Name : ……..……

Form : ……..……

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA SEKOLAH MENENGAH NEGERI KEDAH DARUL AMAN

PEPERIKSAAN PERCUBAAN SPM 2010

3472 / 1

ADDITIONAL MATHEMATICS
Kertas 1
September 2010
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	4	
4	3	
5	3	
6	3	
7	3	
8	3	
9	4	
10	4	
11	4	
12	3	
13	3	
14	3	
15	3	
16	3	
17	3	
18	3	
19	4	
20	4	
21	3	
22	3	
23	2	
24	3	
25	4	
TOTAL	**80**	

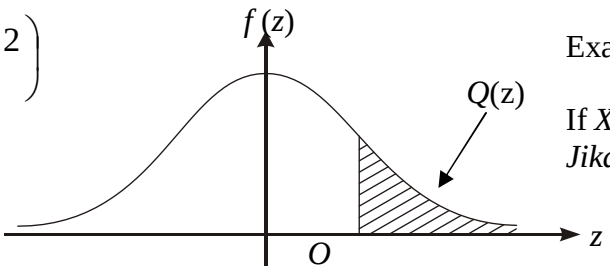
Kertas soalan ini mengandungi 19 halaman bercetak

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

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

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

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 of revolution

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

$= \dfrac{1}{2} \left| (x_1 y_2 + x_2 y_3 + x_3 y_{1_1}) - (x_2 y_1 + x_3 y_2 + x_1 y_3) \right|$

STATISTICS

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

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

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

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

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

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

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

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

12 Mean, $\mu = np$

13 $\sigma = \sqrt{npq}$

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

TRIGONOMETRY

1 Arc length, $s = r\theta$

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

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

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

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

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

For examiner's use only

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

1. The absolute value function $f(x) = |7 - x|$ is defined for the domain $0 \le x \le 15$.
Fungsi nilai mutlak $f(x) = |7 - x|$ *ditakrifkan untuk domain* $0 \le x \le 15$.

State
Nyatakan
(a) the image of 15.
imej bagi 15.
(b) the range of *f(x)* corresponding to the given domain.
julat f(x) berdasarkan domain yang diberi.

[2 marks]
[2 markah]

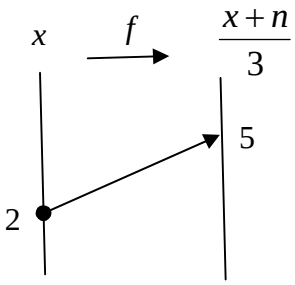
Answer/Jawapan : (a) ……..

(b) ……...

1

2

2.



The diagram shows the function $f : x \to \frac{x+n}{3}$ where *n* is a constant.

Rajah di atas menunjukkan fungsi $f : x \to \frac{x+n}{3}$ *dengan n ialah satu pemalar.*

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

(b) $f^{-1}(x)$

[3 marks]
[3 markah]

2

Answer/ Jawapan : (a) ……..……..

(b) .....

3

3. Given that function $f : x \to 4x + 2$ and $fg : x \to 5x - 2$.

Diberi fungsi $f : x \to 4x + 2$ *dan* $fg : x \to 5x - 2$.

Find
Cari

(a) $g(x)$,

(b) the value of x when $gf(x) = 4$.
nilai x apabila $gf(x) = 4$

[4 marks]
[4 markah]

Answer/Jawapan : (a).....

(b) x = ...

3

4

---

4. One of the roots of the equation $9x^2 + 3x + k = 0$ is two times the other root, find the possible value of k.

[3 marks]

Salah satu punca bagi persamaan $9x^2 + 3x + k = 0$ *adalah dua kali punca yang satu lagi, cari nilai yang mungkin bagi* k.

[3 markah]

Answer/Jawapan : k =.....

4

3

For examiner's use only

5. The graph of the quadratic function $y = -2(x-3)^2+11$ has a maximum point (*p, q*) and the y-intercept is *h*.

Graf bagi fungsi kuadratik $y = -2(x-3)^2+11$ *mempunyai titik maksimum (p, q) dan pintasan-y ialah h.*

Find the value of
Cari nilai bagi

(a) *p*,

(b) *q*,

(c) *h*.

[3 marks]
[3 markah]

Answer /Jawapan: (a) *p* = ...

(b) *q* =.....

(c) *h* =.....

5

3

---

6. Find the range of values of *x* for $6x - x(2-5x) \le 12$ [3 marks]

Cari julat bagi nilai-nilai x untuk $6x - x(2-5x) \le 12$ *[3 markah]*

Answer/Jawapan :.....

