUWV*……. (in cm^2) form a geometric progression,

Tunjukkan bahawa luas trapezium PQSR, RSUT, TUWV……. (dalam cm^2*) membentuk janjang geometri.*

[3 *marks*]

[3 *markah*]

(*b*) Find the number of trapeziums, such that the total area exceed 100 cm^2.

Cari bilangan trapezium, supaya jumlah luasnya melebihi 100 cm^2.

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

4 Solution by scale drawing will **not** be accepted.
*Penyelesaian secara lukisan berskala **tidak** diterima.*

Diagram 4 shows a right angle triangle *BAC* where *O* is origin.
Rajah 4 *menunjukkan segi tiga bersudut tepat BAC dengan keadaan O ialah asalan.*

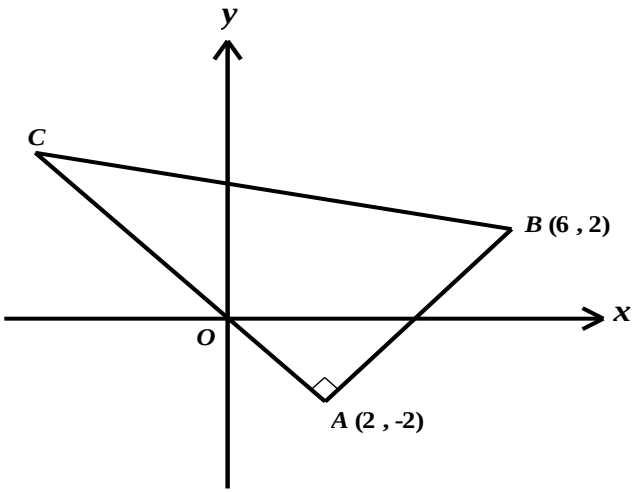


Diagram 4

Rajah 4

(*a*) Given that $AO : AC = 1:3$, find the coordinates of *C*. [2 *marks*]

Diberi $AO : AC = 1:3$, *cari koordinat C.* [2 *markah*]

(*b*) A point *P* moves such that its locus is a circle which passes through the point *A, B* and *C*. Find the equation of the locus *P*. [5 *marks*]

Suatu titik P bergerak dengan lokusnya membentuk satu bulatan di mana ia melalui titik A, B dan C. Cari persamaan lokus bagi P. [5 *markah*]

5 (*a*) Sketch the graph of $y = \left|2\sin\frac{3}{2}x\right|$ for $0 \le x \le 2\pi$. [4 *marks*]

Lakar graf bagi $y = \left|2\sin\frac{3}{2}x\right|$ *untuk* $0 \le x \le 2\pi$. [4 *markah*]

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

Nyatakan bilangan penyelesaian itu. [3 *markah*]

6 Diagram 6 shows a histogram which represent the distribution of the times taken by a group of 70 teachers to travel to school in a particular day.

Rajah 6 *menunjukkan sebuah histogram yang mewakili taburan masa yang diambil oleh sekumpulan* 70 *orang guru untuk perjalanan ke sekolah pada hari tertentu.*

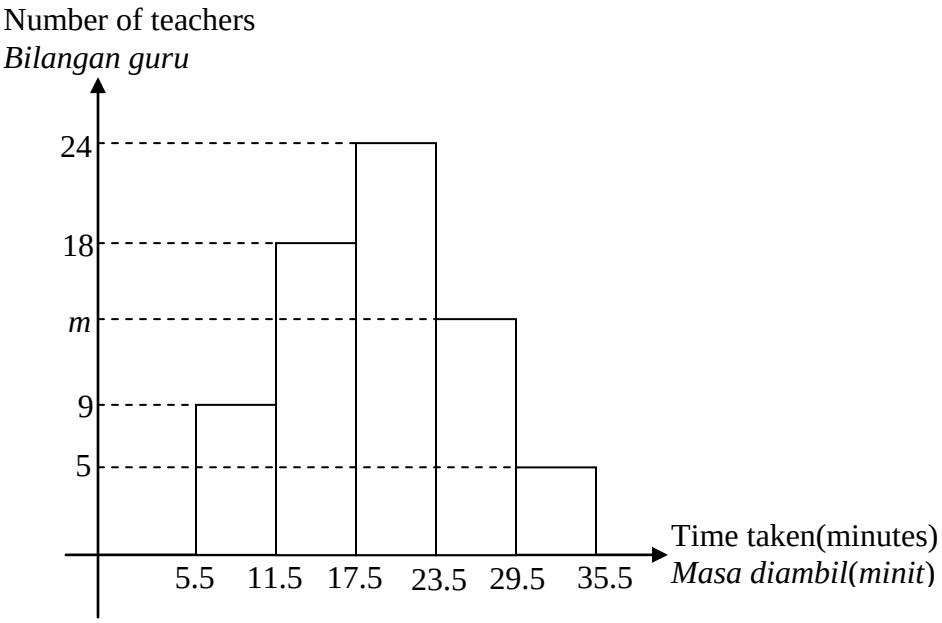


Diagram 6
Rajah 6

(*a*) Find the value of *m*.
Cari nilai m.

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

(*b*) Without drawing an ogive, calculate the median of the time taken.
Tanpa melukis ogif, hitung median bagi masa yang diambil.

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

(*c*) Find the variance of the time taken.
Cari varians bagi masa yang diambil.

[4 *marks*]
[4 *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 $y = \frac{b}{(x+1)^a}$, where a and b 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* $y = \frac{b}{(x+1)^a}$*, dengan keadaan* a *and* b *adalah pemalar.*

x	1	2	3	4	5	6
y	7.07	5.77	5.00	4.47	4.08	3.78

Table 7
Jadual 7

(*a*) Plot $\log_{10} y$ against $\log_{10}(x+1)$, using a scale of 2 cm to 0.1 units on both axes. Hence, draw the line of best fit.

[5 *marks*]

Plot $\log_{10} y$ *melawan* $\log_{10}(x+1)$ *dengan menggunakan skala* 2 cm *kepada* 0.1 *unit pada kedua-dua paksi.*
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) a,
(ii) b,
(iii) y when $x = 2.16$.
y *apabila* $x = 2.16$.

