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Name : ……..…… **Form : ……..……**

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH
DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PELAJARAN MALAYSIA

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2012 3472 / 1

PERCUBAAN SIJIL PELAJARAN MALAYSIA

ADDITIONAL MATHEMATICS
Kertas 1
Ogos 2012
2 jam **Dua 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	3	
7	3	
8	4	
9	3	
10	3	
11	3	
12	3	
13	4	
14	3	
15	3	
16	3	
17	3	
18	3	
19	3	
20	3	
21	4	
22	4	
23	3	
24	4	
25	4	
TOTAL	**80**	

Kertas soalan ini mengandungi **26** halaman bercetak

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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

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

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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 $\bar{I} = \dfrac{\sum w_1 I_1}{\sum w_1}$

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 $= \dfrac{1}{2}ab\sin C$

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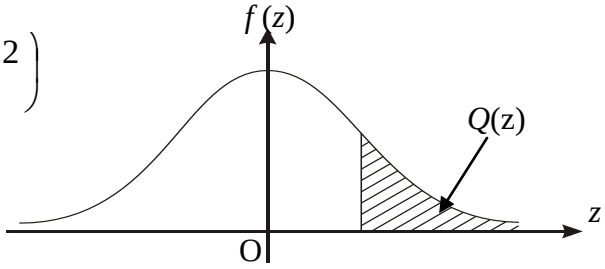
THE UPPER TAIL PROBABILITY Q(z) FOR THE NORMAL DISTRIBUTION N(0,1)
***KEBARANGKALIAN HUJUNG ATAS Q*(z) *BAGI TABURAN NORMAL* N(0, 1)**

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

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

1. Given that set $P = \{16, 25, 81, 100\}$ and set $Q = \{-4, -3, 4, 5, 9, 10\}$. The relation from set P to set Q is "the square root of".
Diberi set $P = \{16, 25, 81, 100\}$ *dan set* $Q = \{-4, -3, 4, 5, 9, 10\}$. *Hubungan antara set P kepada set Q adalah "punca kuasa dua bagi"* .

State,
Nyatakan,

(*a*) the object of 5
objek bagi 5

(*b*) the image of 16
imej bagi 16

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

Answer/*Jawapan* :

(*a*)

(*b*)

1 2

2. Given that the function $k : x \to \frac{3x}{x-2}, x \neq m.$

Diberi fungsi $k : x \to \frac{3x}{x-2}, x \neq m.$

Find

Cari

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

(b) $k^{-1}(2)$.

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

Answer/*Jawapan* :

(*a*)

(*b*)

2 3

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3. Given that the function $g : x \to \frac{5}{x}, x \neq 0$ and $gf : x \to \frac{5}{x-3}, x \neq 3.$

Diberi fungsi $g : x \to \frac{5}{x}, x \neq 0$ dan $gf : x \to \frac{5}{x-3}, x \neq 3.$

Find

Cari

(*a*) the function $f(x)$

fungsi bagi $f(x)$

(b) $f(2)$

[3 *marks*]

[3 *markah*]

Answer/*Jawapan* :

(*a*)

(*b*)

3

3

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4. Find the range of values of *m* if the quadratic equation $3-2x-mx^2=-2x^2+4x$ has no roots.

Cari julat bagi nilai m jika persamaan kuadratik $3-2x-mx^2=-2x^2+4x$ *tidak mempunyai punca.*

[3 *marks*]

[3 *markah*]

Answer/*Jawapan* :

4

3

5. Find the range of values of p for $2p^2-p\le p^2-2(2p+1)$.

Cari julat nilai p bagi $2p^2-p\le p^2-2(2p+1)$.

[3 *marks*]

[3 *markah*]

Answer/*Jawapan* :

5

3

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6. Diagram 6 shows the graph of a quadratic function for $f(x) = (x + m)^2 - 4$.

Rajah 6 *menunjukkan graf fungsi kuadratik bagi* $f(x) = (x + m)^2 - 4$.

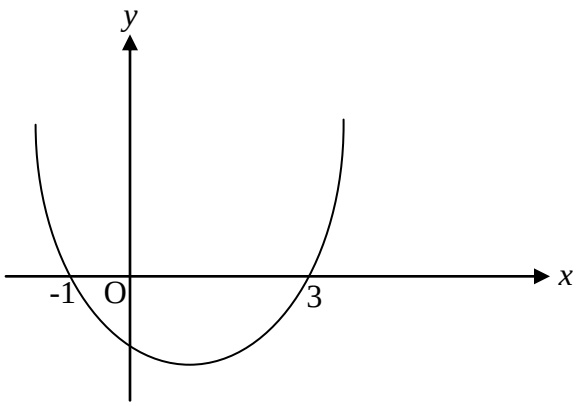

Diagram 6
Rajah 6

Find

Cari

(*a*) the equation of the axis of symmetry,
persamaan paksi simetri,

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

(*c*) the coordinates of the minimum point.
koordinat bagi titik minimum.

[3 *marks*]

[3 *markah*]

Answer/*Jawapan* :

(*a*)

(*b*)

(*c*)

6

3

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7. Solve the equation $\sqrt{9^{2x-3}} = 243(27^{2x})$.

Selesaikan persamaan $\sqrt{9^{2x-3}} = 243(27^{2x})$.

[3 *marks*]

[3 *markah*]

Answer/*Jawapan* :

7

3

8. Given that $\log_5 m - \log_{125} n = 4$, express m in terms of n.

Diberi $\log_5 m - \log_{125} n = 4$, *ungkapkan m dalam sebutan n.*

[4 *marks*]

[4 *markah*]

Answer/*Jawapan* :

8

4

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9. It is given that $-7, h, k, 20, ...$ are the first four terms of an arithmetic progression.

Diberi bahawa $-7, h, k, 20, ...$ *adalah empat sebutan pertama bagi suatu janjang aritmetik.*

Find the value of *h* and of *k* .

Cari nilai bagi h dan bagi k .

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

Answer/*Jawapan* :

9

3

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10 In a geometric progression, the first term is $\frac{1}{2}$ and the fourth term is $-\frac{4}{27}$.

Dalam satu janjang geometri, sebutan pertama ialah $\frac{1}{2}$ *dan sebutan keempat ialah* $-\frac{4}{27}$.

Calculate,

Hitung,

(*a*) the common ratio,

nisbah sepunya,

(*b*) the sum to infinity of the geometric progression.

hasiltambah hingga sebutan ketakterhinggaan bagi janjang geometri itu.

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

Answer/*Jawapan* :

(*a*)

(*b*)

10

3

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11 The first three terms of an arithmetic progression are

Tiga sebutan pertama suatu janjang aritmetik ialah

$$3h + 1, 4h + 2, 5h + 3, \ldots$$

Find the sum of the first tenth terms in terms of h .

Cari hasitambah sepuluh sebutan pertama dalam sebutan h .

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

Answer/*Jawapan* :

11

3

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12 The variables x and y are related by the equation $y = pq + px$, where p and q are constants. Diagram 12 shows the straight line obtained by plotting $\frac{y}{x}$ against $\frac{1}{x}$.

Pembolehubah x dan y dihubungkan oleh persamaan $y = pq + px$, *dengan keadaan p dan q adalah pemalar. Rajah* 12 *menunjukkan graf garislurus diperolehi dengan memplotkan* $\frac{y}{x}$ *melawan* $\frac{1}{x}$.

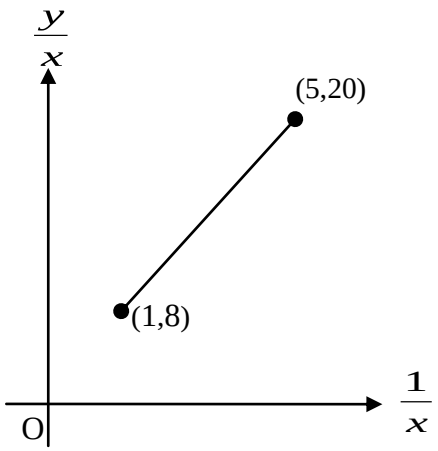

Diagram 12

Rajah 12

(*a*) Express p in terms of q.

Ungkapkan p dalam sebutan q.

(*b*) Find the y-intercept.

Cari pintasan-y.

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

Answer/*Jawapan* :

(*a*)

12

3

(*b*)

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13. Given that the straight line $\frac{x}{3}+\frac{y}{2}=1$ intersect the *x*-axis at point *S* and intersect the *y*-axis at point *T*.

Diberi bahawa persamaan garis lurus $\frac{x}{3}+\frac{y}{2}=1$ *menyilang paksi- x di titik S dan menyilang di paksi- y di titik T.*

Find the equation of the perpendicular bisector of *ST*.
Cari persamaan pembahagi dua sama serenjang bagi ST.

