Matematik
Tambahan
Kertas 1
September
2 jam

NAMA ..... KELAS .....

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN DARUL KHUSUS

PROGRAM PENINGKATAN AKADEMIK TINGKATAN 5
SEKOLAH-SEKOLAH NEGERI SEMBILAN 2014

MATEMATIK TAMBAHAN
Kertas 1
Dua jam

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1 Tulis nama dan kelas 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 24.

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

Kertas soalan ini mengandungi 24 halaman bercetak.

[Lihat halaman sebelah

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

Rumus-rumus berikut boleh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

ALGEBRA

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

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

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

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

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

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

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

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

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

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

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

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

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

CALCULUS / *KALKULUS*

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

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

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

4. Area under a curve
Luas di bawah lengkung
$= \int_a^b y\,dx$ or (*atau*) $= \int_a^b x\,dy$

5. Volume of revolution
Isi padu kisaran
$= \int_a^b \pi y^2\,dx$ or (*atau*)
$= \int_a^b \pi x^2\,dy$

[Lihat halaman sebelah

STATISTICS / *STATISTIK*

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

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

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

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

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

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

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

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

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 / *Min*, $\mu = np$

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

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

GEOMETRY / *GEOMETRI*

1. Distance / *Jarak*

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

2. Midpoint / *Titik tengah*

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

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

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

4. Area of triangle / *Luas segitiga*

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

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

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

[Lihat halaman sebelah

TRIGONOMETRY / *TRIGONOMETRI*

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

2. Area of sector, $A = \frac{1}{2}r^2\theta$
   Luas sector, $L = \frac{1}{2}j^2\theta$

3. $\sin^2 A + \cos^2 A = 1$
   $\sin^2 A + \text{kos}^2 A = 1$

4. $\sec^2 A = 1 + \tan^2 A$
   $\text{sek}^2 A = 1 + \tan^2 A$

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

6. $\sin 2A = 2\sin A\cos A$
   $\sin 2A = 2\sin A\,kosA$

7. $\cos 2A = \cos^2 A - \sin^2 A$
   $= 2\cos^2 A - 1$
   $= 1 - 2\sin^2 A$
   $\text{kos}\,2A = \text{kos}^2 A - \sin^2 A$
   $= 2\,\text{kos}^2 A - 1$
   $= 1 - 2\sin^2 A$

8. $\sin(A \pm B) = \sin A\cos B \pm \cos A\sin B$
   $\sin(A \pm B) = \sin A\,\text{kos}\,B \pm \text{kos}\,A\sin B$

9. $\cos(A \pm B) = \cos A\cos B \mp \sin A\sin B$
   $\text{kos}\,(A \pm B) = \text{kos}A\,\text{kos}B \mp \sin A\sin B$

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

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

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

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

14. Area of triangle / *Luas segitiga*
    $= \frac{1}{2}ab\sin C$

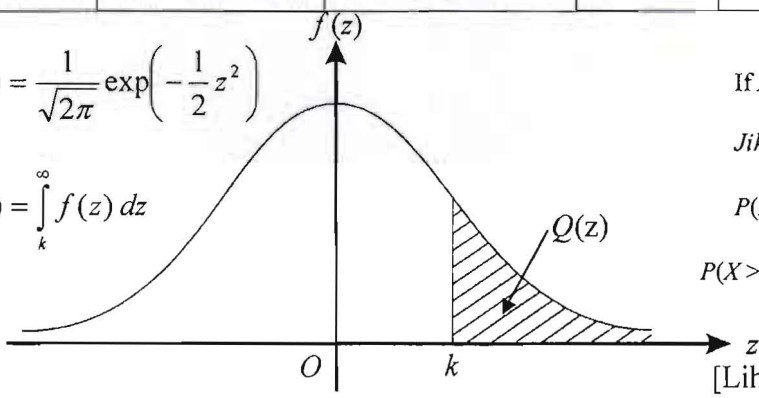
THE UPPER TAIL PROBABILITY $Q(z)$ FOR THE NORMAL DISTRIBUTION $N(0, 1)$
KEBARANGKALIAN HUJUNG ATAS $Q(z)$ BAGI TABURAN NORMAL $N(0, 1)$

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	0.00468	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

Example / *Contoh*:

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

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



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

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

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

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

[Lihat halaman sebelah

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

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

1. Diagram 1 shows elements in set *B* is the images of the elements of the set *A*.
Rajah 1 *menunjukkan unsur dalam set B adalah imej bagi unsur dalam set A.*

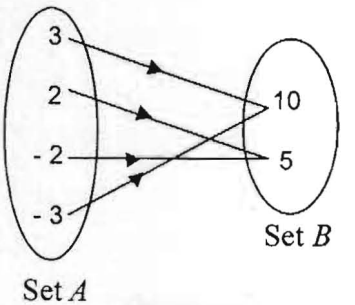


Diagram 1
Rajah 1

(a) State the type of relation between set *A* and set *B*.
Nyatakan jenis hubungan antara set A dan set B.

(b) Using the function notation, write a relation between set *A* and set *B*.
Dengan menggunakan tatatanda fungsi, tuliskan hubungan antara set A dan set B.

[2 marks]
[2 *markah*]

Answer / *Jawapan* :

(a)

(b)

1

2

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

2. Diagram 2 shows the function, $f : x \to ax^2 - bx$, where a and b are constants.

Rajah 2 menunjukkan fungsi, $f : x \to ax^2 - bx$ *, dengan keadaan a dan b adalah pemalar.*

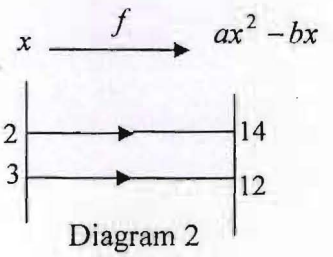


Diagram 2
Rajah 2

Find the value of a and of b. [3 marks]
Cari nilai a dan b. [3 *markah*]

Answer / *Jawapan* :

2

3

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

3. Given that $f : x \rightarrow \dfrac{3x}{2x-5}$, $x \neq k$, find the value of

Diberi, $f : x \rightarrow \dfrac{3x}{2x-5}$ $x \neq k$, *cari nilai bagi*

(a) k,

(b) $f^{-1}(2)$. [3 marks]
[3 *markah*]

Answer / *Jawapan* :

(a)

(b)

3

3

4. Solve the quadratic equation $3 - 8(x - 1) = 2x(x + 1)$. Give your answers correct to four significant figures. [4 marks]
Selesaikan persamaan kuadratik $3 - 8(x - 1) = 2x(x + 1)$. *Berikan jawapan anda betul kepada empat angka bererti.* [4 *markah*]

Answer / *Jawapan* :

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

4

4

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

5. Diagram 5 shows the graph of a quadratic function $f(x)=(x+m)^2-n+1$, where m and n are constants.

Rajah 5 menunjukkan graf bagi fungsi kuadratik $f(x)=(x+m)^2-n+1$, *dengan keadaan m dan n adalah pemalar.*

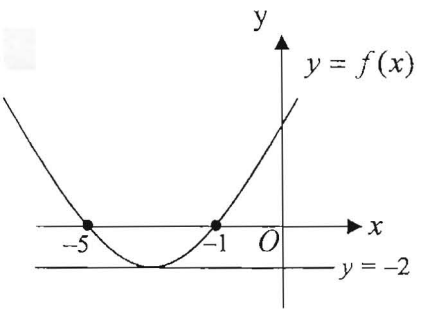


Diagram 5
Rajah 5

The straight line $y=-2$ is a tangent to the curve.
Garis lurus $y=-2$ *ialah tangen kepada lengkung.*

(*a*) Write the equation of the axis of symmetry.
Tuliskan persamaan paksi simetri.

(*b*) Find the value of m and of n.
Cari nilai m dan n.

[3 marks]
[3 *markah*]

Answer / *Jawapan* :

(a)

(b)

5

3

6. Find the range of x for $1 - 3x \leq 2(x^2 - x)$. [3 marks]
Cari julat nilai x bagi $1 - 3x \leq 2(x^2 - x)$. [3 *markah*]

Answer / *Jawapan* :

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

6

3

7. Solve the equation $27^{2x-3} = \sqrt{9^{x+1}}$. [3 marks]
Selesaikan persamaan $27^{2x-3} = \sqrt{9^{x+1}}$. [3 *markah*]

Answer / *Jawapan* :

7

3

For Examiner's Use / *Untuk Kegunaan Pemeriksa*

8. Solve the equation $2\log_2 x - \log_2(x-3) = 4$. [4 marks]

Selesaikan persamaan $2\log_2 x - \log_2(x-3) = 4$. [4 *markah*]

Answer / *Jawapan* :

8

4

9. Given that $\log_9 m^2 - \log_3 2n = 1$, express m in terms of n. [4 marks]

Diberi $\log_9 m^2 - \log_3 2n = 1$, *ungkapkan m dalam sebutan n.* [4 *markah*]

Answer / *Jawapan*

9

4

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

10. The first three terms of an arithmetic progression are 38, 35 and 32. The *n*th term of this progression is negative. Find the least value of *n*. [3 marks]

Tiga sebutan pertama bagi suatu janjang aritmetik ialah 38, 35 *dan* 32. *Sebutan ke-n janjang ini adalah negatif. Cari nilai n yang terkecil.* [3 *markah*]

Answer / *Jawapan* :

10 | 3

11. Given that the fourth term of a geometric progression is 8. The sum of the fourth term and the fifth term is 4. Find the first term and the common ratio of the progression. [3 marks]

Diberi sebutan keempat janjang geometri ialah 8. *Hasil tambah sebutan keempat dan sebutan kelima ialah* 4. *Cari sebutan pertama dan nisbah sepunya janjang itu.* [3 *markah*]

Answer / *Jawapan* :

11 | 3

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

12. Diagram 12 shows a straight line AC which is perpendicular to the straight line AD at point A. B is midpoint of line AC, find
Rajah 12 menunjukkan garis lurus AC yang berserenjang dengan garis lurus AD pada titik A. B ialah titik tengah garis AC, cari

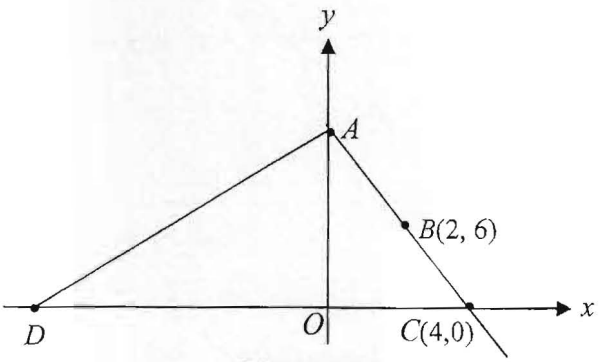


Diagram 12
Rajah 12

(a) the coordinates of A,
koordinat A,

(b) equation of the straight line AD. [4 marks]
persamaan garis lurus AD. [4 *markah*]

Answer / *Jawapan* :

(a)

(b)

12

4

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

13. A straight line graph is obtained by plotting $\frac{y}{x}$ against $\frac{1}{x^2}$ as shown in Diagram 13.

Plotkan satu graf garis lurus $\frac{y}{x}$ *melawan* $\frac{1}{x^2}$ *seperti yang ditunjukkan dalam Rajah* 13.