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

8 Diagram 8 shows a curve $y = f(x)$. The straight line *AB* is a normal to the curve at point *B*(2,2).

Rajah 8 *menunjukkan lengkung* $y = f(x)$ *.Garis lurus AB adalah normal kepada lengkung pada titik B*(2,2).

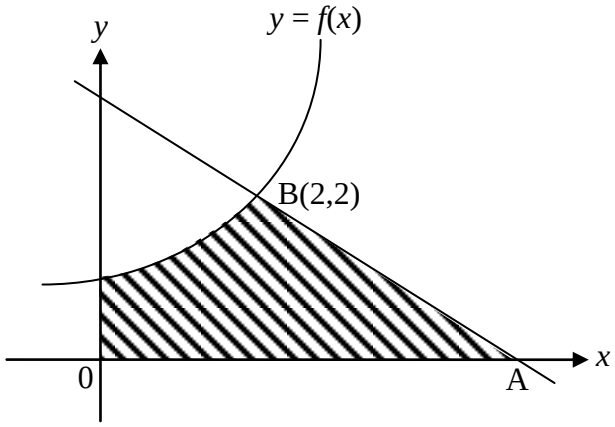


Diagram 8
Rajah 8

Given that the gradient function of the curve is $\frac{x}{2}$.

Diberi fungsi kecerunan bagi lengkung ialah $\frac{x}{2}$.

Find
Cari

(*a*) (i) the equation of the straight line *AB*,
persamaan garis lurus AB,

(ii) the equation of the curve,
persamaan lengkung itu,

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

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

(*c*) the volume of revolution, in terms of π, when the region bounded by the curve, *y*-axis and straight line $y = 2$ and is rotated through $360°$ about the *y*-axis.

[3 *marks*]

isipadu kisaran, dalam sebutan π *, apabila rantau yang dibatasi oleh lengkung, paksi-y dan garis lurus* $y = 2$ *dan diputarkan melalui* $360°$ *pada paksi-y.*

[3 *markah*]

9 Diagram 9 shows a trapezium *PQRS* where *PS* parallel to *QR*.

Rajah 9 *menunjukkan trapezium PQRS di mana PS selari dengan QR*.

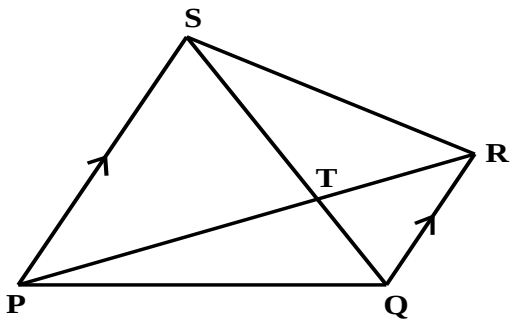


Diagram 9

Rajah 9

It is given that $\overrightarrow{PQ} = 8\underset{\sim}{a}$, $\overrightarrow{PS} = 10\underset{\sim}{b}$ and $\overrightarrow{QR} = \frac{2}{5}\overrightarrow{PS}$.

Diberi bahawa $\overrightarrow{PQ} = 8\underset{\sim}{a}$, $\overrightarrow{PS} = 10\underset{\sim}{b}$ *dan* $\overrightarrow{QR} = \frac{2}{5}\overrightarrow{PS}$.

(*a*) Express, in terms of $\underset{\sim}{a}$ and $\underset{\sim}{b}$:

Ungkapkan dalam sebutan $\underset{\sim}{a}$ *dan* $\underset{\sim}{b}$ *:*

(i) $\overrightarrow{PR}$

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

[3 *markah*]

(*b*) It is given that $\overrightarrow{PT} = m\overrightarrow{PR}$ and $\overrightarrow{ST} = n\overrightarrow{SQ}$, where *m* and *n* are constants.

Diberi bahawa $\overrightarrow{PT} = m\overrightarrow{PR}$ *dan* $\overrightarrow{ST} = n\overrightarrow{SQ}$, *dengan keadaan m dan n ialah pemalar.*

Express $\overrightarrow{PT}$

Ungkapkan $\overrightarrow{PT}$

(i) in terms of *m*, $\underset{\sim}{a}$ and $\underset{\sim}{b}$

dalam sebutan m, $\underset{\sim}{a}$ *dan* $\underset{\sim}{b}$

(ii) in terms of *n*, $\underset{\sim}{a}$ and $\underset{\sim}{b}$

dalam sebutan n, $\underset{\sim}{a}$ *dan* $\underset{\sim}{b}$ [3 *marks*]

[3 *markah*]

(*c*) Hence, find the value of *m* and of *n*. [4 *marks*]

Seterusnya cari nilai m dan nilai n. [4 *markah*]

10 (*a*) In a basket of mangoes, it is found that 15% of the mangoes are rotten.

Di dalam sebakul buah mangga, 15% *daripada buah mangga tersebut didapati rosak.*

If 8 mangoes are chosen at random from the basket, calculate the probability that at least 6 mangoes are good.

Sekiranya 8 *biji mangga dipilih secara rawak daripada bakul tersebut, hitung kebarangkalian bahawa sekurang-kurangnya* 6 *biji mangga adalah dalam keadaan baik.*

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

(*b*) In a school, 180 students sit for Additional Mathematics examination. The marks obtained is normally distributed with mean 48 marks and standard deviation of 6 marks.

Dalam sebuah sekolah,180 pelajar menduduki peperiksaan Matematik Tambahan. Markah yang diperolehi didapati tertabur secara normal dengan min 48 markah dan sisihan piawai 6 *markah.*

(i) If a student is chosen at random, find the probability that the student obtained the marks between 35 mark and 66 mark. Hence, find the number of students that obtained the marks between 35 mark and 66 mark.

Sekiranya seorang pelajar dipilih secara rawak, cari kebarangkalian pelajar tersebut mendapat markah di antara 35 *markah dan* 66 *markah. Seterusnya, cari bilangan pelajar yang mendapat markah di antara* 35 *markah dan* 66 *markah.*

(ii) Students who failed have to attend remedial classes. If 5% of the students attended remedial classes, find the passing mark for Additional Mathematics examination.