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

Answer/*Jawapan* :

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13

4

14. A point *S* moves along the arc of a circle with centre $P(-2,2)$. The arc of circle passes through point $Q(6,-4)$.

Titik S bergerak pada lengkok suatu bulatan berpusat $P(-2,2)$. *Lengkok bulatan itu melalui titik* $Q(6,-4)$.

Find the equation of the locus of point *S*.
Cari persamaan lokus bagi titik S.

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

Answer/*Jawapan* :

14

3

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15. Diagram 15 shows the vector $\overrightarrow{OR}$.
Rajah 15 *menunjukkan vektor* $\overrightarrow{OR}$.

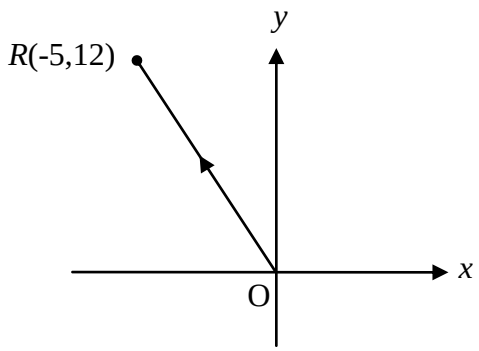

Diagram 15
Rajah 15

(*a*) Express $\overrightarrow{OR}$ in the form $x\underline{i} + y\underline{j}$.
Ungkapkan $\overrightarrow{OR}$ *dalam sebutan* $x\underline{i} + y\underline{j}$.

(*b*) Find the unit vector in the direction of $\overrightarrow{OR}$.
Cari vektor unit dalam arah $\overrightarrow{OR}$.

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

Answer/*Jawapan* :

(*a*)

(*b*)

15

3

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16. Given that $\overrightarrow{OP} = \underline{i} + \underline{j}$ and $\overrightarrow{OQ} = 3\underline{i} - 2\underline{j}$.

Diberi $\overrightarrow{OP} = \underline{i} + \underline{j}$ dan $\overrightarrow{OQ} = 3\underline{i} - 2\underline{j}$.

Find the value of *k* if $4k\overrightarrow{OP} + \overrightarrow{OQ}$ is parallel to the *y*-axis.

Cari nilai k jika $4k\overrightarrow{OP} + \overrightarrow{OQ}$ *selari dengan paksi-y.*

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

Answer/*Jawapan* :

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16

3

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17. Diagram 17 shows a right angle triangle *POR* and a sector *ROS* in a circle with centre *R*.

Rajah 17 *menunjukkan segitiga bersudut tegak POR dan sektor ROS dalam bulatan yang berpusat R.*

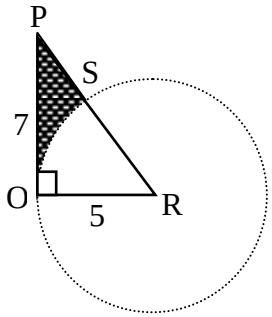

Diagram 17
Rajah 17

Find,
Cari,

[Use/Guna $\pi = 3.142$]

(*a*) $\angle ORS$, in radian,
$\angle ORS$ *, dalam radian,*

(*b*) perimeter of shaded region.
perimeter kawasan berlorek.

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

Answer/*Jawapan* :

(*a*)

(*b*)

17

3

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18. Solve the trigonometry equation $4\sin x\cos x = 1$ for $0^0 \le x \le 360^0$.

Selesaikan persamaan trigonometri $4\sin x\cos x = 1$ *untuk* $0^0 \le x \le 360^0$.

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

Answer/*Jawapan* :

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18

3

---

19. Given $y = 16x(5-x)$.

Diberi $y = 16x(5-x)$.

Find

Cari

(a) $\dfrac{dy}{dx}$

(*b*) the value of x when y is maximum.

nilai x apabila y adalah maksimum.

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

Answer/*Jawapan* :

(*a*)

(*b*)

19

3

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20. Given that the point $M\left(-1, \frac{3}{2}\right)$ lies on a curve with gradient function $x - 3$.

Diberi bahawa titik $M\left(-1, \frac{3}{2}\right)$ *berada pada suatu lengkung dengan fungsi kecerunan* $x - 3$.

Find the equation of the tangent at point *M*.

Cari persamaan tangen pada titik M.

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

Answer/*Jawapan* :

20

3

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21. Given that $\int_1^3 f(x)dx = 5.$

Diberi bahawa $\int_1^3 f(x)dx = 5.$

Find,
Cari,

(*a*) the value of $\int_3^1 2f(x)dx,$

nilai bagi $\int_3^1 2f(x)dx,$

(*b*) the value of h if $\int_1^3 [h - \frac{f(x)}{2}]dx = \frac{7}{2}.$

nilai h *jika* $\int_1^3 [h - \frac{f(x)}{2}]dx = \frac{7}{2}.$

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

Answer/*Jawapan* :

(*a*)

(*b*)

21

4

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22. Table 22 shows a cumulative frequency for 20 teams and the score obtained from a game.
Jadual 22 *menunjukkan kekerapan longgokan bagi* 20 *pasukan dan mata yang diperoleh daripada suatu permainan.*

Score *Mata*	0	1	2	3	4
Cumulative frequency *Kekerapan longgokan*	2	5	7	15	20

Table 22
Jadual 22

Find
Cari,

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

(*b*) variance, for the score.
varians, bagi mata yang diperoleh.

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

Answer/*Jawapan* :

(*a*)

(*b*)

22

4

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23. A team consists of 5 students are to be chosen from 4 girls and 6 boys.
Satu pasukan terdiri daripada 5 *orang pelajar hendak dipilih daripada* 4 *orang pelajar perempuan dan* 6 *orang pelajar lelaki.*

Find the number of ways the team can be formed if
Cari bilangan cara pasukan itu boleh dibentuk jika

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

(*b*) a minimum of 3 girls must be chosen.
minimum 3 *orang pelajar perempuan mesti dipilih.*

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

Answer/*Jawapan* :

(*a*)

(*b*)

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24. In a selection to represent the school for the mathematics competition, the probability that Ramon , Ailing and Suzana is chosen are $\frac{2}{5}$, $\frac{3}{4}$ and $\frac{2}{3}$ respectively.

Dalam satu pemilihan untuk mewakili sekolah bagi suatu pertandingan matematik, kebarangkalian bahawa Ramon, Ailing dan Suzana terpilih adalah $\frac{2}{5}$, $\frac{3}{4}$ *dan* $\frac{2}{3}$ *masing-masing.*

Find the probability that
Cari kebarangkalian bahawa

(*a*) only Suzana is chosen,
hanya Suzana yang terpilih,

(*b*) at least one of them is chosen.
sekurang-kurangnya seorang daripada mereka terpilih.

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

Answer/*Jawapan* :

(*a*)

(*b*)

24

4

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

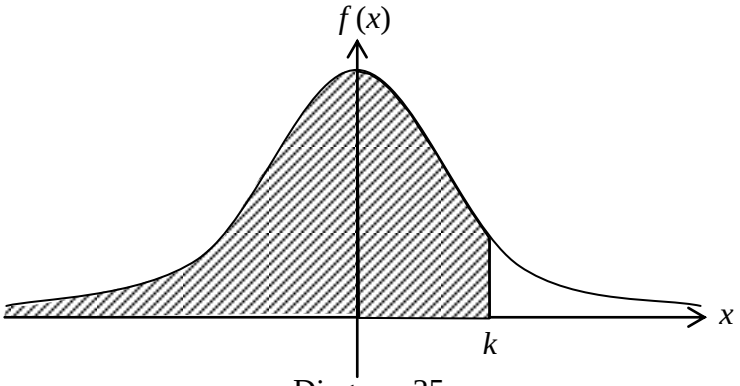

Diagram 25
Rajah 25

Given that the area of the shaded region is 0.8259.
Diberi bahawa luas kawasan berlorek adalah 0.8259.

(*a*) Find the value of $P(x > k)$.
Nilai bagi $P(x > k)$.

(*b*) X is a continuous random variable which is normally distributed with a mean of 45 and a standard deviation of 5 .
X *adalah pembolehubah rawak selanjar yang tertabur secara normal dengan min* 45 *dan sisihan piawai* 5.

Find the value of k.
Cari nilai k.

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

Answer/*Jawapan* :

(*a*)

(*b*)

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25

4

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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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.