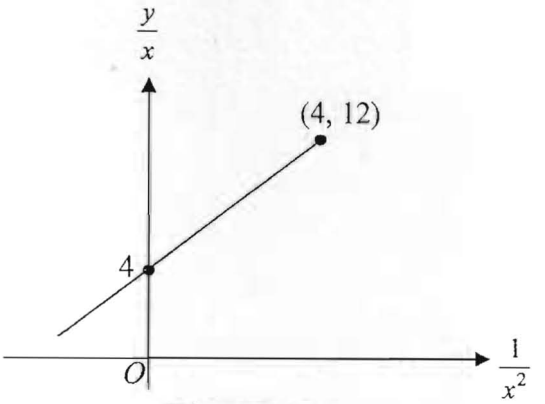


Diagram 13
Rajah 13

Express y in terms of x.
Ungkapkan y dalam sebutan x.

[3 marks]
[3 *markah*]

Answer / *Jawapan* :

13

3

[Lihat halaman sebelah
SULIT

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

14. Diagram 14 shows a trapezium $PQRS$. PQ is parallel to SR and M is a midpoint of QR.
Rajah 14 *menunjukkan sebuah trapezium PQRS. PQ selari dengan SR dan M ialah titik tengah QR.*

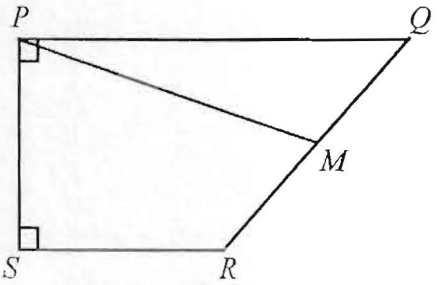


Diagram 14
Rajah 14

Given that $\overrightarrow{SR} = 4\underset{\sim}{a}$, $\overrightarrow{SP} = 5\underset{\sim}{b}$ and $3SR = 2PQ$, find

Diberi bahawa $\overrightarrow{SR} = 4\underset{\sim}{a}$, $\overrightarrow{SP} = 5\underset{\sim}{b}$ *dan* $3SR = 2PQ$, *cari*

(a) $\overrightarrow{QR}$ (b) $\overrightarrow{PM}$ [4 marks]
[4 *markah*]

Answer / *Jawapan* :

14

4

15. The vectors $\underset{\sim}{a}$ and $\underset{\sim}{b}$ are non-zero and non-parallel. It is given that $(2-5h)\underset{\sim}{a} = (3k+9)\underset{\sim}{b}$, where h and k are constants.
Vektor $\underset{\sim}{a}$ dan $\underset{\sim}{b}$ adalah bukan sifar dan tidak selari. Diberi bahawa $(2-5h)\underset{\sim}{a} = (3k+9)\underset{\sim}{b}$, *dengan keadaan h dan k ialah pemalar.*

Find the value of h and of k.
Cari nilai h dan nilai k.

[2 marks]
[2 *markah*]

Answer / *Jawapan* :

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

15

2

16. Given $\sin\theta = m$, where m is a constant and $90^\circ \le \theta \le 180^\circ$, without using calculator, find
Diberi bahawa $\sin\theta = m$, dengan keadaan m ialah pemalar dan $90^\circ \le \theta \le 180^\circ$, tanpa menggunakan kalkulator, cari

(a) $\operatorname{cosec}\theta$,
kosek θ,

b) $\cos(\theta + 60^\circ)$.
kos $(\theta + 60^\circ)$.

[3 marks]
[3 *markah*]

Answer/ *Jawapan*:

16

3

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

17. Diagram 17 shows is a sector AOB of a circle with centre O and radius 15 cm. PQR is a sector of a circle with centre P and radius 12 cm.
Rajah 17 menunjukkan sektor AOB bagi sebuah bulatan berpusat O dan berjejari 15 cm. PQR ialah sektor bagi sebuah bulatan berpusat P dan berjejari 12 cm.

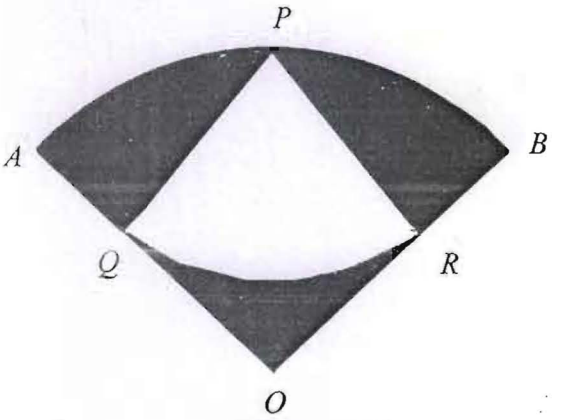


Diagram 17
Rajah 17

Given that $\angle AOB = 2$ radians and $\angle QPR = 0.95$ radian, find the area, in cm^2, of the shaded region. [3 marks]
Diberi bahawa $\angle AOB = 2$ radian dan $\angle QPR = 0.95$ radian, cari luas, dalam cm^2, kawasan berlorek.

[3 *markah*]

Answer / *Jawapan* :

17

3

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

18. Given that $y = \dfrac{4x^3 - x^2}{2x}$, find

Diberi bahawa $y = \dfrac{4x^3 - x^2}{2x}$, *cari*

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

(b) the value of x when y is minimum. [3 marks]
nilai x apabila y adalah minimum. [3 *markah*]

Answer / *Jawapan* :

(a)

(b)

18

3

19. A cylinder with radius r cm and height 9 cm. The volume of a cylinder is decreasing at a constant rate of 36π cm^{3}s^{-1}. Find value of r when the radius is decreasing at a rate of 0.4 cms^{-1}. (Volume of cylinder = $\pi r^2 h$) [3 marks]
Sebuah silinder dengan jejarinya r cm dan tinggi 9 cm. Isipadu silinder menyusut pada kadar tetap 36π *cm*^{3}*s*$^{-1}$. *Cari nilai r apabila jejarinya menyusut pada kadar* 0.4 *cms*$^{-1}$.
(Isi padu silinder = $\pi r^2 h$*)* [3 *markah*]

Answer / *Jawapan* :

19

3

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

20. Find the value of k, if $\int_{-1}^{5}(3x^2 + k)dx = 122$. [3 marks]

Cari nilai k, jika $\int_{-1}^{5}(3x^2 + k)dx = 122$. [3 *markah*]

Answer / *Jawapan* :

20

3

21. Diagram 21 shows a straight line *OP* intersect the curve of $y = f(x)$ at point *P*.

Rajah 21 *menunjukkan satu garis lurus OP yang bersilang dengan lengkung* $y=f(x)$ *pada titik P.*

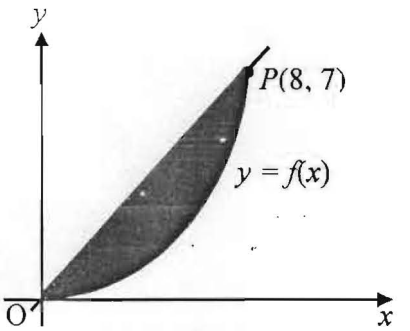


Diagram 21
Rajah 21

Given that $\int_0^8 f(x)dx = 20$, find the area of the shaded region. [2 marks]

Diberi bahawa $\int_0^8 f(x)dx = 20$, *cari luas kawasan berlorek.* [2 *markah*]

Answer / *Jawapan* :

21

2

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

22. The mean and standard deviation of a set of data $x_1, x_2, x_3, \ldots, x_n$ are p and q respectively. If the data change uniformly to $4x_1 - 1, 4x_2 - 1, 4x_3 - 1, \ldots, 4x_n - 1$, express in terms of p and/ or q the new value of
Nilai min dan sisihan piawai bagi satu set data $x_1, x_2, x_3, \ldots, x_n$ adalah masing-masing p dan q. Jika data tersebut berubah secara seragam dalam bentuk $4x_1 - 1, 4x_2 - 1, 4x_3 - 1, \ldots, 4x_n - 1$, ungkapkan dalam sebutan p dan/ atau q nilai bagi
(a) mean,
min,
(b) variance. [3 marks]
varians. [3 *markah*]
Answer / *Jawapan* :
(a)

(b)

22 | 3

23. A teacher wants to choose 6 representatives consisting of 2 girls and 4 boys for a competition. These 6 representatives are chosen from a group of 8 girls and 7 boys.
Seorang guru ingin memilih 6 orang wakil yang terdiri daripada 2 orang perempuan dan 4 orang lelaki untuk menyertai satu pertandingan. 6 orang wakil itu dipilih daripada 8 orang perempuan dan 7 orang lelaki.
Find
Cari
(a) the number of ways the group of representative can be formed,
bilangan cara kumpulan wakil tersebut dapat dibentuk,
(b) the number of ways the representatives can be arranged in a row for a group photograph if the two girls sit next to each other.
bilangan cara menyusun wakil tersebut dalam satu baris untuk satu sesi bergambar, jika kedua-dua wakil perempuan duduk bersebelahan antara satu sama lain.
[4 marks]
[4 *markah*]

Answer / *Jawapan* :
(a)

(b)

23 | 4

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

24. Table 24 shows the number of red marbles and black marbles in two bags.
Jadual 24 menunjukkan bilangan guli merah dan guli hitam dalam dua buah beg.