Pelajar yang gagal dikehendaki menghadiri kelas pemulihan. Didapati 5 *% daripada pelajar menghadiri kelas pemulihan, cari markah lulus untuk peperiksaan Matematik Tambahan.*

[6 *marks*]
[6 *markah*]

11

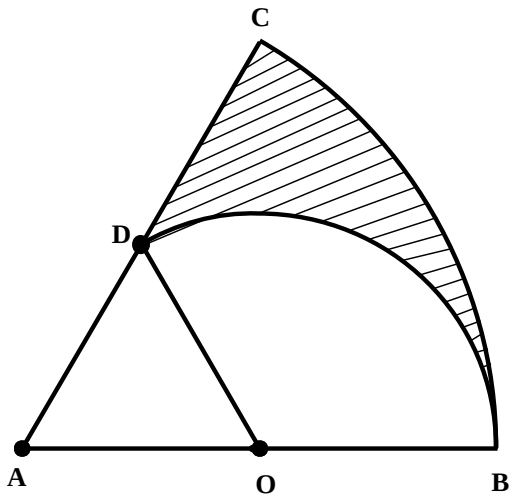


Diagram 11

Rajah 11

In Diagram 11, *OBD* is a sector of circle with centre *O* and *ABC* is a sector of a circle with centre *A. T*he perimeter of the shaded region is 31.134 cm. *O* and *D* is a midpoint of *AB* and *AC*. Calculate

Dalam rajah 11, *OBD ialah sektor sebuah bulatan berpusat O dan ABC ialah sektor sebuah bulatan berpusat A. Perimeter rantau berlorek ialah* 31.134 cm. *O dan D ialah titik tengah bagi AB dan AC. Hitung*

[Use/Guna $\pi = 3.142$]

(*a*) $\angle BOD$, in radians. [2 *marks*]

$\angle BOD$, *dalam radian.* [2 *markah*]

(*b*) the length of *AC*, in cm. [4 *marks*]

panjang AC, dalam cm. [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 with an initial velocity of -8 ms^{-1} Its acceleration, a ms^{-2}, is given by $a = 6 - 2t$, where t is the time, in seconds, after passing through a fixed point O.

Satu zarah bergerak di sepanjang suatu garis lurus dengan halaju awal -8 ms^{-1}. Pecutannya, a ms^{-2}, *diberi oleh* $a = 6 - 2t$ *dengan keadaan* t *ialah masa, dalam saat, selepas melalui titik tetap* O.

Find
Cari

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

(*b*) the times, in seconds, when the particle change its direction. [3 *marks*]
masa, dalam saat, apabila zarah menukar arah gerakan. [3 *markah*]

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

13

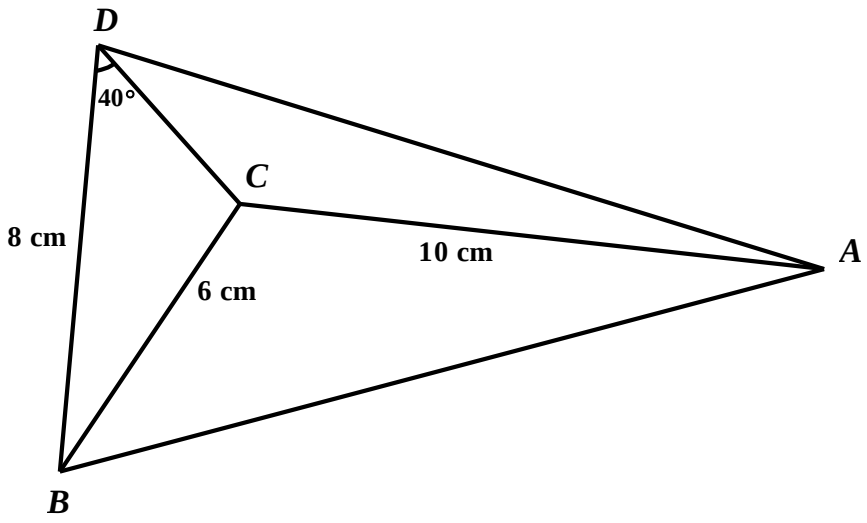


Diagram 13
Rajah 13

Diagram 13 shows combination of triangles *ACB*, *BCD* and *DCA*. Given that $\angle ACB$ and $\angle BCD$ are obtuse. It is given that *DB* = 8 cm, *BC* = 6 cm, *AC* = 10 cm and $\angle BDC = 40°$. If the area of triangle *ABC* is 22 cm^2, calculate

Rajah 13 menunjukkan kombinasi segitiga ACB, BCD dan DCA. Diberi $\angle ACB$ *dan* $\angle BCD$ *adalah sudut cakah. Diberi DB* = 8 cm, *BC* = 6 cm, *AC* = 10 cm *dan* $\angle BDC = 40°$. *Jika luas segitiga ABC ialah* 22 cm^2, *kirakan*

(*a*) $\angle ACB$, [2 marks]
[2 *markah*]

(*b*) the length, in cm, of *BA*, [2 marks]
panjang, dalam cm, *bagi B*, [2 *markah*]

(*c*) $\angle DBA$, [4 marks]
[4 *markah*]

(*d*) the area, in cm^2, of triangle *ABD*. [2 marks]
luas, dalam cm^2, *bagi segitiga ABD*. [2 *markah*]

14 Table 15 shows the price and price indices of five types of furniture *A, B, C, D* and *E*. Diagram 15 is a pie chart represent the sales of the furniture in the year 2004.

Jadual 15 *menunjukkan harga dan indeks harga bagi lima jenis perabot A, B, C, D dan E. Rajah* 15 *ialah carta pai yang mewakili jualan perabot tersebut pada tahun* 2004.