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3472/2
Matematik
Tambahan
Kertas 2
2 ½ jam
Ogos 2012

BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PELAJARAN MALAYSIA

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2012
PERCUBAAN SIJIL PELAJARAN MALAYSIA

ADDITIONAL MATHEMATICS

Kertas 2

Dua jam tiga puluh 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.*

Kertas soalan ini mengandungi **19** halaman bercetak

[Lihat Halaman Sebelah

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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 =

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

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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 $\bar{I} = \dfrac{\sum w_1 I_1}{\sum w_1}$

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 $= \dfrac{1}{2}ab\sin C$

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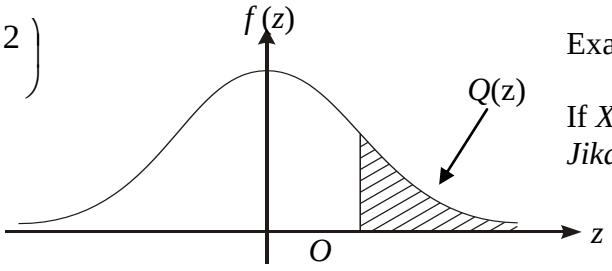
THE UPPER TAIL PROBABILITY Q(z) FOR THE NORMAL DISTRIBUTION N(0,1)
***KEBARANGKALIAN HUJUNG ATAS Q*(z) *BAGI TABURAN NORMAL* N(0, 1)**

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

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Section A
Bahagian A

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

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

1 Solve the following simultaneous equations:
Selesaikan persamaan serentak berikut:

$$2x + 3y - 8 = 0$$
$$y^2 + 3xy + 6 = 0$$

Give your answer correct to 3 decimal places. [5 *marks*]
Beri jawapan betul kepada 3 *tempat perpuluhan.* [5 *markah*]

2 Given that $y = -x^2 + 2x - 3k$ has a maximum value of 4.
Diberi $y = -x^2 + 2x - 3k$ *mempunyai nilai maksimum* 4.

(*a*) By using the method of completing the square, find the value of k. [3 *marks*]
Dengan menggunakan kaedah penyempurnaan kuasa dua, cari nilai k.
[3 *markah*]

(*b*) Hence sketch the graph for $y = -x^2 + 2x - 3k$. [3 *marks*]
Seterusnya lakarkan graf bagi $y = -x^2 + 2x - 3k$. [3 *markah*]

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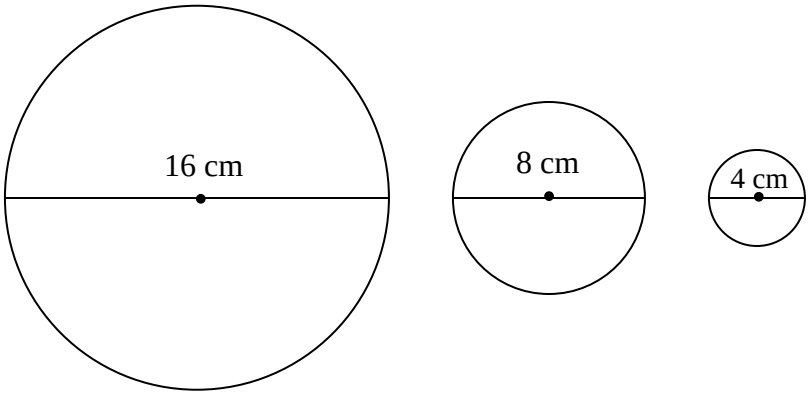

Diagram 3
Rajah 3

Diagram 3 shows the first three of an infinite series of circles. The first circle has a diameter of 16 cm, the second circle has a diameter of 8 cm, the third circle has a diameter of 4 cm and so on.
Rajah 3 *menunjukkan tiga bulatan daripada satu siri bulatan yang ketakterhinggaan. Bulatan pertama mempunyai diameter* 16 cm, *bulatan kedua mempunyai diameter* 8 cm, *bulatan ketiga mempunyai diameter* 4 cm *dan seterusnya.*

Find,
Cari,

(*a*) the value of *n*, if the total length of the circumferences of the first *n* circles is more than 30.5π cm, [4 *marks*]

nilai n, jika hasil tambah panjang lilitan bulatan bagi n bulatan pertama adalah melebihi 30.5π cm,

[4 *markah*]

(*b*) the total area, in cm^2, of this infinite series of circles. [3 *marks*]
jumlah luas , dalam cm^2, *bagi siri bulatan yang ketakterhinggaan ini.* [3 *markah*]

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4 Solutions to this question by scale drawing will **not** be accepted.
Penyelesian secara lukisan berskala **tidak** *diterima.*

Diagram 4 shows the straight line *BC* with equation $3y+x+6=0$ which is perpendicular to straight line *AB* at point *B*.
Rajah 4 *menunjukkan garis lurus BC dengan persamaan* $3y+x+6=0$ *yang berserenjang dengan garis lurus AB pada titik B.*

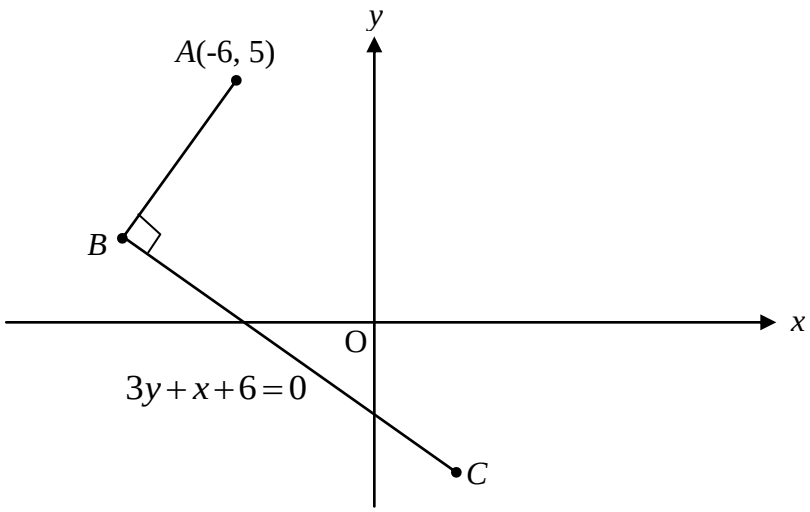

Diagram 4
Rajah 4

(*a*) Find
Cari

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

(ii) the coordinates of *B*.
koordinat titik B.

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

(*b*) The straight line *AB* is extended to a point *D* such that *AB* : *BD* = 2 : 3.
Find the coordinates of *D*. [2 *marks*]

Garis lurus AB dipanjangkan ke titik D dimana AB : *BD* = 2 : 3.
Cari koordinat D. [2 *markah*]

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5 (*a*) Sketch the graph of $y = -3\sin 2x$ for $0 \le x \le 2\pi$. [4 *marks*]

Lakarkan graf bagi $y = -3\sin 2x$ *untuk* $0 \le x \le 2\pi$. [4 *markah*]

(*b*) By using the same axes, sketch a suitable straight line to find the number of solutions for the equation $3\sin 2x + \frac{5x}{\pi} = 2$ for $0 \le x \le 2\pi$.
State the number of solutions.

[3 *marks*]

Dengan menggunakan paksi yang sama, lakarkan satu garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan $3\sin 2x + \frac{5x}{\pi} = 2$ *untuk* $0 \le x \le 2\pi$. *Nyatakan bilangan penyelesaian itu.*

[3 *markah*]

6 Table 6 shows the marks obtained by 36 candidates in an examination.
Jadual 6 *menunjukkan markah yang diperolehi oleh* 36 *orang calon dalam suatu peperiksaan.*

Marks *Markah*	Number of candidates *Bilangan calon*
40 – 49	4
50 – 59	5
60 – 69	6
70 – 79	9
80 – 89	4
90 - 99	8

Table 6
Jadual 6

(*a*) Without drawing an ogive, find the third quartile of the marks, [3 *marks*]
Tanpa melukis ogif, cari kuartil ketiga bagi markah itu, [3 *markah*]

(*b*) Find,
Hitung,

(i) the mean of the marks,
min markah tersebut,

(ii) the standard deviation of the marks.
sisihan piawai bagi markah tersebut.

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

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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 $x^2y = 2mx^2 - \frac{n}{m}x$, where m and n 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* $x^2y = 2mx^2 - \frac{n}{m}x$, *dengan keadaan* m *and* n *adalah pemalar.*

x	10	5	4	2.5	2	1.25
y	62	54	50	38	29	4

Table 7
Jadual 7

(*a*) Plot y against $\frac{1}{x}$, using a scale of 2 cm to 0.1 units on the $\frac{1}{x}$ - axis and 2 cm to 10 units on the *y*-axis . Hence, draw the line of best fit. [4 *marks*]

Plot y melawan $\frac{1}{x}$, *dengan menggunakan skala* 2 cm *kepada* 0.1 *unit pada paksi-* $\frac{1}{x}$ *dan* 2 cm *kepada* 10 unit *pada paksi-y .Seterusnya, lukis garis lurus penyuaian terbaik.*

[4 *markah*]

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

(i) m,
(ii) n,
(iii) x when $y = 40$.
x *apabila* $y = 40$.

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

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8 Diagram 8 shows part of the curve $y = f(x)$ which passes through point $(-1, 4)$.
Rajah 8 *menunjukkan sebahagian dari lengkung* $y = f(x)$ *yang melalui titik* $(-1, 4)$.