Bag / *Beg* — Colour of marbles / *Warna guli*	*A*	*B*
Red / *Merah*	8	5
Black / *Hitam*	6	3

Table 24
Jadual 24

A marble is drawn at random from each bag. Find the probability that
Sebiji guli dikeluarkan secara rawak daripada setiap beg. Cari kebarangkalian bahawa

(a) both marbles are of the same colour,
kedua-dua biji guli adalah sama warna ,

(b) at least one of the marbles is black colour. [4 marks]
sekurang-kurangnya sebiji guli adalah berwarna hitam. [4 *markah*]

Answer / *Jawapan*:

(a)

(b)

24

4

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

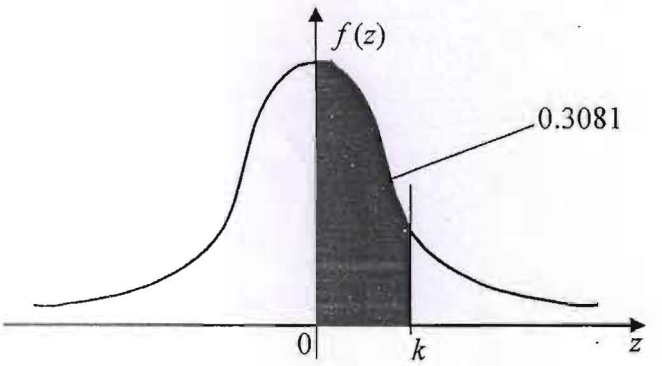


Diagram 25
Rajah 25

The probability represented by the area of the shaded region is 0.3081.
Kebarangkalian yang diwakili oleh luas kawasan berlorek ialah 0.3081.

(a) Find the value of k.
Cari nilai k.

(b) X is a continuous random variable which is normally distributed with a mean of 12 and a standard deviation of 5. Find the value of X when the z-score is k.
X ialah pembolehubah rawak selanjar bertaburan secara normal dengan min 12 *dan sisihan piawai* 5. *Cari nilai X apabila skor-z ialah k.* [4 marks]
[4 *markah*]

Answer/ *Jawapan*:

(a)

(b)

For Examiner's Use/ *Untuk Kegunaan Pemeriksa*

25

4

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **25** questions.
   Kertas soalan ini mengandungi **25** *soalan.*

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

3. Write your answers in the spaces provided in this question paper.
   Tulis jawapan anda pada ruang yang disediakan dalam kertas soalan.

4. Show your working. It may help you to get marks.
   Tunjukkan langkah-langkah penting dalam kerja mengira anda. Ini boleh membantu anda untuk mendapatkan markah.

5. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
   Sekiranya anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.

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

7. The marks allocated for each question are shown in brackets.
   Markah yang diperuntukkan bagi setiap soalan ditunjukkan dalam kurungan.

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

9. The Upper Tail Probability $Q(z)$ For the Normal Distribution N(0, 1) Table is provided on page 5.
   Jadual Kebarangkalian Hujung Atas $Q(z)$ *Bagi Taburan Normal* N(0, 1) *disediakan di halaman* 5.

10. You may use a scientific calculator.
    Anda dibenarkan menggunakan kalkulator saintifik.

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

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN DARUL KHUSUS

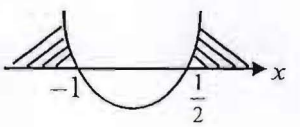
PROGRAM PENINGKATAN AKADEMIK TINGKATAN 5
SEKOLAH-SEKOLAH MENENGAH NEGERI SEMBILAN 2014

PERATURAN PEMARKAHAN

ADDITIONAL MATHEMATICS

PAPER 1

MARKING SCHEME FOR ADDITIONAL MATHEMATICS FORM 5 PAPER 1 - 2014

No.	Marking Scheme	Marks	Full Marks
1	(a) many to one (b) $f : x \rightarrow x^2 + 1$	1 1	2
2	$a = -3$ and $b = -13$ $a = -3$ or $b = -13$ $4a - 2b = 14$ or $9a - 3b = 12$	3 B2 B1	3
3	(a) $\frac{5}{2}$ or equivalent (b) 10 $f^{-1}(x) = \frac{5x}{2x-3}$ or $\frac{3y}{2y-5} = 2$	1 2 B1	3
4	0.9278 and -5.928 0.9278 or -5.928 $\frac{-(10) \pm \sqrt{(10)^2 - 4(2)(-11)}}{2(2)}$ $2x^2 + 10x - 11 = 0$	4 B3 B2 B1	4
5	(a) $x = -3$ (b) $m = 3$, $n = 3$ both $m = 3$ or $n = 3$	1 2 B1	3
6	$x \geq \frac{1}{2}$, $x \leq -1$ $(2x - 1)(x + 1) \geq 0$ or  $2x^2 + x - 1 \geq 0$	3 B2 B1	3
7	2 $3(2x - 3) = x + 1$ $3^{3(2x-3)}$ or $(3^{2(x+1)})^{1/2}$	3 B2 B1	3

No.	Marking Scheme	Marks	Full Marks
8	$x = 4,\ 12$ $(x-4)(x-12)=0$ $\frac{x^2}{x-3}=2^4$ $\log_2\left(\frac{x^2}{x-3}\right)$	4 B3 B2 B1	4
9	$m = 6n$ $\frac{m^2}{4n^2}=3^2$ or $\frac{m}{2n}=3$ $\log_3\left(\frac{m^2}{4n^2}\right)$ or $\log_3\left(\frac{m}{2n}\right)$ $\frac{\log_3 m^2}{\log_3 9}$	4 B3 B2 B1	4
10	14 $n > 13\frac{2}{3}$ $38+(n-1)(-3)<0$	3 B2 B1	3
11	$a=-64$ and $r=-\frac{1}{2}$ $a=-64$ or $r=-\frac{1}{2}$ $ar^3=8$ or $8+ar^4=4$	3 B2 B1	3
12	a) A(0,12) $\left(\frac{x+4}{2},\frac{y+0}{2}\right)=(2,6)$ b) $y=\frac{1}{3}x+12$ $m_{AD}=\frac{1}{3}$ or $-3m_{AD}=-1$	2 B1 2 B1	4

No.	Marking Scheme	Marks	Full Marks
13	$y = 4x + \frac{2}{x}$ $\frac{y}{x} = \frac{2}{x^2} + 4$ m = 2	3 B2 B1	3
14	a) $-2\underset{\sim}{a} - 5\underset{\sim}{b}$ $\overrightarrow{QP} + \overrightarrow{PS} + \overrightarrow{SR}$ or $\overrightarrow{QP} = -6\underset{\sim}{a}$ b) $5\underset{\sim}{a} - \frac{5}{2}\underset{\sim}{b}$ $6\underset{\sim}{a} + \frac{1}{2}(-2\underset{\sim}{a} - 5\underset{\sim}{b})$	2 B1 2 B1	4
15	$h = \frac{2}{5}$ and $k = -3$ $h = \frac{2}{5}$ or $k = -3$	2 B1	2
16	a) $\frac{1}{m}$ b) $-\frac{1}{2}(\sqrt{1-m^2} + \sqrt{3}m)$ $\cos\theta = -\sqrt{1-m^2}$	1 2 B1	3
17	156.6 cm^2 $\frac{1}{2} \times 15^2 \times 2 - \frac{1}{2} \times 12^2 \times 0.95$ $\frac{1}{2} \times 15^2 \times 2$ or $\frac{1}{2} \times 12^2 \times 0.95$	3 B2 B1	3

No.	Marking Scheme	Marks	Full Marks
18	a) $4x - \frac{1}{2}$	1	3
	b) $x = \frac{1}{8}$	2	
	$4x - \frac{1}{2} = 0$	B1	
19	r = 5	3	3
	$-36\pi = 18\pi r \times (-0.4)$	B2	
	$\frac{dv}{dr} = 18\pi r$	B1	
20	$k = -\frac{2}{3}$	3	3
	$5^3 + 5k - [(-1)^3 + (-k)] = 122$	B2	
	$\frac{3x^3}{3} + kx$	B1	
21	8	2	2
	$\frac{1}{2}(8)(7) - \int_0^8 f(x)dx$	B1	
22	a) $4p - 1$	1	3
	b) $16q^2$	2	
	Variances = q^2	B1	

No.	Marking Scheme	Marks	Full Marks
23	a) 980 ${}^{8}C_{2} \times {}^{7}C_{4}$ b) 240 ${}^{5}P_{5} \times {}^{2}P_{2}$	2 B1 2 B1	4
24	a) $\frac{29}{56}$ $\frac{8}{14}\times\frac{5}{8}+\frac{6}{14}\times\frac{3}{8}$ b) $\frac{9}{14}$ $\frac{6}{14}\times\frac{3}{8}+\frac{6}{14}\times\frac{5}{8}+\frac{8}{14}\times\frac{3}{8}$ or $1-\frac{8}{14}(\frac{5}{8})$	2 B1 2 B1	4
25	a) 0.871 $0.5 - P(z > k) = 0.3081$ b) 16.355 $\frac{x-12}{5} = 0.871$	2 B1 2 B1	4

3472/2
Matematik Tambahan
Kertas 2
September
2 ½ jam

MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN DARUL KHUSUS

PROGRAM PENINGKATAN AKADEMIK TINGKATAN 5
SEKOLAH-SEKOLAH MENENGAH NEGERI SEMBILAN 2014

MATEMATIK TAMBAHAN

Kertas 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*
3. *Calon dikehendaki membaca arahan di halaman belakang.*
4. *Calon dikehendaki menceraikan halaman 20 dan ikat sebagai muka hadapan bersama-sama dengan kertas jawapan.*

Kertas soalan ini mengandungi 20 halaman bercetak dan 1 halaman kosong.