Furniture *Perabot*	Price *Harga* (RM)		Price Index in 2004 based on 2001 *Indeks Harga pada tahun* 2004 *berasaskan* 2001
	Year 2001 *Tahun* 2001	Year 2004 *Tahun* 2004	
A	600	*x*	125
B	1500	1980	*z*
C	1200	1500	125
D	750	900	120
E	*y*	1040	130

Table 15
Jadual 15

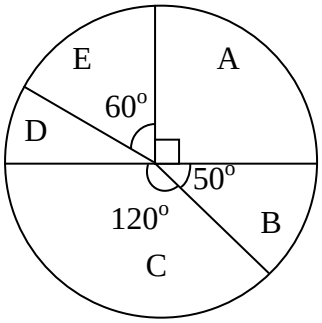


Diagram 15
Rajah 15

(*a*) Find the values of *x, y* and *z*. [3 *marks*]
Cari nilai-nilai x, y dan z. [3 *markah*]

(*b*) Calculate the composite index for the price of the furniture in the year 2004 based on the year 2001. [3 *marks*]
Hitung nombor indeks gubahan bagi harga perabot pada tahun 2004 *berasaskan tahun* 2001. [3 *markah*]

(*c*) Find the sales of the furniture in the year 2004 if its sales in the year 2001 was RM 200 000. [2 *marks*]
Cari jualan perabot pada tahun pada tahun 2004 *jika jualan pada tahun* 2001 *adalah* RM 200 000. [2 *markah*]

(*d*) If the sales of furniture increases by 20% from the year 2004 to the year 2007, calculate the composite index for the sales of the furniture in the year 2007 based on the year 2001. [2 *marks*]
Jika jualan perabot meningkat 20% *dari tahun* 2004 *ke tahun* 2007, *hitung nombor indeks gubahan bagi jualan perabot itu pada tahun* 2007 *berasaskan tahun* 2001. [2 *markah*]

15 A tailor makes two types of clothes, trousers and shirt . In a week, he makes x trousers and y shirts. The cost of making a trouser is RM 80 and a shirt is RM 40.
The production of clothes is based on the following constraints:
Seorang tukang jahit membuat 2 *jenis pakaian, seluar panjang dan kemeja. Dalam seminggu, dia membuat x helai seluar panjang dan y helai kemeja. Kos untuk menghasilkan sehelai seluar panjang ialah* RM 80 *dan sehelai kemeja ialah* RM 40.
Penghasilan pakaian adalah berdasarkan kekangan berikut:

I: The maximum total number of trousers and shirts must be 80.
Jumlah maksimum seluar panjang dan kemeja ialah 80 .

II: The number of shirt must exceed the number of trousers by at least 5.
Bilangan kemeja mesti melebihi bilangan seluar panjang sekurang-kurangnya 5.

III: The minimum cost to produce the clothes is RM 3200.
Kos minimum bagi menghasilkan pakaian tersebut ialah RM 3200.

(*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 clothes on both axes, construct and shade the region *R* which satisfies all the above constraints. [3 *marks*]
Menggunakan skala 2 cm *kepada* 10 *pakaian pada kedua-dua paksi, 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 shirts produced .
bilangan minimum kemeja yang dihasilkan .

(ii) the maximum cost for the production of the clothes.
kos maksimum bagi menghasilkan pakaian tersebut .

[4 *marks*]
[4 *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 to 4.
Satu senarai rumus disediakan di halaman 2 *hingga* 4.

8. Graph paper and booklet of four – figure mathematical tables is provided.
Kertas graf dan sebuah buku sifir matematik empat angka disediakan.

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

10. 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		7	
	3		6	
	4		7	
	5		7	
	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 2013

BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PENDIDIKAN MALAYSIA

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2013
PERCUBAAN SIJIL PELAJARAN MALAYSIA

ADDITIONAL MATHEMATICS

Paper 1

MARKING SCHEME

Skema Pemarkahan ini mengandungi **6** halaman bercetak

PERATURAN PEMARKAHAN- KERTAS 1

No.	Solution and Mark Scheme	Sub Marks	Total Marks
1(*a*)	4	1	2
(*b*)	$f(x)=\frac{x}{2}$	1	
2	$n=-\frac{3}{4}$ B2 : $\frac{3n-1-2}{7}=n$ OR $7n+2=3n-1$ B1 : $g^{-1}(x)=\frac{x-2}{7}$ OR $g(n)=3n-1$	3	3
3	$p=-7$ *and* $q=18$ B2 : $p=-7$ *or* $q=18$ B1 : $p(px-3)-3$	3	3
4	$m=\frac{1}{5}$ and $n=10$ B2: $m=\frac{1}{5}$ or $n=10$ B1: $2m=\frac{2}{5}$ or $m+2=\frac{n+1}{5}$ OR $5(2)^2-(n+1)(2)+2=0$ OR $5x^2-5(2+m)x+10m=0$	3	3
5	$q<\frac{9}{4}$ B2: $(-3)^2-4(3)(-q+3)<0$ B1: $3x^2-3x-q+3=0$	3	3
6(*a*)	-3	1	4
(*b*)	$\frac{2}{9}$ B1 : $5=7-m(0-3)^2$	2	
(*c*)	$(3,7)$	1	

7	-2 B2 : $5^x(5^3-100)=1$ OR $5^x=\frac{1}{25}$ B1 : $5^x\times5^3=1+100(5^x)$	3	3
8	$x=\frac{9}{4}$ B3 : $9x-18=x$ *OR* $\frac{x-2}{x}=3^{-2}$ B2 : $\log_3 9(x-2)=\log_3 x$ *OR* $\log_3\frac{x-2}{x}=-2$ B1 : $\frac{\log_3 x}{\log_3 9}$ (accept any base)	4	4
9	4 B2 : $m=6$ B1 : $(2m+1)-(m+3)=(m+3)-(m-1)$ or equivalent	3	3
10(*a*)	$r=\frac{1}{5}$ or 0.2 B2 : $(5r-1)(5r+6)=0$ B1 : $ar+ar^2=\frac{6}{25}a$ or equivalent	3	4
(*b*)	$\frac{25}{2}$ or 12.5	1	
11	19, 23, 27, 31 B3 : $n=8$ or $n=11$ OR 19 or 31 B2 : $T_n+T_{n+1}+T_{n+2}+T_{n+3}=100$ OR $T_n+T_{n-1}+T_{n-2}+T_{n-3}=100$ B1 : $d=4$	4	4