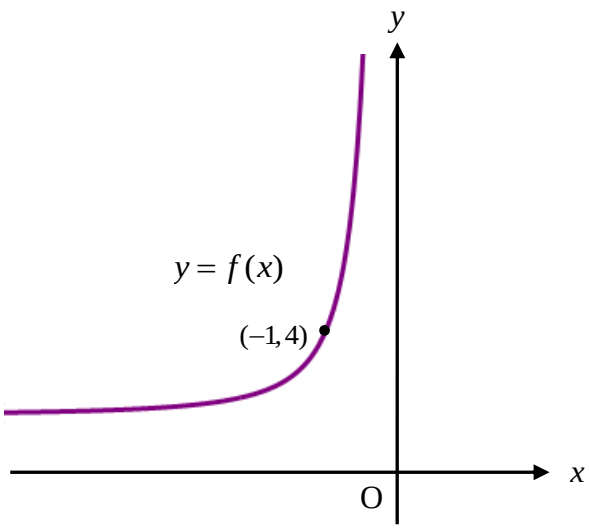

Diagram 8
Rajah 8

The curve has a gradient function of $-\frac{4}{x^3}$.

Lengkung itu mempunyai fungsi kecerunan $-\frac{4}{x^3}$.

(*a*) Find the equation of the curve, [3 *marks*]
Cari persamaan lengkung, [3 *markah*]

(*b*) A region is bounded by the curve, the *x*-axis, the line $x = -5$ and the line $x = -2$.
Satu kawasan dibatasi oleh lengkung, paksi-x, garis $x = -5$ dan *garis* $x = -2$.

(i) Find the area of the region.
Cari luas kawasan yang dibatasi.

(ii) The region is revolved through 360° about the *x*-axis.
Find the volume generated, in terms of π.
Kawasan itu dikisarkan melalui 360° *pada paksi-x .*
Cari isipadu yang dijana dalam sebutan π.

[7 *marks*]
[7 *markah*]

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9 Diagram 9 shows quadrilateral *OABC*. Point *D* lies on straight line *AC* .
Rajah 9 *menunjukkan sisiempat OABC. Titik D berada di atas garis lurus AC.*

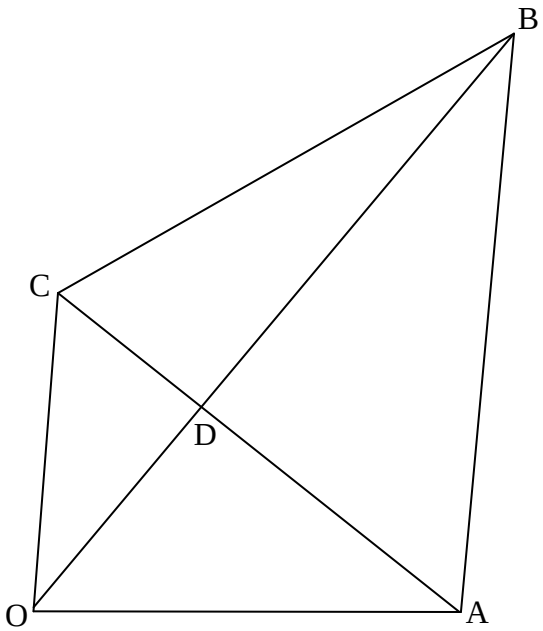

Diagram 9
Rajah 9

(*a*) It is given that $\overrightarrow{OA} = 7\underline{x}$, $\overrightarrow{OC} = 5\underline{y}$, $AD : DC = 3 : 1$ and $\overrightarrow{OC}$ is parallel to $\overrightarrow{AB}$.
Diberi bahawa $\overrightarrow{OA} = 7\underline{x}$, $\overrightarrow{OC} = 5\underline{y}$ *,*$AD : DC = 3 : 1$ *dan* $\overrightarrow{OC}$ *selari dengan* $\overrightarrow{AB}$.
Express in terms of $\underline{x}$ and/or $\underline{y}$.
Ungkapkan dalam sebutan $\underline{x}$ dan/atau $\underline{y}$

(i) $\overrightarrow{AC}$,

(ii) $\overrightarrow{OD}$.

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

(*b*) Using $\overrightarrow{AB} = h\overrightarrow{OC}$ and $\overrightarrow{DB} = k\overrightarrow{OD}$, where *h* and *k* are constants, find the value of *h* and of *k*. [5 marks]
Dengan menggunakan $\overrightarrow{AB} = h\overrightarrow{OC}$ and $\overrightarrow{DB} = k\overrightarrow{OD}$ *, di mana h dan k adalah pemalar, cari nilai h dan nilai k.*

[5 *markah*]

(*c*) Given that $|\underline{y}| = 4$ units and the area of *OCD* is 50 cm^2, find the perpendicular distance from point *D* to *OC*. [2 *marks*]
Diberi bahawa $|\underline{y}| = 4$ unit *dan luas OCD ialah* 50 *cm*^{2}*, cari jarak tegak dari titik D ke OC.* [2 *marks*]

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10 (*a*) In a garden, 30% of the flower are white roses. If 10 flowers are chosen at random, find the probability (correct to four significant figures) that

Dalam sebuah taman, 30% *daripada bunga adalah bunga ros putih. Jika* 10 *kuntum bunga dipilih secara rawak, cari kebarangkalian (betul sehingga* 4 *angka beerti) bahawa*

(i) 6 white roses are selected,
6 *kuntum bunga ros putih dipilih,*

(ii) at least 9 white roses are selected.
sekurang-kurangnya 9 *kuntum bunga ros putih dipilih.*

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

(*b*) The ages of the teachers in a school is normally distributed with a mean of 45 years old and a standard deviation of 3.5 years old.
Umur guru-guru di sebuah sekolah adalah mengikut taburan normal dengan min 45 *tahun dan sisihan piawai* 3.5 *tahun.*

(i) If a teacher in the school is chosen at random, find the probability that the teacher has age between 40 and 48 years old.
Jika seorang guru di sekolah itu dipilih secara rawak, cari kebarangkalian bahawa guru itu berumur antara 40 *dan* 48 *tahun.*

(ii) Given that 70% of age of the teachers are more than *m* years old. Find the value of *m*.
Diberi bahawa 70% *guru-guru di sekolah itu berumur lebih daripada m tahun.*
Cari nilai bagi m.

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

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11 Diagram 11 shows a circle *RST* with centre *O* and radius 7 cm. *PR* is a tangent to the circle at point *R* and *PRQ* is a quadrant of a circle with centre *R*. *R* is the midpoint of *OQ* and *RS* is a chord. *ORQ* and *POS* are straight lines.

Rajah 11 *menunjukkan satu bulatan RST yang berpusat O dan berjejari* 7 cm. *PR adalah garis tangen kepada bulatan pada titik R dan PRQ adalah sukuan bagi bulatan berpusat R. R adalah titik tengah bagi OQ dan RS adalah garis perentas.ORQ dan POS adalah garislurus* .

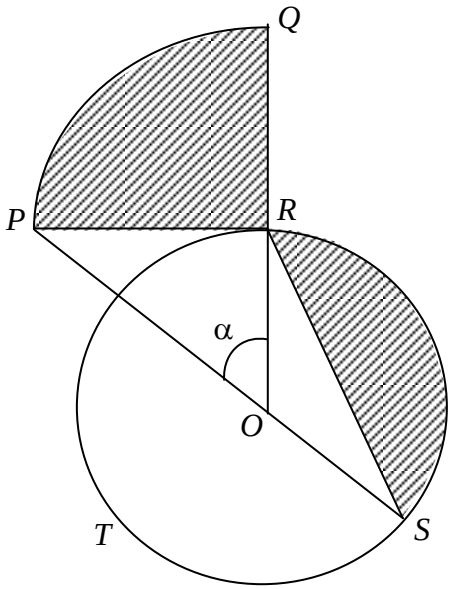

Diagram 11
Rajah 11

Calculate,
Hitung,

[Use / Guna $\pi = 3.142$]

(*a*) the angle α, in radians, [2 *marks*]
sudut α, *dalam radian,* [2 *markah*]

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

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

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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 a fixed point *O*, with a velocity of 30 ms^{-1}. Its acceleration, a ms^{-2}, is given by $a = 10 - 5t$, where t is the time, in second, after passing through *O*.