[Lihat halaman sebelah

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

Rumus-rumus berikut boleh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

ALGEBRA

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

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

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

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

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

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

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

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

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

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

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

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

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

CALCULUS / *KALKULUS*

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

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

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

4. Area under a curve
Luas di bawah lengkung
$= \int_a^b y\,dx$ or (*atau*) $= \int_a^b x\,dy$

5. Volume of revolution
Isi padu kisaran
$= \int_a^b \pi y^2\,dx$ or (*atau*)
$= \int_a^b \pi x^2\,dy$

STATISTICS / *STATISTIK*

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

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

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

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

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

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

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

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

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 / *Min* , $\mu = np$

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

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

GEOMETRY / *GEOMETRI*

1. Distance / *Jarak*

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

2. Midpoint / *Titik tengah*

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

3. A point dividing a segment of a line

Titik yang membahagi suatu tembereng garis

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

4. Area of triangle / *Luas segitiga*

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

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

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

[Lihat halaman sebelah

TRIGONOMETRY / *TRIGONOMETRI*

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

2. Area of sector, $A = \frac{1}{2}r^2\theta$
   Luas sector, $L = \frac{1}{2}j^2\theta$

3. $\sin^2 A + \cos^2 A = 1$
   $\sin^2 A + \text{kos}^2 A = 1$

4. $\sec^2 A = 1 + \tan^2 A$
   $\text{sek}^2 A = 1 + \tan^2 A$

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

6. $\sin 2A = 2\sin A\cos A$
   $\sin 2A = 2\sin A\,\text{kos}A$

7. $\cos 2A = \cos^2 A - \sin^2 A$
   $= 2\cos^2 A - 1$
   $= 1 - 2\sin^2 A$
   $\text{kos}2A = \text{kos}^2 A - \sin^2 A$
   $= 2\,\text{kos}^2 A - 1$
   $= 1 - 2\sin^2 A$

8. $\sin(A \pm B) = \sin A\cos B \pm \cos A\sin B$
   $\sin(A \pm B) = \sin A\,\text{kos}\,B \pm \text{kos}\,A\sin B$

9. $\cos(A \pm B) = \cos A\cos B \mp \sin A\sin B$
   $\text{kos}\,(A \pm B) = \text{kos}A\,\text{kos}B \mp \sin A\sin B$

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

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

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

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

14. Area of triangle / *Luas segitiga*
    $= \frac{1}{2}ab\sin C$

Section A
Bahagian A

[40 marks]
[40 *markah*]

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

1 Solve the following simultaneous equations:

Selesaikan persamaan serentak berikut:

$$2x = 5 + y$$

$$3x^2 - y^2 = 14 - 2x - y$$

[5 marks]
[5 *markah*]

2 Given that the quadratic function $f(x) = a(x-p)^2 + 3$ with a minimum point $(2, q)$, where a, p and q are constants. Point $A(0, 7)$ lies on the curve $y = f(x)$.

Diberi fungsi kuadratik $f(x) = a(x-p)^2 + 3$ *mempunyai titik minimum* $(2, q)$, *dengan keadaan* a, p *dan* q *adalah pemalar. Titik* A (0, 7) *berada pada lengkung* $y = f(x)$.

(a) Find the value of a, of p and of q. [4 marks]
Tentukan nilai a, p *dan* q. [4 *markah*]

(b) Sketch the graph of the function $y = f(x)$. [3 marks]
Lakarkan graf bagi fungsi $y = f(x)$. [3 *markah*]

(c) State the function of the curve when the graph in 2(b) is reflected on the x-axis.
Nyatakan fungsi bagi lengkung apabila graf di 2(b) *dipantulkan pada paksi-x.*

[1 mark]
[1 *markah*]

3 Given that the function $y = x(x-3)$, find the values of x that satisfy the equation
Diberi fungsi $y = x(x-3)$, *cari nilai-nilai* x *yang memenuhi persamaan*

$$y\frac{d^2y}{dx^2} + x\frac{dy}{dx} + 5 = 0$$

[5 marks]
[5 *markah*]

[Lihat halaman sebelah

4 Solution by scale drawing is not accepted.

Penyelesaian secara lukisan berskala tidak diterima.

Diagram 4 shows a trapezium *OEFG*. The line *OE* is perpendicular to the line *EF* which intersects with y-axis at the point *H*. *EO* is parallel to *FG*. Given that the equation of *OE* is $y = 2x$ and the equation of *EF* is $x + 2y + 15 = 0$.

Rajah 4 *menunjukkan trapezium OEFG. Garis lurus OE adalah berserenjang dengan garis lurus EF yang bersilang dengan paksi-y pada titik H. EO* adalah selari dengan *FG*. *Diberi persamaan OE ialah* $y = 2x$ *dan persamaan EF ialah* $x + 2y + 15 = 0$.

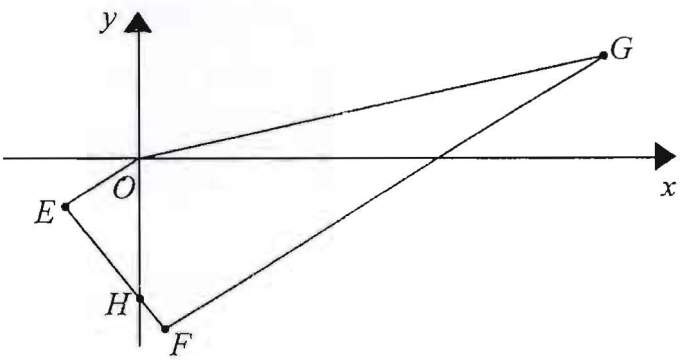


Diagram 4
Rajah 4

(a) Find the coordinates of *E*. [2 marks]
Cari koordinat E. [2 *markah*]

(b) Given $EH : HF = 3 : 1$, find
Diberi $EH : HF = 3 : 1$, *carikan*
(i) the coordinates of *F*,
koordinat F,
(ii) the equation of the straight line *FG*.
persamaan garis lurus FG.

[4 marks]
[4 *markah*]

(c) A point *J* moves such that $2JE = JF$. Find the equation of the locus of *J*. [2 marks]
Titik J bergerak dengan keadaan $2JE = JF$. *Carikan persamaan lokus J.*
[2 *markah*]

5 Table 5 shows the frequency distribution of the ages of workers in a factory.
Jadual 5 menunjukkan taburan frekuensi bagi umur pekerja di sebuah kilang.

Age (years) *Umur (tahun)*	Number of workers *Bilangan pekerja*
25 – 29	5
30 – 34	8
35 – 39	x
40 – 44	15
45 – 49	8
50 – 54	4

Table 5
Jadual 5

(a) Given the mean age of the workers is 39.5 years, find the value of x. [3 marks]
Diberi min umur bagi pekerja-pekerja itu ialah 39.5 tahun, cari nilai x. [3 *markah*]

(b) Without drawing an ogive, find the median of age. [3 marks]
Tanpa melukis ogif, cari median bagi umur. [3 *markah*]

6 (a) Prove that
Buktikan bahawa

$$\frac{2\tan x}{1+\tan^2 x} = \sin 2x$$

[2 marks]
[2*markah*]

(b) Sketch the graph of $y = \frac{3}{2}\sin 2x$ for $0 \le x \le \frac{3}{2}\pi$.
Lakarkan graf bagi $y = \frac{3}{2}\sin 2x$ bagi $0 \le x \le \frac{3}{2}\pi$.
Hence, using the same axes, draw a suitable straight line to find the number of solutions for the equation $\frac{4}{3\pi}x - \frac{3}{2} = \frac{2\tan x}{1+\tan^2 x}$ for $0 \le x \le \frac{3}{2}\pi$.
State the number of solutions.

Seterusnya, dengan menggunakan paksi yang sama, lukiskan satu garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan $\frac{4}{3\pi}x - \frac{3}{2} = \frac{2\tan x}{1+\tan^2 x}$ bagi $0 \le x \le \frac{3}{2}\pi$.
Nyatakan bilangan penyelesaian itu.

[6 marks]
[6 *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 Diagram 7 shows a triangle PQR. The point S lies on PR and the point T lies on PQ. The straight line QS intersects the straight line RT at the point U.
Rajah 7 menunjukkan segi tiga PQR. Titik S terletak pada PR dan titik T terletak pada PQ. Garis lurus QS bersilang dengan garis lurus RT pada titik U.

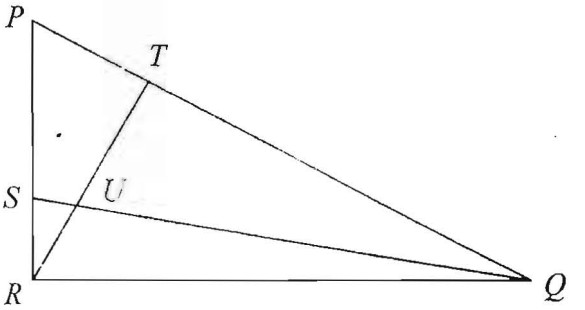


Diagram 7
Rajah 7

It is given that $\angle PRQ = 90°$, $\overrightarrow{PR} = 9\underset{\sim}{x}$, $\overrightarrow{RQ} = 12\underset{\sim}{y}$, $\overrightarrow{PR} : \overrightarrow{SR} = 3 : 1$ and $\overrightarrow{PQ} : \overrightarrow{PT} = 5 : 1$.

Diberi bahawa $\angle PRQ = 90°$, $\overrightarrow{PR} = 9\underset{\sim}{x}$, $\overrightarrow{RQ} = 12\underset{\sim}{y}$, $\overrightarrow{PR} : \overrightarrow{SR} = 3 : 1$ *dan* $\overrightarrow{PQ} : \overrightarrow{PT} = 5 : 1$.

(a) Express in terms of $\underset{\sim}{x}$ and $\underset{\sim}{y}$,
Ungkapkan dalam sebutan $\underset{\sim}{x}$ *dan* $\underset{\sim}{y}$,

(i) $\overrightarrow{QS}$
(ii) $\overrightarrow{RT}$ [3 marks]
[3 *markah*]

(b) Using $\overrightarrow{RU} = h\overrightarrow{RT}$ and $\overrightarrow{QU} = k\overrightarrow{QS}$, where h and k are constants, find the value of h and of k.
Dengan menggunakan $\overrightarrow{RU} = h\overrightarrow{RT}$ *dan* $\overrightarrow{QU} = k\overrightarrow{QS}$, *dengan keadaan h dan k ialah pemalar, cari nilai h dan k.* [5 marks]
[5 *markah*]

(c) Given that $|\underset{\sim}{x}| = 5$ units and $|\underset{\sim}{y}| = 2$ units, find $|\overrightarrow{PQ}|$. [2 marks]

Diberi $|\underset{\sim}{x}| = 5$ *unit dan* $|\underset{\sim}{y}| = 2$ *unit, cari* $|\overrightarrow{PQ}|$. [2 *markah*]

[Lihat halaman sebelah

8 Use graph paper to answer this question.
Gunakan kertas graf untuk menjawab soalan ini.

Table 8 shows the values of two variables, x and y, obtained from an experiment. The variables x and y are related by the equation $y = \frac{p^{6x}}{q}$, where p and q are constants.