12	$s=5$ and $t=4$ B2 : $s=5$ or $t=4$ B1 : $\frac{y}{x}=-x^2+8$	3	3
13	(a) $-\frac{5}{2}$ (b) $y=-\frac{3}{2}x+6$ or equivalent B1 : $m_{AB}=-\frac{3}{2}$	1 2	3
14	$p=-7$ and $p=13$ B2 : $p=-7$ OR $p=13$ B1 : $\lvert -2p+6\rvert=20$ or $\lvert 2p-6\rvert=20$	3	3
15	(a) $C(7,-6)$ B1 : $\overrightarrow{OC}=2\begin{pmatrix}4\\-2\end{pmatrix}-\begin{pmatrix}1\\2\end{pmatrix}$ OR $\overrightarrow{OC}=2(4\underset{\sim}{i}-2\underset{\sim}{j})-(\underset{\sim}{i}+2\underset{\sim}{j})$ (b) $\sqrt{85}$ or 9.220	2 1	3
16	$p=2$ and $q=6$ B2 : $p=2$ or $q=6$ B1 : $p-2=0$ or $p-q+4=0$	3	3
17(*a*)	1.117 rad	1	4
(*b*)	2.728 cm^2 B2 : $\frac{1}{2}(5^2)(1.117-\sin 64°)$ OR $\frac{1}{2}(5^2)(1.117)-\frac{1}{2}(5^2)(\sin 64°)$ B1 : $\frac{1}{2}(5^2)(1.117)$ or $\frac{1}{2}(5^2)(\sin 64°)$	3	

18	$0^\circ, 60^\circ, 180^\circ$ B2 : $\sin x(2\cos x - 1) = 0$ B1 : $2\sin x \cos x = \sin x$	3	3
19	(2,1) B2 : $2(5-2x)(-2) = -4$ B1 : $2(5-2x)(-2)$ or $m = -4$ (use $m_1 m_2 = -1$)	3	3
20	-3 B2 : $\left(\frac{1}{3}\right)(-m) = 1$ B1 : $\frac{dy}{du} = \frac{1}{3}$ or $\frac{du}{dx} = -m$ or $\frac{dy}{dx} = -\frac{m}{3}$	3	3
21	3 B2 : $[mx]_1^5 - 10 = 2$ B1 : $\int_1^5 m\,dx - \int_1^5 k(x)\,dx = 2$ *or* 10	3	3
22(*a*) (*b*)	315 B1 : $9 = \frac{\sum x^2}{7} - (6)^2$ 81	2 1	3
23(*a*) (*b*)	252 48 B1 : $4! \times 2!$	1 2	3

24(*a*)	$\frac{2}{9}$ B1 : $\frac{1}{3}\times\frac{20}{30}$	2	4
(*b*)	$\frac{2}{5}$ B1 : $\frac{2}{3}\times\frac{13}{30}$ or $\frac{1}{3}\times\frac{10}{30}$	2	
25	6 B2 : ${}^{n}C_{0}\left(\frac{1}{2}\right)^{0}\left(\frac{1}{2}\right)^{n}=\frac{1}{64}$ B1 : $1-P(x=0)$	3	3

3472/2

Matematik
Tambahan
Kertas 2
Ogos 2013
2 ½ jam

BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PELAJARAN MALAYSIA

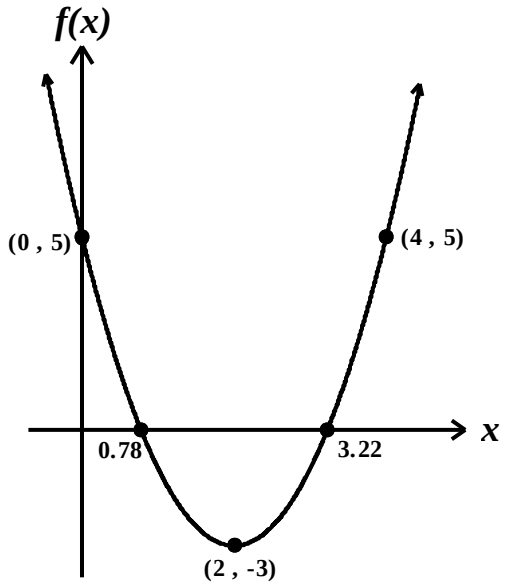
PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2013
PERCUBAAN SIJIL PELAJARAN MALAYSIA

ADDITIONAL MATHEMATICS

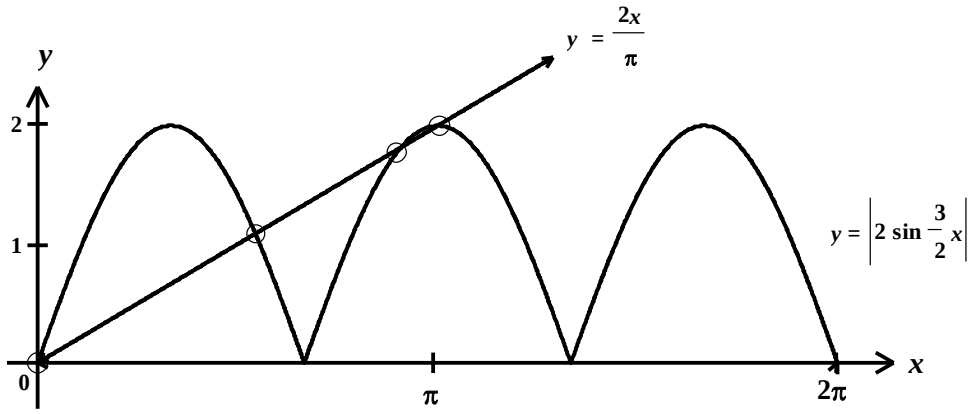
Paper 2

MARKING SCHEME

Skema Pemarkahan ini mengandungi **10** halaman bercetak

No	Solution and Mark Scheme		Sub Marks	Total Marks
1	$h = 2 - 2k$	$k = \frac{2-h}{2}$ P1	5	5
	$2k^2 - k(2-2k) - 7 = 0$ OR	$2\left(\frac{2-h}{2}\right)^2 - h\left(\frac{2-h}{2}\right) - 7 = 0$ K1		
	$4k^2 - 2k - 7 = 0$	$h^2 - 3h - 5 = 0$		
	$k = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(4)(-7)}}{2(4)}$	$h = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-1)}}{2(1)}$ K1		
	$k = 1.596 / 1.597$, $-1.096 / -1.097$ N1			
	$h = -1.192 / -1.193$, $4.192 / 4.193$ N1			
2(a)	$2[(x - \frac{p}{4})^2 - (\frac{p}{4})^2] + 5$ K1		3	7
	$\frac{p}{4} = 2$ K1			
	$p = 8$ N1			
(b)	(i) (2,-3) N1		4	
	(ii) 			
		Shape P1		
		Minimum point P1		
		Another 2 points P1		