Satu zarah bergerak di sepanjang suatu garis lurus dan melalui satu titik tetap O dengan halaju 30 ms^{-1}. *Pecutannya,* a ms^{-2}, *diberi oleh* $a = 10 - 5t$, *dengan keadaan* t *ialah masa, dalam* saat, *selepas melalui O.*

Find,
Cari,

(*a*) the constant velocity, in ms^{-1}, of the particle, [4 *marks*]
halaju tetap, dalam ms^{-1}, zarah itu, [4 *markah*]

(*b*) the range of values of t, when the particle moves to the right, [3 *marks*]
julat nilai t , apabila zarah itu bergerak ke kanan, [3 *markah*]

(*c*) the total distance, in m, travelled by the particle in the first 8 seconds.
[3 *marks*]
jumlah jarak , dalam m, *yang dilalui oleh zarah itu dalam* 8 saat *pertama*.
[3 *markah*]

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13 Table 13 shows the price indices in the year 2011 based on the year 2010, of four different materials *P*, *Q*, *R* and *S* in the production of a type of a body lotion.
Jadual 13 *menunjukkan indeks harga pada tahun* 2011 *berasaskan harga pada tahun* 2010 *bagi empat bahan berlainan P, Q, R dan S yang digunakan dalam pengeluaran suatu jenis losyen badan.*

Material *Bahan*	Price Index 2011 *Indeks Harga* 2011 (2010 = 100)	Weightage *Pemberat*
P	110	*h*
Q	125	4
R	140	*h* + 3
S	88	5

Table 13 / *Jadual* 13

(*a*) If the price of material *Q* is RM55 in the year 2011, calculate its price in the year 2010. [2 marks]
Jika harga bahan Q ialah RM55 *pada tahun* 2011, *hitung harganya pada tahun* 2010. [2 *markah*]

(*b*) If the composite index for the year 2011 based on the year 2010 is 115, find the value of *h*. [2 marks]
Jika indeks komposit pada tahun 2011 *berasaskan tahun* 2010 *ialah* 115, *cari nilai h.* [2 *markah*]

(*c*) Find the price of the body lotion in the year 2011 if its price in the year 2010 was RM 20.00. [2 marks]
Cari harga losyen badan pada tahun 2011 *jika harganya pada tahun* 2010 *ialah* RM20.00. [2 *markah*]

(*d*) Given that the price of material S increases by 25 % from the year 2011 to the year 2012, while the others remain unchanged. Calculate the composite index of the body lotion in the year 2012 based on the year 2010. [4 marks]
Diberi bahawa harga bahan S meningkat 25 % *dari tahun* 2011 *ke tahun* 2012, *manakala bahan-bahan lain tidak berubah. Hitung indeks komposit losyen badan pada tahun* 2012 *berasaskan tahun* 2010. [4 *markah*]

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14 Use the graph paper provided to answer this question.

Gunakan kertas graf untuk menjawab soalan ini.

A prestige college offers two courses, *A* and *B*. The enrolment of students is based on the following constraints :

Sebuah kolej ternama menawarkan dua kursus, A dan B. Kemasukan pelajar adalah berdasarkan kekangan berikut :

I The capacity of the college is 170 students.

Kapasiti kolej adalah 170 *orang pelajar.*

II The minimum total number of students enrolled is 80.

Jumlah minimum pengambilan pelajar adalah 80 orang.

III The number of students enrolled for course *B* exceeds twice the number of students enrolled for course *A* by at least 20 students.
Bilangan pelajar yang diambil untuk kursus B adalah melebihi dua kali bilangan pelajar yang diambil untuk kursus A sekurang-kurangnya 20 *orang.*

Given that there are x students enrolled for course *A* and y students enrolled for course *B*,
Diberi bahawa x pelajar mendaftar untuk kursus A dan y pelajar mendaftar untuk kursus B.

(*a*) Write three inequalities, other than $x \geq 0$ and $y \geq 0$, that 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 students on the *x*-axis and 2 cm to 20 students on the *y*-axis, construct and shade the region *R* which satisfies all the above constraints. [3 marks]
Menggunakan skala 2 cm *kepada* 10 *pelajar pada paksi-x dan* 2 cm *kepada* 20 *pelajar pada paksi-y, bina dan lorek rantau R yang memuaskan semua kekangan di atas.* [3 *markah*]

(c) Using the graph constructed in 14(b), find,
Dengan menggunakan graf yang dibina di 14*(b), cari*

(i) the maximum amount of fees collected per month if the monthly fees for course *A* is RM 100 and for course *B* is RM 80. [3 marks]
jumlah maksimum kutipan yuran sebulan jika kutipan yuran bulanan bagi seorang pelajar kursus A ialah RM100 *dan bagi seorang pelajar B ialah* RM80. [3 *markah*]

(ii) the range of the number of students enrolled for course *B* if the number of students enrolled for course *A* is 30. [1 mark]
julat bilangan pelajar yang mendaftar untuk kursus B jika bilangan pelajar yang mendaftar untuk kursus A ialah 30. [1 *markah*]

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15 Diagram 15 shows a quadrilateral *ABCD* where the sides *AB* and *DC* are parallel.

$\angle BAC$ is an obtuse angle .

Rajah 15 *menunjukkan sebuah sisiempat ABCD dengan keadaan sisi AB dan sisi DC adalah selari.* $\angle BAC$ *ialah sudut cakah.*

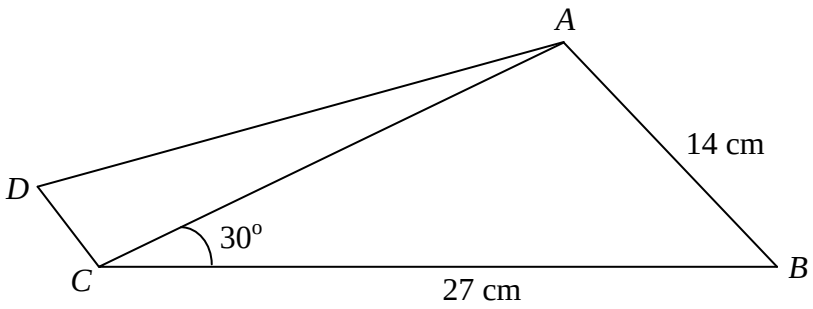

Diagram 15
Rajah 15

Given that $AB = 14$ cm, $BC = 27$ cm , $\angle ACB = 30^o$ and $DC : AB = 3 : 7$.

Diberi bahawa $AB = 14$ cm, $BC = 27$ cm , $\angle ACB = 30^o$ *dan* $DC : AB = 3 : 7$.

Calculate

Hitung

(a) $\angle BAC$, [3 *marks*]
[3 *markah*]

(b) the length, in cm, of diagonal *BD*, [3 *marks*]
panjang, dalam cm, *bagi perpenjuru BD,* [3 *markah*]

(c) the area, in cm^2, of quadrilateral *ABCD*. [4 *marks*]
luas, dalam cm^2, *bagi sisiempat ABCD.* [4 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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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 cerian soalan are shown in brackets.

7 A list of formulae is provided on pages 2 and 3.
Satu senarai rumus disediakan di halaman 3 *hingga* 5

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.

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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		6	
	3		7	
	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				

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Matematik Tambahan
Kertas 1
2 jam
Ogos 2012

BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PELAJARAN MALAYSIA

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2012
PERCUBAAN SIJIL PELAJARAN MALAYSIA

ADDITIONAL MATHEMATICS

Paper 1

MARKING SCHEME

Skema Pemarkahan ini mengandungi **6** halaman bercetak

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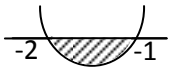
PERATURAN PEMARKAHAN- KERTAS 1

No.	Solution and Mark Scheme	Sub Marks	Total Marks
1(a)	25	1	2
(b)	4	1	
2(a)	2	1	3
(b)	-4 B1: $\frac{2x}{x-3}$ OR $\frac{3y}{y-2}=2$ [use $k^{-1}(2)=y$].	2	
3(a)	$x-3$ B1: $\frac{5}{f(x)}=\frac{5}{x-3}$	2	3
(b)	-1	1	
4	$m<-1$ B2: $(-6)^2-4(2-m)(3)<0$ B1: $(2-m)x^2-6x+3=0$	3	3
5	$-2\le p\le -1$ B2 : $(p+2)(p+1)\le 0$ or  B1: $p^2+3p+2\le 0$	3	3
6(a)	$x=1$	1	3
(b)	-1	1	
(c)	$(1,-4)$	1	
7	$x=-2$ B2: $2(2x-3)\frac{1}{2}=5+6x$ or $2x-3=5+6x$ B1: $3^{2(2x-3)\frac{1}{2}}=3^5\left(3^{6x}\right)$	3	3

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8	$625\sqrt[3]{n}$ or $625n^{\frac{1}{3}}$ B3: $\frac{m}{n^{\frac{1}{3}}} = 625$ or equivalent B2: $\log_5 \frac{m}{n^{\frac{1}{3}}} = 4$ or equivalent B1: $\frac{\log_5 m}{\log_5 125}$ (for change base)	4	4
9	$h = 2$ and $k = 11$ [both] B2: $h = 2$ or $k = 11$ B1: $-7 + 3d = 20$ OR $-7 + 3(20 - k) = 20$ OR $-7 + 3(h - (-7)) = 20$	3	3
10 (a) (b)	$r = -\frac{2}{3}$ $\frac{3}{10}$ B1 : $S_\infty = \frac{\frac{1}{2}}{1-(*-\frac{2}{3})}$	1 2	3
11	$75h + 55$ B2 : $\frac{10}{2}[2(3h+1)+9(h+1)]$ B1: $a = 3h+1$ or $d = h+1$	3	3