Jadual 8 menunjukkan nilai-nilai bagi dua pemboleh ubah, x dan y, yang diperoleh daripada satu eksperimen. Pemboleh ubah x dan y dihubungkan oleh persamaan $y = \frac{p^{6x}}{q}$, *dengan keadaan p dan q ialah pemalar.*

x	1	1.5	2	2.5	3	3.5
y	4.3	5.1	6.2	7.2	8.9	10.7

Table 8
Jadual 8

(a) Based on Table 8, construct a table for the values of $\log_{10} y$. [1 mark]
Berdasarkan Jadual 8, bina satu jadual bagi nilai-nilai $\log_{10} y$. [1 *markah*]

(b) Plot $\log_{10} y$ against x, by using a scale of 2 cm to 0.5 units on the x-axis and 2 cm to 0.1 units on the $\log_{10} y$-axis.
Hence, draw the line of best fit. [3 marks]
Plot $\log_{10} y$ *melawan x, dengan menggunakan skala 2 cm kepada 0.5 unit pada paksi-x dan 2 cm kepada 0.1 unit pada paksi-*$\log_{10} y$.
Seterusnya, lukis garis lurus penyuaian terbaik. [3 *markah*]

(c) Use the graph in 8(b) to find the value of
Gunakan graf di 8(b) untuk mencari nilai

(i) y when $x = 2.7$,
y apabila $x = 2.7$,
(ii) p,
(iii) q. [6 marks]
[6 *markah*]

9 a) Given $y = \frac{7}{x^2}$ find the value of $\frac{dy}{dx}$ when $x = 3$. Hence, find the approximate value of $\frac{7}{(2.98)^2}$.

Diberi $y = \frac{7}{x^2}$ *cari nilai bagi* $\frac{dy}{dx}$ *apabila* $x = 3$. *Seterusnya cari nilai hampir bagi* $\frac{7}{(2.98)^2}$.

[3 marks]
3 *markah*]

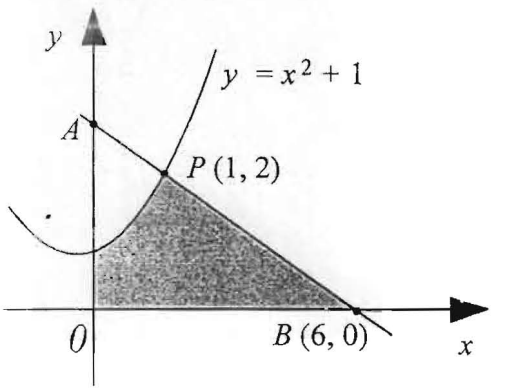


Diagram 9
Rajah 9

b) Diagram 9 shows the curve $y = x^2 + 1$, and the straight line AB which intersect at point P (1, 2). Calculate
Rajah 9 *menunjukkan lengkung* $y = x^2 + 1$, *dan garis lurus* AB *yang bersilang pada titik* P (1, 2). *Hitung*

(i) the area of the shaded region, [3 marks]
luas kawasan berlorek, [3 *markah*]

(ii) the volume of revolution, in terms of π, when the region bounded by the curve, the y-axis and the straight line $y = 3$ is revolved 360° about the y-axis. [4 marks]
isi padu janaan, dalam sebutan π, *apabila rantau yang dibatasi oleh lengkung itu, paksi-y dan garis lurus* $y = 3$, *dikisarkan melalui* 360° *pada paksi-y.* [4 *markah*]

10. Diagram 10 shows *AOBC* is a semicircle with centre *O* and radius 6 cm. *APD* is a sector of a circle with centre *P* and radius 8 cm.
Rajah 10 *menunjukkan AOBC ialah sebuah semibulatan berpusat O dengan berjejari 6 cm. APD ialah sebuah bulatan berpusat P dengan jejari 8 cm.*

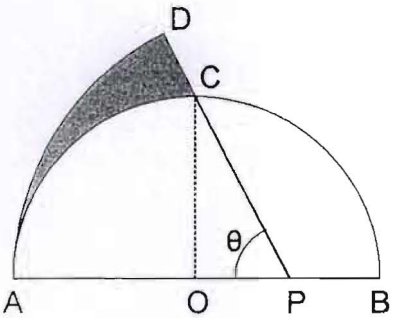


Diagram 10
Rajah 10

It is given that OC is perpendicular to AOB .
Diberi bahawa OC bersererenjang dengan AOB.
[Use/*Guna* π =3.142]

Calculate
Hitung

(a) the value of θ, in radians, [2 marks]
nilai θ, dalam radian, [2 *markah*]

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

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

11 (a) It is found that 40% of the swans in a zoo have white feathers. If 5 swans from the zoo are chosen at random, calculate the probability that

Didapati bahawa 40% angsa di sebuah zoo mempunyai bulu putih. Jika 5 ekor angsa dari zoo itu dipilih secara rawak, hitungkan kebarangkalian bahawa

(i) exactly 3 of the swans have white feathers, [2 marks]
tepat 3 ekor angsa mempunyai bulu putih, [2 *markah*]

(ii) less than 4 of the swans have white feathers. [3 marks]
kurang daripada 4 ekor angsa mempunyai bulu putih. [3 *markah*]

(b) The masses of students in a college follow a normal distribution with a mean of 48 kg and a standard deviation of 16 kg, find

Jisim pelajar di sebuah kolej mengikut taburan normal dengan min 48 kg dan sisihan piawai 16 kg, cari

(i) the probability that a student chosen randomly from the college has a mass of not more than 57.4 kg,
kebarangkalian seorang pelajar yang dipilih secara rawak dari kolej mempunyai jisim yang tidak melebihi 57.4 kg,

(ii) the value of m if 70% of the students from the college have a mass of more than m kg.
nilai m jika 70% daripada pelajar-pelajar sekolah itu mempunyai jisim melebihi m kg.

[5 marks]
[5 *markah*]

Section C
Bahagian C

[20 marks]
[20 *markah*]

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

12 A particle moves along a straight line and passes through a fixed point O. Its velocity, v ms^{-1}, at time t seconds after leaving O is given by $v = 7t - 6 - t^2$.

Suatu zarah bergerak di sepanjang suatu garis lurus dan melalui satu titik tetap O. Halaju zarah itu, v ms^{-1}, pada masa t saat selepas melalui O, diberi oleh $v = 7t - 6 - t^2$.

[Assume motion to the right is positive.]
[*Anggapkan gerakan ke arah kanan sebagai positif.*]

Find
Cari

(a) (i) the initial velocity of the particle, [1 mark]
halaju awal zarah itu, [1 *markah*]

(ii) the time interval during which the particle moves towards the right. [2 marks]
selang masa apabila zarah itu bergerak ke arah kanan. [2 *markah*]

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

(c) (i) Sketch the velocity-time graph of the motion of the particle for the first 6 seconds. [2 marks]
Lakarkan graf halaju-masa bagi pergerakan zarah itu bagi tempoh 6 saat pertama. [2 *markah*]

(ii) the distance travelled by the particle in the sixth second after leaving O. [2 marks]
jarak yang dilalui oleh zarah itu dalam saat keenam selepas melalui O. [2 *markah*]

13 A particular kind of biscuits is made by using four ingredients A, B, C and D. Table 13 shows the prices of the ingredients.
Sejenis biskut diperbuat daripada bahan-bahan A, B, C dan D. Jadual 13 *menunjukkan harga bagi bahan-bahan tersebut.*

Ingredients *Bahan-bahan*	Price (RM) per kilogram in the year *Harga* (RM) *per kilogram pada tahun*	
	2008	2009
A	5.00	w
B	4.00	5.00
C	x	y
D	6.00	7.80

Table 13
Jadual 13

(a) The price index of ingredient A in the year 2009 based on the year 2008 is 120. Calculate the value of w. [2 marks]
Indeks harga bahan A pada tahun 2009 *berasaskan tahun* 2008 *ialah* 120. *Hitung nilai w.*

[2 *markah*]

(b) The price index of ingredient C in the year 2009 based on the year 2008 is 150.

The price per kilogram of ingredient C in the year 2009 is RM3.00 more than its corresponding price in the year 2008. Calculate the value of x and of y. [3 marks]
Indeks harga bahan C pada tahun 2009 *berasaskan tahun* 2008 *ialah* 150. *Harga bahan C sekilogram pada tahun* 2009 *ialah* RM3.00 *lebih daripada harganya yang sepadan pada tahun* 2008. *Hitung nilai x dan y.* [3 *markah*]

(c) The composite index for the cost of making the biscuit in the year 2009 based on the year 2008 is 128. Find
Indeks gubahan bagi kos penghasilan biskut pada tahun 2009 *berasaskan tahun* 2008 *ialah* 128. *Cari*

(i) the price of a packet of biscuit in the year 2008 if its corresponding price in the year 2009 is RM35.00. [2 marks]
harga sebungkus biskut pada tahun 2008 *jika harganya yang sepadan pada tahun* 2009 *ialah* RM35.00. [2 *markah*]

(ii) the value of m if the quantities of ingredients A, B, C and D used are in ratio of $3 : m : 1 : 4$. [3 marks]
nilai m jika kuantiti bahan A, B, C dan D digunakan dalam nisbah $3 : m : 1 : 4$. [3 *markah*]

[Lihat halaman sebelah

14 Use the graph paper to answer this question.
Gunakan kertas graf untuk menjawab soalan ini.

Mathematics Society organizes a visit to National Science Centre by renting x buses and y vans. The rental for a bus is RM750 and the rental for a van is RM250. The rental for the vehicles is based on the following constraints :
Persatuan Matematik menganjurkan lawatan ke Pusat Sains Negara dengan menyewa x buah bas and y buah van. Sewaan sebuah bas ialah RM750 *dan sewaan sebuah van ialah* RM250. *Sewaan kenderaan adalah berdasarkan kekangan berikut :*

I : The total number of vehicles to be rented is not more than 8.
Jumlah kenderaan yang disewa adalah tidak melebihi 8 *buah.*

II : The number of buses is at most twice the number of vans.
Bilangan bas selebih-lebihnya dua kali ganda daripada bilangan van.