3(a)	$A_1 = \frac{1}{2}(10+9)(2) = 19cm^2$ OR $A_2 = \frac{1}{2}(9+8.1)(2) = 17.1cm^2$		3	6
	OR $A_3 = \frac{1}{2}(8.1+7.29)(2) = 15.39cm^2$	K1		
	$r_1 = \frac{17.1cm^2}{19cm^2} = 0.9$ OR $r_2 = \frac{15.39cm^2}{17.1cm^2} = 0.9$	K1		
	$r_1 = r_2 = 0.9$	N1		
(b)	$S_n = \frac{19(1-0.9^n)}{1-0.9} > 100$	K1	3	
	$\log_{10} 0.9^n < \log_{10}\left(\frac{9}{19}\right)$	K1		
	$n > 7.092$			
	$\therefore n = 8$	N1		
4(a)	$\frac{2(2)+x(1)}{3} = 0$ or $\frac{-2(2)+y(1)}{3} = 0$	K1	2	7
	$c(-4,4)$	N1		
(b)	Method 1		5	
	Mid point BC , $M = (1,3)$	P1		
	Use distance MB = $\sqrt{26}$	K1		
	$\sqrt{(x-1)^2+(y-3)^2} = \sqrt{26}$	K1		
	$x^2 - 2x + 1 + y^2 - 6y + 9 = 26$	K1		
	$x^2 + y^2 - 2x - 6y - 16 = 0$	N1		
	OR			

	Method 2 $m_1 = \frac{y-2}{x-6}$ *or* $m_2 = \frac{y-4}{x+4}$ $\left(\frac{y-2}{x-6}\right)\left(\frac{y-4}{x+4}\right) = -1$ $\frac{y^2-4y-2y+8}{x^2+4x-6x-24} = -1$ $y^2-6y+8 = -x^2+2x+24$ $x^2+y^2-2x-6y-16 = 0$	 P1 K1 K1 K1 N1	5	
5(a)	 Shape (Sine) Cycle (1.5 cycles) Amplitute (±2) Modulus	 P1 P1 P1 P1	4	7
(b)	$y = \frac{2x}{\pi}$ Draw line $y = \frac{2x}{\pi}$ Bilangan Penyelesaian = 4	N1 K1 N1	3	

6(a)	$m = 14$	N1	1	8
(b)	L = 17.5 OR F = 27 OR $f_m = 24$	P1	3	
	$17.5 + \left(\dfrac{\frac{1}{2}(70) - 27}{24} \right) 6$	K1		
	$= 19.5$	N1		
(c)	$\overline{X} = \dfrac{8.5\times9 + 14.5\times18 + 20.5\times24 + 26.5\times14 + 32.5\times5}{70}$	K1	4	
	$\sum fx^2 = (8.5)^2\times9 + (14.5)^2\times18 + (20.5)^2\times24 + (26.5)^2\times14 + (32.5)^2\times5$	K1		
	$\sigma^2 = \dfrac{29633.5}{70} - (*19.47)^2$	K1		
	$\sigma^2 = 44.25$	N1		
7	LAMPIRAN			
8(a)	(i) $y - 2 = -1(x - 2)$	K1	4	10
	$y = -x + 4$	N1		
	(ii) $y = \dfrac{x^2}{4} + c$	K1		
	$y = \dfrac{x^2}{4} + 1$	N1		
(b)	$\left[\dfrac{x^3}{12} + x \right]_0^2$ OR $\dfrac{1}{2}\times2\times2$ *or* 2	K1	3	
	$2\frac{2}{3} + 2$	K1		
	$4\frac{2}{3}$	N1		
(c)	$\pi\left[\dfrac{4y^2}{2} - 4y \right]_1^2$	K1	3	
	$\left[\left[2(2)^2 - 4(2) \right] - \left[2(1)^2 - 4(1) \right] \right] \pi$	K1		
	2π	N1		

9(a)	$\overrightarrow{QR} = 4\underset{\sim}{b}$	K1	3	10
	(i) $\overrightarrow{PR} = 8\underset{\sim}{a} + 4\underset{\sim}{b}$	N1		
	(ii) $SQ = -10\underset{\sim}{b} + 8\underset{\sim}{a}$	N1	3	
(b)	(i) $\overrightarrow{PT} = 8m\underset{\sim}{a} + 4m\underset{\sim}{b}$	N1		
	(ii) $\overrightarrow{PT} = 10\underset{\sim}{b} + n\left(-10\underset{\sim}{b} + 8\underset{\sim}{a}\right)$	K1		
	$\overrightarrow{PT} = \left(10 - 10n\right)\underset{\sim}{b} + 8n\underset{\sim}{a}$	N1		
(c)	$8m = 8n$ or $4m = 10 - 10n$	K1	4	
	Solve to find m and n	K1		
	$n = \frac{5}{7}$	N1		
	$m = \frac{5}{7}$	N1		
10(a)			4	10
	use $p = 0.85$ *and* $q = 0.15$	P1		
	${}^8C_6 (0.85)^6 (0.15)^2$ *OR* ${}^8C_7 (0.85)^7 (0.15)^1$ *OR* ${}^8C_8 (0.85)^8 (0.15)^0$	K1		
	$P(X \geq 6) = P(x = 6) + P(x = 7) + P(x = 8)$	K1		
	$= 0.8948$	N1		
(b)	(*i*) $P\left(35 \leq X \leq 66\right) = P\left(\frac{35 - 48}{6} \leq Z \leq \frac{66 - 48}{6}\right)$	K1	6	
	$= P\left(-2.167 \leq Z \leq 3\right)$			
	$= 0.9835$	K1		
	$0.9835 \times 180 \quad = 177$	N1		