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12 (a) (b)	$p=\frac{3}{q}$ $B1$: $\frac{y}{x}=pq\frac{1}{x}+p$ or $pq=3$ 5	2 1	3
13	$y=\frac{3}{2}x-\frac{5}{4}$ or $4y=6x-5$ or equivalent B3 : $y-1=\frac{3}{2}\left(x-\frac{3}{2}\right)$ B2 : $m_2=\frac{3}{2}$ or $\left(\frac{3}{2},1\right)$ B1 : $m_1=-\frac{2}{3}$ OR $S(3,0)$ and $T(0,2)$	4	4
14	$x^2+y^2+4x-4y-92=0$ B2 : $\sqrt{(x+2)^2+(y-2)^2}=\sqrt{(6-(-2))^2+(-4-2)^2}$ B1 : $PS=PQ$ OR $\sqrt{(6-(-2))^2+(-4-2)^2}$	3	3
15(a) (b)	$-5\underline{i}+12\underline{j}$ $-\frac{5}{13}\underline{i}+\frac{12}{13}\underline{j}$ or $\frac{-5\underline{i}+12\underline{j}}{13}$ or $\frac{1}{13}\begin{pmatrix}-5\\12\end{pmatrix}$ B1 : $\lvert\overrightarrow{OR}\rvert=13$	1 2	3

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16	$k = -\frac{3}{4}$ B2: $4k + 3 = 0$ B1: $(4k+3)\underline{i} + (4k-2)\underline{j}$	3	3
17(a) (b)	0.9506 rad / 0.9505 rad / 0.9507 rad 15.36 or 15.355 B1 : arc OS = 5 (*0.9506) or PS = 3.602	1 2	3
18	x =15°,75°,195°,255° B2 : $2x = 30^0, 150^0, 390^0, 510^0$ or $\sin 2x = \frac{1}{2}$ B1 : $2(2\sin x \cos x) = 1$	3	3
19(a) (b)	$80 - 32x$ $x = 2.5$ or $x = \frac{5}{2}$ B1 : $80 - 32x = 0$	1 2	3
20	$y = -4x - \frac{5}{2}$ or equivalent B2 : $y - \frac{3}{2} = -4(x+1)$ or equivalent B1 : $\frac{dy}{dx} = -4$ or $\frac{dy}{dx} = (-1) - 3$	3	3

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21(a) (b)	–10 3 B2 : $\left[hx\right]_1^3 - \frac{5}{2} = \frac{7}{2}$ B1: $\int_1^3 h\,dx - \int_1^3 \frac{f(x)}{2}\,dx = \frac{7}{2}$	1 3	4
22(a) (b)	3 1.648 or 1.6475 B2: $\frac{163}{20} - (\frac{51}{20})^2$ or equivalent B1 : $\bar{x} = \frac{51}{20}$ or $\sigma^2 = \frac{2(0)^2 + 3(1)^2 + 2(2)^2 + 8(3)^2 + 5(4)^2}{20}$	1 3	4
23(a) (b)	252 66 B1 : ${}^4C_3 \times {}^6C_2$ or 60 OR ${}^4C_4 \times {}^6C_1$ or 6	1 2	3
24(a) (b)	$\frac{1}{10}$ B1 : $\frac{3}{5} \times \frac{1}{4} \times \frac{2}{3}$ $\frac{19}{20}$ B1 : $1 - \left(\frac{3}{5} \times \frac{1}{4} \times \frac{1}{3}\right)$	2 2	4
25(a) (b)	0.1741 49.69 B2 : $0.938 = \frac{k - 45}{5}$ B1 : z = 0.938	1 3	4

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Matematik
Tambahan
Kertas 2
Ogos 2012
2 ½ jam

BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PELAJARAN MALAYSIA

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2012
PERCUBAAN SIJIL PELAJARAN MALAYSIA

ADDITIONAL MATHEMATICS

Paper 2

MARKING SCHEME

Skema Pemarkahan ini mengandungi **10** halaman bercetak

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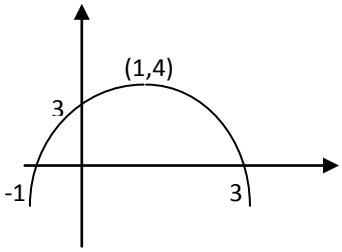
No	Solution and Mark Scheme	Sub Marks	Total Marks
1	$x=\frac{8-3y}{2}$ OR $y=\frac{8-2x}{3}$ P1 $y^2+3y\left(\frac{8-3y}{2}\right)+6=0$ OR $\left(\frac{8-2x}{3}\right)^2+3x\left(\frac{8-2x}{3}\right)+6=0$ K1 Replace *a*, *b* & *c* into formula K1 $y=\frac{-(-24)\pm\sqrt{(-24)^2-4(7)(-12)}}{2(7)}$ OR $x=\frac{-(-20)\pm\sqrt{(-20)^2-4(7)(-59)}}{2(7)}$ $y=-0.443,\ 3.871$ OR $x=4.664,\ -1.807$ N1 $x=4.664,\ -1.807$ OR $y=-0.443,\ 3.871$ N1	5	5
2	(a) $y=-\left[x^2-2x\right]-3k$ $y=-(x-1)^2+1-3k$ K1 $1-3k=4$ K1 $k=-1$ N1 (b)  -Maximum shape P1 -*Maximum point K1 -Another 1 point *y*-intercept / *x*-intercept K1	3 3	6

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3(a)	$16\pi, 8\pi, 4\pi, \ldots\ldots$ OR $r = \frac{1}{2}$	P1	4	7
	$\frac{16\pi\left[1-\left(\frac{1}{2}\right)^n\right]}{1-\frac{1}{2}} > 30.5\pi$ **Use** $S_n = \frac{a(1-r^n)}{1-r}$	K1		
	$n > 4.416$	K1		
	$\therefore n = 5$	N1		
(b)	$64\pi, 16\pi, 4\pi, \ldots\ldots$ OR $r = \frac{1}{4}$	P1	3	
	$S_\infty = \frac{64\pi}{1-\frac{1}{4}}$ **Use** $S_\infty = \frac{a}{1-r}$	K1		
	$= 85\frac{1}{3}\pi$ **or** $85.33\,\pi$	N1		
4(a)	(i) Change $3y + x + 6 = 0$ *to* $y = -\frac{1}{3}x - 2$ or $m_{BC} = -\frac{1}{3}$		5	7
	OR $m_{AB} = 3$	K1		
	$y - 5 = 3[x - (-6)]$ OR any correct method	K1		
	$y = 3x + 23$	N1		
	(ii) Use simultaneous equation to find point B			
	$*y = 3x + 23$ and $3y + x + 6 = 0$ *or* $y = -\frac{1}{3}x - 2$	K1		
	B = $\left(-\frac{15}{2}, \frac{1}{2}\right)$	N1		
(b)	$*\left(-\frac{15}{2}, \frac{1}{2}\right) = \left(\frac{2(x)+3(-6)}{5}, \frac{2(y)+3(5)}{5}\right)$	K1	2	
	D = $\left(-\frac{39}{4}, -\frac{25}{4}\right)$	N1		

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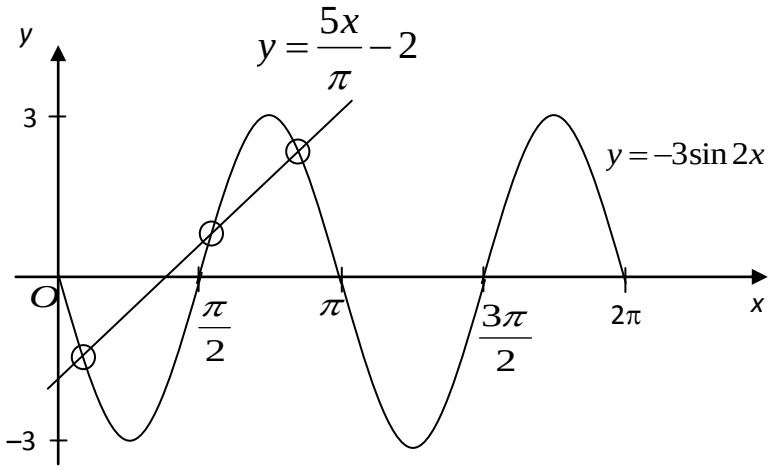
5(a)	 Amplitude = 3 [Maximum = 3 and Minimum = − 3] P1 Sine shape correct P1 Two full cycle in $0 \le x \le 2\pi$ P1 Negative sine shape correct(reflect) P1	4	7
(b)	$-3\sin 2x = \frac{5x}{\pi}-2$ **or** $y=\frac{5x}{\pi}-2$ N1 Draw the straight line $y=\frac{5x}{\pi}-2$ K1 Number of solutions is **3** N1	3	
6(a)	L = 79.5 OR F = 24 OR $f_m = 4$ P1 $79.5+\left(\frac{\frac{3}{4}(36)-24}{4}\right)10$ K1 $=87$ N1	3	8
(b)	(i) $\overline{X}=\frac{(44.5\times4)+(54.5\times5)+(64.5\times6)+(74.5\times9)+(84.5\times4)+(94.5\times8)}{36}$ OR $\frac{2602}{36}$ K1 = 72.28 N1	5	