III : The maximum allocation for the rental of the vehicles is RM2 250.
Peruntukan maksimum untuk sewaan kenderaan ialah RM2 250.

(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 $x \geq 0$ *dan* $y \geq 0$ *yang memenuhi semua kekangan di atas.* [3 *markah*]

(b) Using a scale of 2 cm to 1 vehicle on both axes, construct and shade the region R which satisfies all the above constraints. [3 marks]
Dengan menggunakan skala 2 *cm kepada* 1 *kenderaan pada kedua-dua paksi, bina dan lorek rantau R yang memenuhi semua kekangan di atas.*
[3 *markah*]

(c) Using the graph constructed in 14(*b*), find
Gunakan graf yang dibina di 14(*b*) *untuk mencari*

(i) the minimum number of vans rented if 2 buses are rented
bilangan minimum van yang disewa jika 2 *buah bas disewa.*

(ii) the maximum number of members that can be accommodated into the rented vehicles if a bus can accommodate 40 passengers and a van can accommodate 10 passengers.
Bilangan maksipmum ahli yang boleh dimuatkan ke dalam kenderaan yang disewa jika sebuah bas boleh dimuatkan dengan 40 *penumpang dan sebuah van boleh dimuatkan dengan* 10 *orang penumpang.*

[4 marks]
[4 *markah*]

15 Diagram 15 shows a quadrilateral $PQRS$. $\angle QRS$ is obtuse.
Rajah 15 *menunjukkan sisiempat PQRS.* $\angle QRS$ *ialah sudut cakah.*

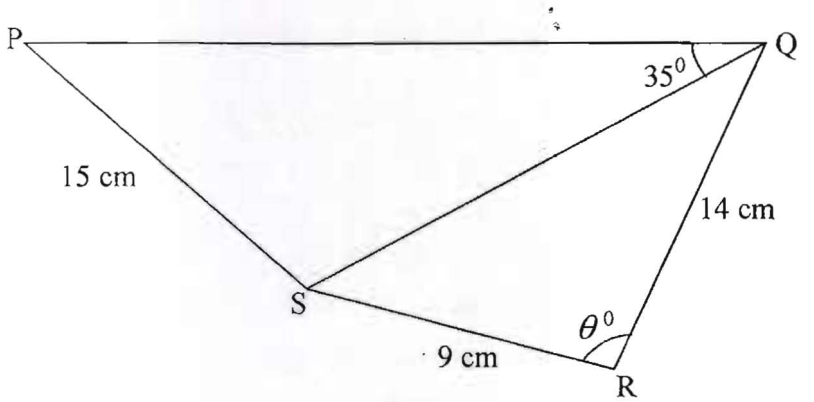


Diagram 15
Rajah 15

Given that the area of triangle QRS is 28 cm^2. Find
Diberi bahawa luas segitiga QRS ialah 28 cm^2. *Cari*

(a) the value of θ, [2 marks]
nilai θ, [2 *markah*]

(b) the length , in cm, of
panjang, dalam cm,

(i) QS ,
(ii) PQ. [5 marks]
[5 markah]

(c) the area, in cm^2 , of quadrilateral $PQRS$. [3 marks]
luas , dalam cm^2, *sisiempat PQRS.* [3 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

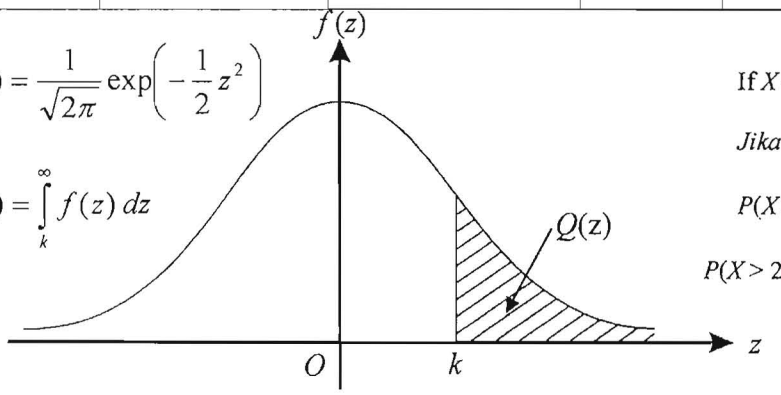
THE UPPER TAIL PROBABILITY $Q(z)$ FOR THE NORMAL DISTRIBUTION $N(0, 1)$
KEBARANGKALIAN HUJUNG ATAS $Q(z)$ BAGI TABURAN NORMAL $N(0, 1)$

z	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

Example / *Contoh*:

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

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



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

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

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

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

BLANK PAGE
HALAMAN KOSONG

Nama:.....

Kelas:.....

Arahan Kepada Calon

1 Tulis nama dan kelas anda pada ruang yang disediakan.
2 Tandakan (√) untuk soalan yang dijawab.
3 Ceraikan helaian ini dan ikat sebagai muka hadapan bersama-sama dengan buku jawapan.

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

[Lihat halaman sebelah

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**, any **four** questions from **Section B** and any **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. 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 .

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

5. The marks allocated for each question and sub-part of a question are shown in brackets.
   Markah yang diperuntukkan bagi setiap soalan dan ceraian soalan ditunjukkan dalam kurungan.

6. The Upper Tail Probability $Q(z)$ for The Normal Distribution N(0, 1) Table is provided on page **17**.
   Jadual Kebarangkalian Hujung Atas $Q(z)$ *bagi Taburan Normal* N(0, 1) *disediakan di halaman* **17**.

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

8. Graph paper is provided.
   Kertas graf disediakan.

9. You may use a scientific calculator.
   Anda dibenarkan menggunakan kalkulator saintifik.

10. Tear out page **19** and tie it together with the answer papers and graph papers.
    Ceraikan halaman **19** *dan ikat bersama dengan kertas jawapan dan kertas graph.*

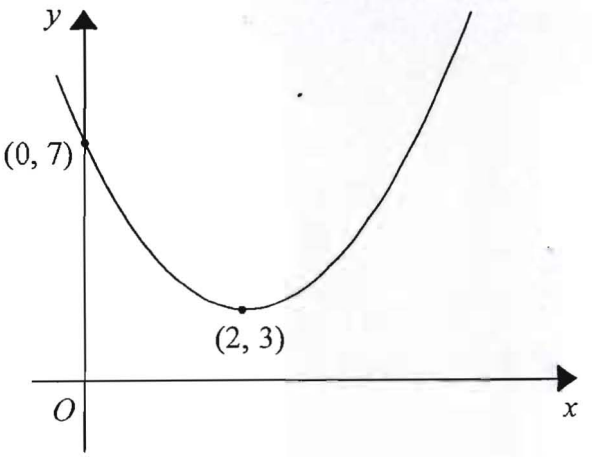
MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN DARUL KHUSUS

PROGRAM PENINGKATAN AKADEMIK TINGKATAN 5
SEKOLAH-SEKOLAH MENENGAH NEGERI SEMBILAN 2014

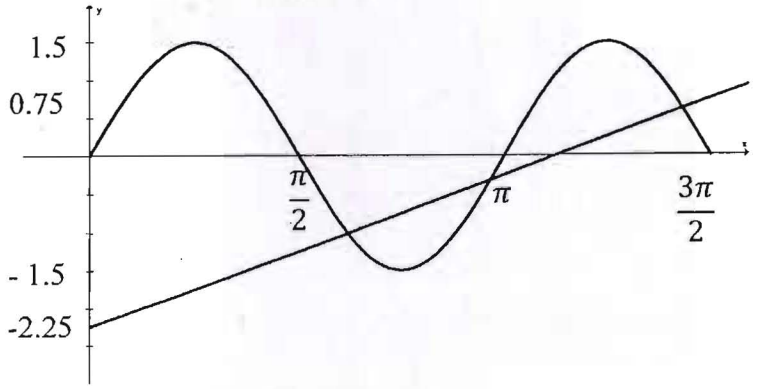
PERATURAN PEMARKAHAN

ADDITIONAL MATHEMATICS

PAPER 2

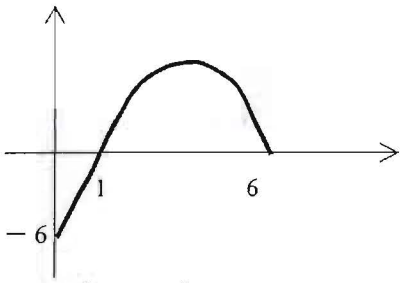
Number	*Solution and marking scheme*	*Sub Marks*	*Full Marks*
1	$x=\frac{5+y}{2}$ $3\left(\frac{5+y}{2}\right)^2-y^2=14-2\left(\frac{5+y}{2}\right)-y$ $(y-39)(y+1)=0$ $y=39, y=-1$ $x=22, x=2$ $y=2x-5$ $3x^2-(2x-5)^2=14-2x-(2x-5)$ $(x-2)(x-22)=0$ $x=2, x=22$ $y=39, y=-1$	P1 K1 K1 N1 N1	5
2(a)	$p=2$ $q=3$ $7=a(0-2)^2+3$ $a=1$	P1 P1 K1 N1	
(b)		P1 titik (0,7) P1 Titik (2,3) P1 Bentuk graf	
(c)	$f(x)=-(x-2)^2-3$	N1	8
3	$\frac{dy}{dx}=2x-3$ $\frac{d^2x}{dy^2}=2$ $(x^2-3x)2+x(2x-3)+5=0$ $(4x-5)(x-1)=0$ $x=\frac{5}{4}, 1$	K1 K1 K1 K1 N1	5