	(*ii*) $P(X < k) = 0.05$	K1		
	$\frac{k-48}{6} = -1.645$	K1		
	$k = 38.13$	N1		
11(a)	$\angle BOD = 120°$	K1	2	10
	2.095 rad	N1		
(b)	$\cap BD = r(2.095)$ or $\cap BC = 2r(1.047)$	K1	4	
	$r + 2r(1.047) + r(2.095) = 31.134$	K1		
	$r = 6$	N1		
	$AC = 12\,\text{cm}$	N1		
(c)	$Area\ of\ \text{sec}tor\ ABC = \frac{1}{2}(12)^2(1.047)\ OR\ \ OBD = \frac{1}{2}(6)^2(2.095)$	K1	4	
	Area of triangle $= \frac{1}{2}(6)(6)(\sin 60°)$	K1		
	$\frac{1}{2}(12)^2(1.047) - \frac{1}{2}(6)^2(2.095) - \frac{1}{2}(6)(6)(\sin 60°)$	K1		
	22.086	N1		
12(a)	$t = 3$	P1	3	10
	$v = 6t - t^2 + c$	K1		
	$v = 6t - t^2 - 8$			
	$V_{max} = 1$	N1		
(b)	$6t - t^2 - 8 = 0$	K1	3	
	$(t-2)(t-4) = 0$	K1		
	$t = 2,\ t = 4$	N1		

(c)	$s = 3t^2 - \frac{t^3}{3} - 8t + c$	K1	4	
	$S_2 = 3(2)^2 - \frac{(2)^3}{3} - 8(2)$ OR $S_3 = 3(3)^2 - \frac{(3)^3}{3} - 8(3)$	K1		
	$\lvert S_2 \rvert + \lvert S_2 - S_3 \rvert$	K1		
	$\frac{22}{3}$	N1		
13(a)	$\frac{1}{2}(6)(10)\sin \angle BCA = 22$	K1	2	10
	$\angle BCA = 47.17°$			
	$\angle BCA = 132.83°$(obtuse)	N1		
(b)	$BA^2 = 6^2 + 10^2 - 2(6)(10)\cos{*}132.83°$	K1	2	
	$BA = 14.75\,\text{cm}$	N1		
(c)	$\angle DBA = \angle DBC + \angle CBA$			
	$\frac{\sin \angle BCD}{8} = \frac{\sin 40°}{6}$	K1	4	
	$\angle BCD = 58.99°$			
	$\angle BCD = 121.01°$(obtuse)			
	$\therefore \angle DBC = 180° - 121.01 - 40° = 18.99°$	K1		
	$\frac{\sin \angle CBA}{10} = \frac{\sin 132.83°}{*14.75}$			
	$\angle CBA = 29.82°$	K1		
	$\angle DBA = 18.99° + 29.82° = 48.81°$	N1		
(d)	Area $= \frac{1}{2}(8)(14.75)\sin 48.81°$	K1	2	
	$= 44.40\,\text{cm}^2$	N1		

14(a)	$\frac{x}{600}\times 100 = 125$ OR $\frac{1040}{y}\times 100 = 130$ OR $\frac{1980}{1500}\times 100 = z$	K1	3	10
	$x = 750,\ y = 800,\ z = 132$	N2: all correct N1: 2 correct		
(b)	use $D = 40^\circ$ $\bar{I} = \frac{125(90)+132(50)+125(120)+120(40)+130(60)}{360}$ $\bar{I} = 126.25$		2	
(c)	$\frac{Q_{04}}{200000}\times 100 = 126.25$ $Q_{04} = 252500$	K1 N1	2	
(d)	$\frac{120}{100}\times 126.25$ $= 151.50$	K1 N1	2	
15	LAMPIRAN			

END OF MARKING SCHEME

No.7

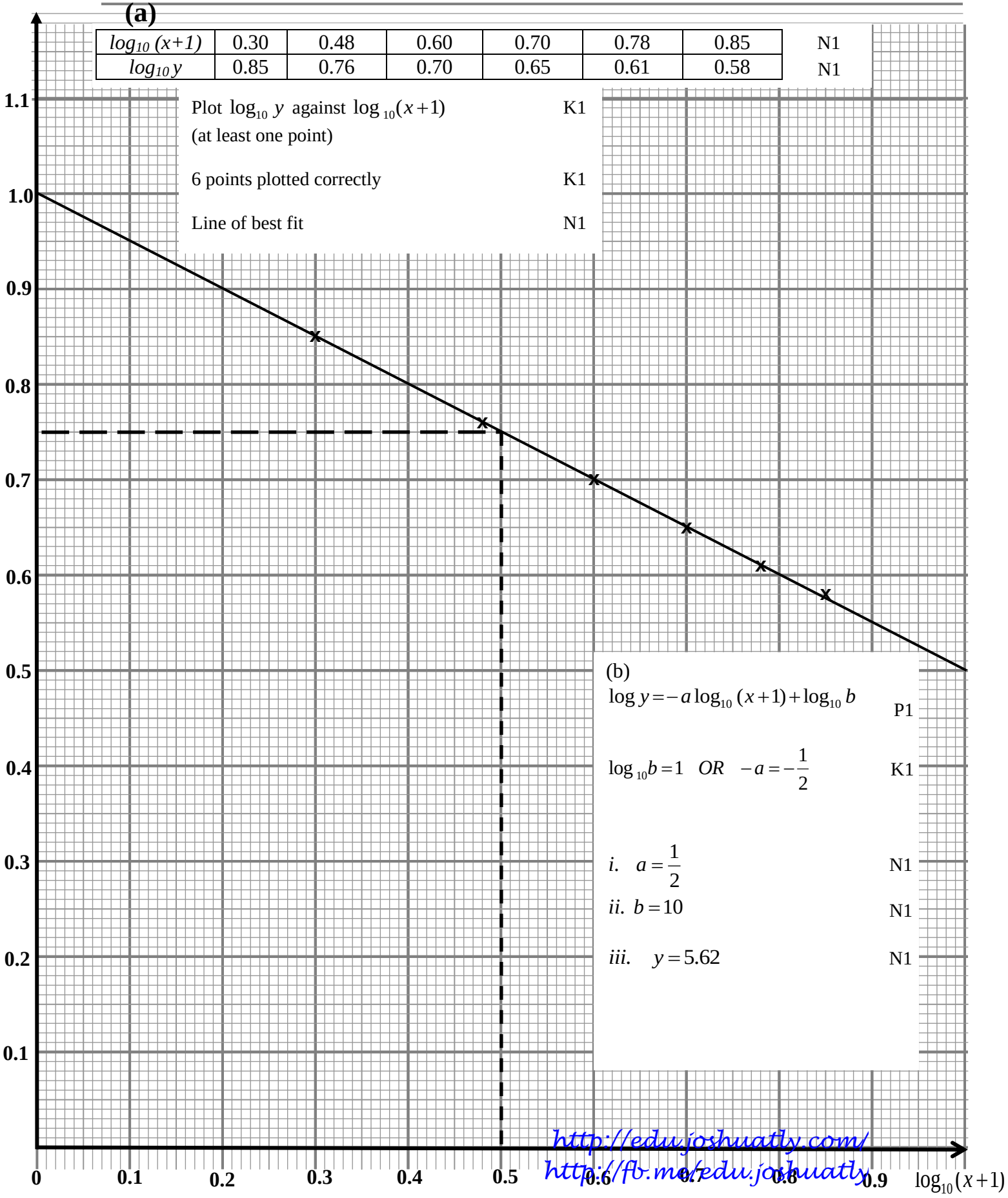
(a)