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	(ii) $(44.5)^2\times4+(54.5)^2\times5+(64.5)^2\times6+(74.5)^2\times9+(84.5)^2\times4+(94.5)^2\times8$ K1 $\sigma=\sqrt{\frac{197\,689}{36}-(*72.28)^2}$ K1 $\sigma=16.34$ N1		
7	Rujuk Lampiran		
8(a)	$y=\int-\frac{4}{x^3}\,dx=\frac{2}{x^2}+c$ K1 $(4)=\frac{2}{(-1)^2}+c\quad,\quad c=2$ K1 $y=\frac{2}{x^2}+2$ N1	3	10
(b)	$=\int_{-5}^{-2}\frac{2}{x^2}+2\,dx$ $=\left[\frac{2x^{-1}}{-1}+2x\right]_{-5}^{-2}$ K1 $=\left[\frac{2(-2)^{-1}}{-1}+2(-2)\right]-\left[\frac{2(-5)^{-1}}{-1}+2(-5)\right]$ K1 $=\frac{33}{5}$ or 6.6 N1	3	
(c)	(i) Volume $=\pi\int_{-5}^{-2}(\frac{2}{x^2}+2)^2\,dx$ K1 $=\pi\left[\frac{4x^{-3}}{-3}+\frac{8x^{-1}}{-1}+4x\right]_{-5}^{-2}$ K1 $=\pi\left[\frac{4(-2)^{-3}}{-3}+\frac{8(-2)^{-1}}{-1}+4(-2)\right]_{-5}^{-2}-\pi\left[\frac{4(-5)^{-3}}{-3}+\frac{8(-5)^{-1}}{-1}+4(-5)\right]_{-5}^{-2}$ K1 $=14.56\pi$ N1	4	

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9(a)	$AC = -7\underset{-}{x} + 5\underset{-}{y}$	N1	3	10
	$OD = 7\underset{-}{x} + \frac{3}{4}(-7\underset{-}{x} + 5\underset{-}{y})$	K1		
	$\frac{7}{4}\underset{-}{x} + \frac{15}{4}\underset{-}{y}$	N1		
(b)	$\frac{3}{4}\left(7\underset{-}{x} - 5\underset{-}{y}\right) + h\left(5\underset{-}{y}\right) = k\left(\frac{7}{4}\underset{-}{x} + \frac{15}{4}\underset{-}{y}\right)$	K1	5	
	$\frac{21}{4} = \frac{7k}{4}$	K1		
	$k = 3$	N1		
	$-\frac{15}{4} + 5h = \frac{15}{4}k$	K1		
	$h = 3$	N1		
(c)	$50 = \frac{1}{2} \times 5 \times 4 \times t$	K1	2	
	$t = 5$	N1		
10(a)	(i) $P(X = 6) = {}^{10}C_6 (0.3)^6 (0.7)^4$	K1	5	10
	$= 0.03676$	N1		
	(ii) ${}^{10}C_9 (0.3)^9 (0.7)^1$ *OR* ${}^{10}C_{10} (0.3)^{10} (0.7)^0$	K1		
	$P(X \geq 9) = {}^{10}C_9 (0.3)^9 (0.7)^1 + {}^{10}C_{10} (0.3)^{10} (0.7)^0$	K1		
	$= 0.0001437$	N1		
			5	

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(b)	(*i*) $P(40 \le X \le 48) = P\left(\frac{40-45}{3.5} \le Z \le \frac{48-45}{3.5}\right)$	K1		
	$= 0.7278$	N1		
	(*ii*) $P(X > m) = 0.7$	K1		
	$\frac{m-45}{3.5} = -0.524$	K1		
	$m = 43.166$	N1		
11(a)	$OR = RQ = PR = 7cm$	K1	2	10
	$\tan\alpha = 1$			
	$\alpha = \frac{\pi}{4} rad = 0.7855 rad$	N1		
(b)	$7(1.571) \quad OR \quad 7(2.3565)$	K1	4	
	$\sqrt{7^2 + 7^2 - 2(7)(7)(\cos 135^o)}$	K1		
	$Perimeter =$	K1		
	$7 + 7 + 7(1.571) + 7(2.3565) + (\sqrt{7^2 + 7^2 - 2(7)(7)(\cos 135^o)})$			
	$= 54.4268$	N1		
(c)	$\frac{1}{4} \times \pi \times 7^2$	K1	4	
	$\left(\frac{1}{2} \times 7^2 \times 2.3565 - \frac{1}{2} \times 7^2 \times \sin 135^o\right)$	K1		
	$Area = \frac{1}{4} \times \pi \times 7^2 + \left(\frac{1}{2} \times 7^2 \times 2.3565 - \frac{1}{2} \times 7^2 \times \sin 135^o\right)$	K1		
	$= 78.8996$	N1		

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No	Solution and Mark Scheme		Sub Marks	Total Marks
12(a)	$a = 10 - 5t = 0$ $t = 2$ s	Use $a = 0$ K1	4	10
	$v = 10t - \frac{5}{2}t^2 + c$	Integrate a to find v K1		
	$30 = 10(0) - \frac{5}{2}(0)^2 + c$ c = 30			
	$v = 10t - \frac{5}{2}t^2 + 30$	Integrate and substitute $t = 2$ K1		
	$v = 10(2) - \frac{5}{2}(2)^2 + 30$ $= 40 \text{ ms}^{-1}$	N1		
(b)	$v = 10t - \frac{5}{2}t^2 + 30 > 0$	Use $v > 0$ K1	3	
	$(t+2)(t-6) < 0$	K1		
	$0 \le t < 6$	N1		
(c)	$s = 5t^2 - \frac{5}{6}t^3 + 30t + c$ s = 0, t = 0 , c = 0	Integrate $\int v\,dt$ K1	3	
	$s = 5t^2 - \frac{5}{6}t^3 + 30t$			
	$s = 5(6)^2 - \frac{5}{6}(6)^3 + 30(6)$ **or** $s = 5(8)^2 - \frac{5}{6}(8)^3 + 30(8)$ K1 $= 180$ $= 133.33$			
	Total distance $= 180 + (180 - 133.33)$ $= 226.67$ m	N1		
	OR			

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	$= \int_0^6 \left(10t - \frac{5}{2}t^2 + 30\right)dt + \int_6^8 \left(10t - \frac{5}{2}t^2 + 30\right)dt$	Integrate v K1		
	$= 180 + 46.67$	$\int_0^6 + \left\lvert \int_6^8 \right\rvert$ K1		
	$= 226.67$	N1		
13(a)	$\frac{55}{P_{10}} \times 100 = 125$	K1	2	10
	P_{10} = RM 44	N1		
(b)	$\frac{(110)(h) + (125)(4) + (140)(h+3) + (88)(5)}{h+4+h+3+5} = 115$	K1	2	
	$^{*}h$ = 1	N1		
(c)	$\frac{P_{11}}{20} \times 100 = 115$	K1	2	
	P_{07} = RM 23	N1		
(d)	See 125	P1	4	
	$I_S = \frac{88}{100} \times 125 = 110$	K1		
	$\bar{I} = \frac{(110)(*1) + (125)(4) + (140)(*1+3) + (110)(5)}{1+4+4+5}$	K1		
	= 122.86	N1		

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14	Rujuk Lampiran			
15(a)	Using sine rule to find $\angle BAC$. $\frac{\sin \angle BAC}{27} = \frac{\sin 30^o}{14}$	K1	3	10
	$\angle BAC = 74.64^o$	N1		
	$\angle BAC\,(\text{obtuse}) = 180^o - 74.64^o$ $= 105.36^o$	N1		
(b)	$\angle DCB = 105.36^o + 30^o$ or $DC = 6\,cm$	P1	3	
	Use cosine rule to find *BD*. $BD^2 = 6^2 + (27)^2 - 2(6)(27)\cos 135.36°$	K1		
	$BD = 31.55$	N1		
(c)	Use formula correctly to find area of triangle *ABC* or *ACD*. $\angle ABC = 180^o - 30^o - 105.36^o$ $= 44.64^o$		4	
	$AC^2 = 27^2 + (14)^2 - 2(27)(14)\cos 44.64°$	K1		
	$AC = 19.67$			
	Area $\Delta ABC = \frac{1}{2}(14)(27)\sin 44.64^o$ or	K1		
	Area $\Delta ACD = \frac{1}{2}(6)(19.67)\sin 105.36^o$			
	Use Area *ABCD* = sum of two areas	K1		
	Area *ABCD* = 189.7 cm^2 .	N1		