Number	*Solution and marking scheme*	*Sub Marks*	*Full Marks*
4(a)	$2x = -\frac{1}{2}x - \frac{15}{2}$ cuba selesaikan	K1	
	$E = (-3, -6)$	N1	
(b) (i)	$\left(0, -7\frac{1}{2}\right) = \left(\frac{1(-3)+3x}{4}, \frac{1(-6)+3y}{4}\right)$	K1	
	$F = (1, -8)$	N1	
(ii)	$y = 2x + c$ or $-8 = 2(1) + c$	K1	
	$y = 2x - 10$	N1	
(c)	$2\sqrt{(x+3)^2 + (y+6)^2} = \sqrt{(x-1)^2 + (y+8)^2}$	K1	
	$3x^2 + 3y^2 + 26x + 32y + 115 = 0$	N1	8
5(a)	$\frac{27(5) + 32(8) + 37x + 42(15) + 47(8) + 52(4)}{5 + 8 + x + 15 + 8 + 4} = 39.5$	K1	
	$1605 + 37x = 39.5(40 + x)$	K1	
	10	N1	
	Seen 39.5	P1	
	$39.5 + \left[\frac{\frac{50}{2} - 23}{15}\right]5$	K1	
	40.17	N1	6

Number	*Solution and marking scheme*	*Sub Marks*	*Full Marks*
6(a)	Seen $\sec^2 x$ or $2\sin x \cos x$	K1	
	$\sin 2x$	N1	
6 (b)		Shape of Sine P1 Amplitud P1 Period P1	
	$\frac{4x}{3\pi} - \frac{3}{2} = sin2x$	K1	
	$y = \frac{2x}{\pi} - \frac{9}{4}$ or line on the graph	P1	
	Number of solutions = 3	N1	8

Number	*Solution and marking scheme*	*Sub Marks*	*Full Marks*
7(a) i)	$\overrightarrow{QS} = \overrightarrow{QR} + \overrightarrow{RS}$ or $\overrightarrow{RT} = \overrightarrow{RQ} + \overrightarrow{QT}$ or $\overrightarrow{RT} = \overrightarrow{RQ} + \frac{4}{5}\overrightarrow{QP}$	K1	
	$-3\underset{\sim}{x} - 12\underset{\sim}{y}$	N1	
ii)	$-\frac{36}{5}\underset{\sim}{x} + \frac{12}{5}\underset{\sim}{y}$	N1	
(b)	$k\overrightarrow{QS} = \overrightarrow{QR} + \overrightarrow{RU}$ or $k\overrightarrow{QS} = \overrightarrow{QR} + h\overrightarrow{RT}$	K1	
	$k(-3\underset{\sim}{x} - 12\underset{\sim}{y}) = h(-\frac{36}{5}\underset{\sim}{x} + \frac{12}{5}\underset{\sim}{y}) - 12\underset{\sim}{y}$	K1	
	$-3k = -\frac{36}{5}h$ *or* $-12k = \frac{12}{5}h - 12$	K1	
	$h = \frac{5}{13}$	N1	
	$k = \frac{12}{13}$	N1	
(c)	$\lvert\overrightarrow{PQ}\rvert^2 = \lvert\overrightarrow{PR}\rvert^2 + \lvert\overrightarrow{RQ}\rvert^2$ or $[9(5)]^2 + [12(2)]^2$	K1	
	51 unit	N1	10
8 (a)	$\log_{10} y$: 0.6335, 0.7076, 0.7924, 0.8573, 0.9494, 1.0294 Sekurang-kurangnya dua tempat perpuluhan	N1	
(b)	Rujuk graf		
(c)(i)	$\log_{10} y = x(6\log_{10} p) - \log_{10} q$	P1	
(ii)	$\log_{10} y = 0.9$	K1	
	$y = 7.943$	N1	
(iii)	$6\log_{10} p = m$ or $-\log_{10} q = Y$–intercept or	K1	
	$\log_{10} p = 0.02583$ or $\log_{10} q = -0.47$		
	$p = 0.9612 - 1.1612$	N1	
	$q = 0.2388 - 0.4388$	N1	10

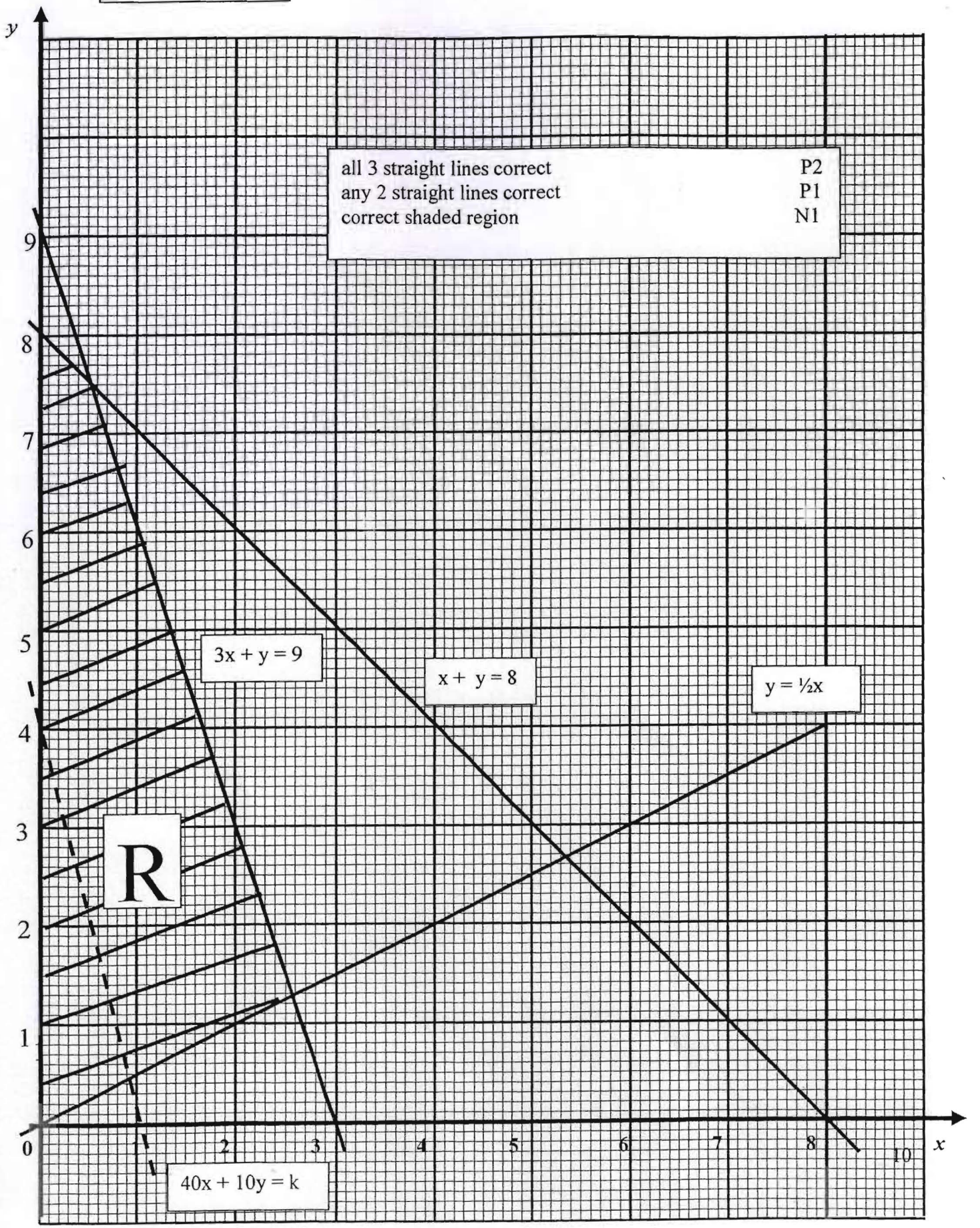
Number	Solution and marking scheme	Sub Marks	Full Marks
9(a)	$\frac{dy}{dx} = -\frac{14}{x^3}$ or $\frac{7}{3^2}$	K1	
	$-\frac{14}{3^3} \times (-0.02) + \frac{7}{3^2}$	K1	
	0.7881	N1	
(b)	$\int_0^1 (x^2 + 1)\, dx$ or $\frac{1}{2}(2)(5)$	K1	
	$\left[\frac{x^3}{3} + x\right]_0^1$	K1	
	$6\frac{1}{3}$	N1	
(c)	$\pi \int_1^3 (y - 1) dy$	K1	
	$\pi \left[\frac{y^2}{2} - y\right]_1^3$	K1	
	$\pi\left[\left(\frac{3^2}{2} - 3\right) - \left(\frac{1}{2} - 1\right)\right]$	K1	
	2π	N1	10
10 (a)	tan θ = 6/2	K1	
	θ = 1.2492 rad	N1	
(b)	1.571 x 6 = 9.2426 or CD = $8 - \sqrt{6^2 + 2^2}$ = 1.6754	K1	
	AD = 1.2492 x 8 = 9.9936	K1	
	9.2426 + 9.9936 + 1.6754	K1	
	20.9116	N1	
(c)	$\frac{1}{2}(8)(8)(1.2492)$	K1	
	$\frac{1}{2}(6)(\cancel{3}\,6)(1.571)$	K1	
	$\frac{1}{2}(8)(8)(1.2492) - \frac{1}{2}(6)(6)(1.571) - \frac{1}{2}(6)(2)$	K1	
	5.6964	N1	10

Number	*Solution and marking scheme*	*Sub Marks*	*Full Marks*
11 a)(i)	$P(X=3) = {}^5C_3(0.4)^3(0.6)^2$ 0.2304	K1 N1	
(ii)	$P(X=0) + P(X=1) + P(X=2) + P(X=3)$ or $1 - P(X=4) - P(X=5)$ ${}^5C_0(0.4)^0(0.6)^5 + {}^5C_1(0.4)^1(0.6)^4 + {}^5C_2(0.4)^2(0.6)^3 +$ ${}^5C_3(0.4)^3(0.6)^2$ or $1 - {}^5C_4(0.4)^4(0.6)^1 + {}^5C_5(0.4)^5(0.6)^0$ 0.9130	K1 K1 N1	
(b)(i)	$P(Z \le \frac{57.4-48}{16})$ 0.7216	K1 N1	
(ii)	$P(Z > 0.524) = 0.3$ $\frac{m-48}{16} = -0.524$ $m = 39.62$	K1 K1 N1	10
12 (a)(i) (ii)	-6 $(t-6)(t-1) < 0$ $1 < t < 6$	P1 K1 N1	
(b)	$a = -2t + 7$ $v_{max} = 7\left(\frac{7}{2}\right) - 6 - \left(\frac{7}{2}\right)^2$ 6.25	K1 K1 N1	
(c)(i)	 Shape of graph P1 Point (0, − 6) and (1, 0) or (6, 0) P1		
(ii)	$s = -\frac{(5)^3}{3} + \frac{7(5)^2}{2} - 6(5) = \frac{95}{6}m$ or $s = -\frac{(6)^3}{3} + \frac{7(6)^2}{2} - 6(6) = 18m$ $Distance = 18 - \frac{95}{6} = \frac{13}{6}m$	K1 N1	10