$\log_{10}(x+1)$	0.30	0.48	0.60	0.70	0.78	0.85	N1
$\log_{10} y$	0.85	0.76	0.70	0.65	0.61	0.58	N1

Plot $\log_{10} y$ against $\log_{10}(x+1)$ (at least one point) K1

6 points plotted correctly K1

Line of best fit N1



(b)

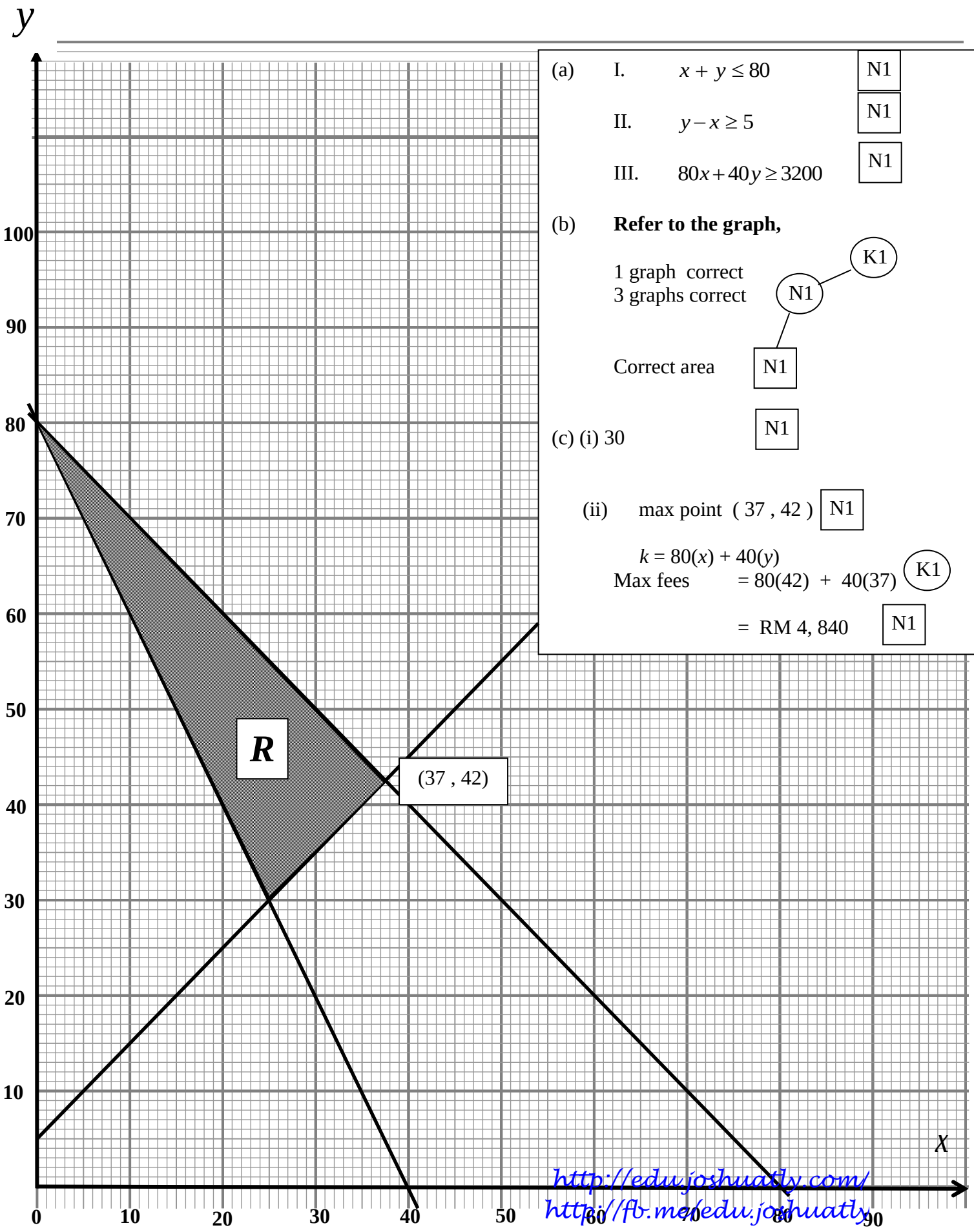
$\log y = -a\log_{10}(x+1) + \log_{10} b$ P1

$\log_{10} b = 1 \quad OR \quad -a = -\frac{1}{2}$ K1

i. $a = \frac{1}{2}$ N1

ii. $b = 10$ N1

iii. $y = 5.62$ N1



(a) I. $x + y \leq 80$ N1

II. $y - x \geq 5$ N1

III. $80x + 40y \geq 3200$ N1

(b) **Refer to the graph,**

1 graph correct
3 graphs correct K1 N1

Correct area N1

(c) (i) 30 N1

(ii) max point (37 , 42) N1

$k = 80(x) + 40(y)$

Max fees = 80(42) + 40(37) K1

= RM 4, 840 N1