END OF MARKING SCHEME

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No.7(a)

	0.1	0.2	0.25	0.4	0.5	0.8
y	62	54	50	38	29	4

N1

$y = -\frac{n}{m}\left(\frac{1}{x}\right) + 2m$ P1

Plot against x K1
(at least one point)

6 points plotted correctly K1

Line of best fit N1

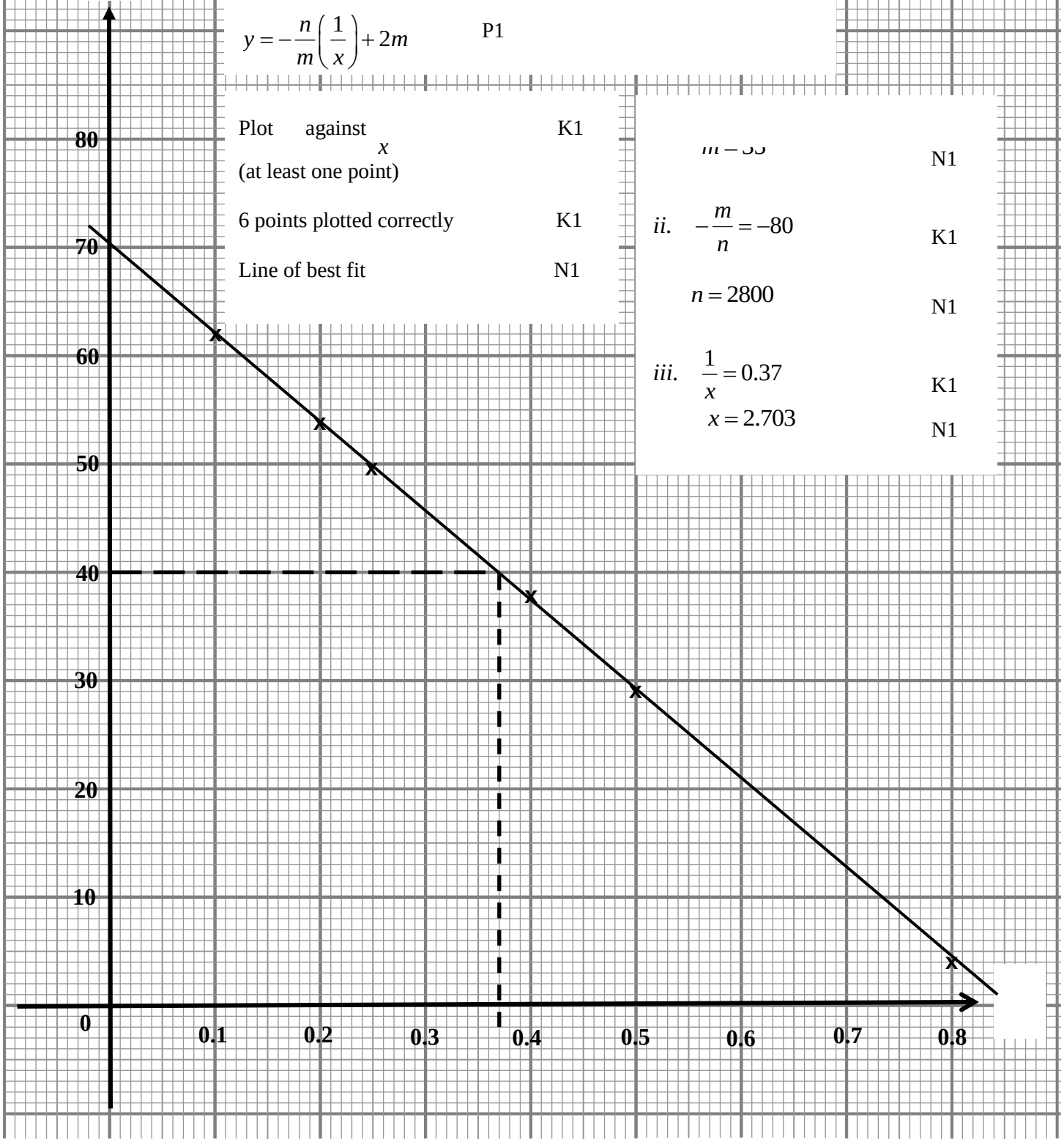
$m = 35$ N1

ii. $-\frac{m}{n} = -80$ K1

$n = 2800$ N1

iii. $\frac{1}{x} = 0.37$ K1

$x = 2.703$ N1



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Answer for question 14

(a) I. N1

II. $x + y \leq 80$ N1

III. $y - 2x \geq 20$ N1

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

1 graph correct
3 graphs correct

Correct area

K1 N1 N1

(c) max point (50,120) N1

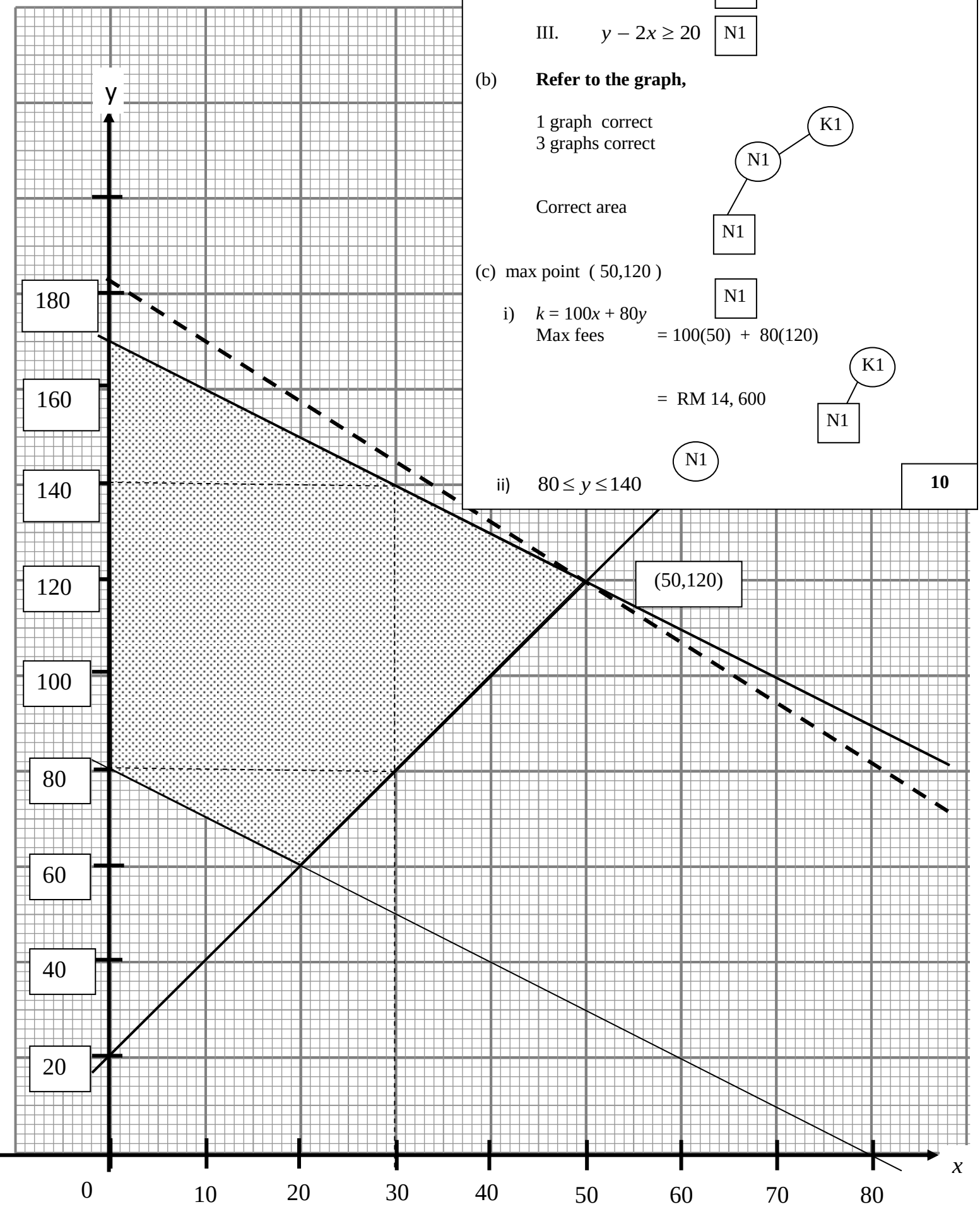
i) $k = 100x + 80y$
Max fees = 100(50) + 80(120)

= RM 14, 600

K1 N1

ii) $80 \leq y \leq 140$ N1

10



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