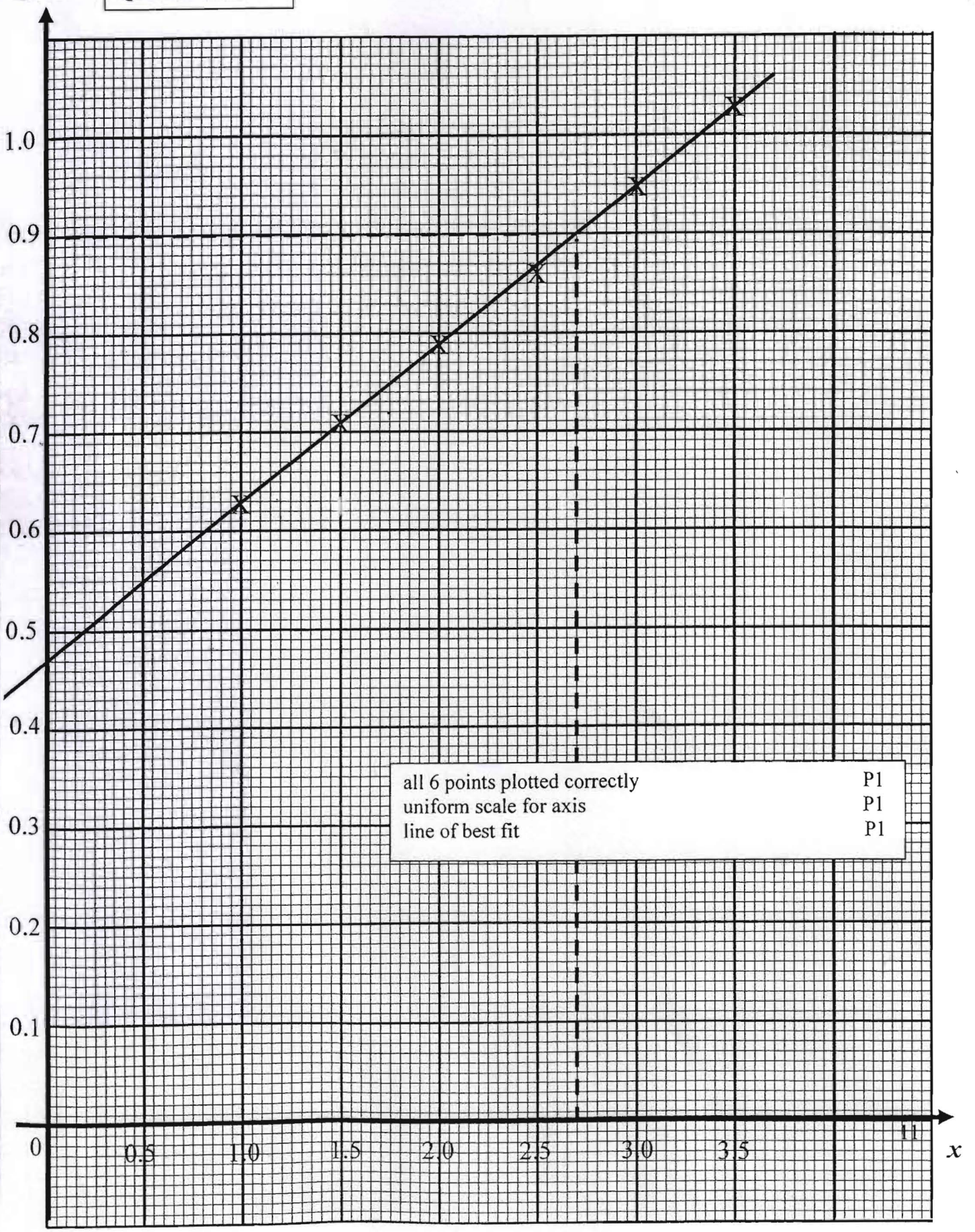
Number	Solution and marking scheme	Sub Marks	Full Marks
13 (a)	$120 = \frac{w}{5} \times 100$	K1	
	$w = RM6.00$	N1	
(b)	$150 = \frac{x+3}{x} \times 100$	K1	
	$x = 6, \quad y = 9$	N1 N1	
(c)(i)	$128 = \frac{35.00}{Q_{2008}} \times 100$	K1	
	$Q_{2008} = RM27.34$	N1	
(ii)	125 or 130		
	$\frac{120(3)+125m+150(1)+130(4)}{8+m} = 128$	P1 K1	10
	$m = 2$	N1	
14 a)	$x + y \leq 8$	N1	
	$x \leq 2y$ or $y \geq \frac{1}{2}x$	N1	
	$750x + 250y \leq 2250$ or $3x + y \leq 9$	N1	
(b)	Refer to graph		
(c) i)	1		
ii)	titik (2, 3)	P1	
	2(40) + 3 (10)	K1	10
	110	N1 N1	

Number	*Solution and marking scheme*	*Sub Marks*	*Full Marks*
15(a)	$\frac{1}{2}(14)(9)\sin\theta = 28$	K1	
	$\angle\theta = 153.61^0$	N1	
(b)(i)	$QS^2 = 14^2 + 9^2 - 2(14)(9)\cos 153.61^0$	K1	
	$QS = 22.42$	N1	
(ii)	$\frac{\sin\angle P}{22.42} = \frac{\sin 35}{15}$ or $\angle P = 59.02^0$	K1	
	$\frac{PQ}{sin85.98°} = \frac{15}{sin35°}$	K1	
	$PQ = 26.09$ cm	N1	
(c)	$\frac{1}{2}(22.42)(26.09)\sin 35$	K1	
	Area quadrilateral $= \frac{1}{2}(22.42)(26.09)\sin 35 + 28$	K1	
	$= 195.75\text{cm}^2$	N1	10

Question No. 14



Question No. 8



all 6 points plotted correctly	P1
uniform scale for axis	P1
line of best fit	P1

ANALISIS JADUAL SPESIFIKASI UJIAN MATEMATIK TAMBAHAN 2014
PROGRAM PENINGKATAN AKADEMIK TINGKATAN 5
SEKOLAH-SEKOLAH MENENGAH NEGERI SEMBILAN 2014

	CONTEXTS	Paper 1		Paper 2					
				Section A		Section B		Section C	
		S	M	S	M	S	M	S	M
A1	**Function (F4)**								
		1	2 (R)						
		2	3 (S)						
		3	3(R)						
A2	**Quadratic Equations (F4)**								
		4	4 (S)						
A3	**Quadratic Functions (F4)**								
		5	3 (R)	**2**	8 (R)				
		6	3 (S)						
A4	**Simultaneous Equations (F4)**								
				1	5 (R)				
A5	**Indices and Logarithm (F4)**								
	Equation of Indices	**7**	3 (S)						
	Equation of Logarithms	**8**	4 (R)						
	Laws of Logarithms	**9**	4 (S)						
A6	**Progressions (F5)**								
	Arithmetic Progressions	**10**	3 (R)						
	Geometric Progressions	**11**	3 (R)						
A7	**Linear Law (F5)**								
		13	3(R)			**8**	10 (S)		
G1	**Coordinate Geometry (F4)**								
		12	4 (R)			**10**	10 (S)		
G2	**Vector (T5)**								
	Vector	**14**	4 (R)			**7**	10 (T)		
	Vector in Cartesian Plane	**15**	2 (R)						
T2	**Trigonometric Functions (F5)**								
		16	3 (T)	**6**	8 (T)				
T1	**Circular Measures (F4)**								
		17	3 (R)	**4**	6 (R)				
C1	**Differentiation (F4)**								
		18	3 (R)	**3**	6 (S)				
		19	3 (T)						
C2	**Integrations (F5)**					**9**	10 (T)		
		20	3 (S)						
		21	2(S)						
S1	**Statistic (F4)**								
		22	3 (S)	**5**	7 (S)				
S2	**Permutations and Combinations (F5)**								
	Permutations	**23**	4 (R)						
S3	**Probability (F5)**								
		24	4 (R)						

	CONTEXTS	Paper 1		Paper 2					
				Section A		Section B		Section C	
S4	**Probability Distributions (F5)**								
	Binomial Distributions					**11(a)**	5 (S)		
	Normal Distributions	**25**	4 (R)			**(b)**	5 (T)		
AST1	**Solutions Of Triangles (F4)**								
								15	10 (R)
AST2	**Motion On the Straight Line (F5)**								
								12	10 (S)
ASS1	**Index Number (F4)**								
								13	10 (R)
ASS2	**Linear Programming (F5)**								
								14	10 (R)
	JUMLAH	**25**	**80**	**6**	**40**	**5**	**50**	**4**	**40**

Nota :

A – Komponen Algebra
G – Komponen Geometri
S – Komponen Statistik
T – Komponen Trigonometri
K – Komponen Kalkulus
ASS – Aplikasi Sains Sosial
AST – Aplikasi Sains Teknologi

R – Aras Rendah
S – Aras Sederhana
T – Aras Tinggi
S – Soalan
M – Markah

BILANGAN SOALAN MENGIKUT ARAS KESUKARAN:

KERTAS	ARAS KESUKARAN	BILANGAN SOALAN	NISBAH
1	RENDAH SEDERHANA TINGGI	15 8 2	
	JUMLAH SOALAN	25	6:3:1
2	RENDAH SEDERHANA TINGGI	6 5 4	
	JUMLAH SOALAN	15	4:3:3