6

3

For examiner's use only

7. Solve the equation:
Selesaikan persamaan:

$$2^x\ (8)\ =\ (\frac{1}{16})^{2x+3}\ .$$

[3 marks]

[3 markah]

7

3

Answer/Jawapan : *x* =.....

---

8. The sum of 10 readings of an experiment was 31 cm and the sum of squares of these readings was 133 cm^2. However, it was later found that a reading of 4 cm could not be accepted. Find the variance of the remaining readings.

[3 marks]

Hasil tambah 10 bacaan bagi suatu eksperimen adalah 31 cm dan hasil tambah kuasa dua bagi bacaan ini ialah 133 cm^2. Walaubagaimanapun, didapati satu bacaan yang bernilai 4cm tidak boleh diterima. Cari variance bagi bacaan yang tertinggal.

[3 markah]

8

3

Answer/Jawapan : .....

For examiner's use only

9. Given $\log_p 2 = 3$ and $\log_q 2 = \frac{6}{5}$, find the value of $\log_2 pq$. [4 marks]

Diberi $\log_p 2 = 3$ and $\log_q 2 = \frac{6}{5}$, cari nilai bagi $\log_2 pq$. *[4 markah]*

Answer/Jawapan : .....

9

4

10. The first three terms of an arithmetic progression are $x - 4$, $3x + 3$, $2x + 4$.

Tiga sebutan pertama bagi satu janjang aritmetik ialah $x - 4$, $3x + 3$, $2x + 4$.

Find
Cari

(a) the value of x,
nilai x,

(b) the sum of the first 10 terms of the progression.
hasil tambah 10 sebutan pertama bagi janjang itu.

[4 marks]
[4 markah]

Answer/Jawapan : (a) x =…..…..……..

(b) .....

10

4

For examiner's use only

11. The second term and the fifth term of a geometric progression are 6 and 162 respectively.
Sebutan kedua dan kelima bagi suatu janjang geometri ialah 6 dan 162.
Find the
Carikan

(a) common ratio ,
nisbah sepunya,

(b) first term.
sebutan pertama.

[4 marks]
[4 markah]

11

4

Answer/Jawapan: a) ……..…..…....

b) .....

---

12. Find the sum to infinity of the geometric progression $\frac{3}{8}, -\frac{3}{16}, \frac{3}{32}, \ldots$.

[3 marks]

Cari hasil tambah hingga ketakterhinggaan bagi janjang geometri
$\frac{3}{8}, -\frac{3}{16}, \frac{3}{32}, \ldots$.

[3 markah]

12

3

Answer/Jawapan:……..…..…....

For examiner's use only

13. A line segment PR is divided by the point Q(2,17) in the ratio PQ : QR = 1 : 3. If R is (11, 8), find the coordinates of P.

[3 marks]

Garis PR dibahagi oleh titik Q(2,17) dalam nisbah PQ:QR = 1:3. Jika R ialah (11,8), cari koordinat P.

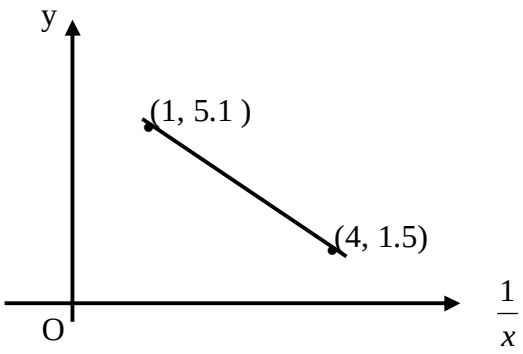
[3 markah]

13

3

Answer/Jawapan : ……..…….

14.



Graph above shows the line of best fit obtained by plotting y against $\frac{1}{x}$ for the relation $y = q + \frac{p}{x}$. The line of best fit passes through the points (1, 5.1) and (4 , 1.5). Find the value of p and of q.

Graf di atas menunjukkan garis penyuaian terbaik yang diperolehi dengan memplotkan y lawan $\frac{1}{x}$ bagi hubungan $y = q + \frac{p}{x}$. Garisan penyuaian terbaik melalui titik (1, 5.1) dan (4, 1.5). Cari nilai p dan nilai q.

[3 marks]

[3 markah]

14

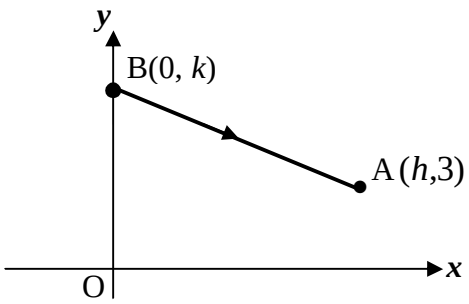
3

Answer/Jawapan : *p* = ……..

q =….……..….

For examiner's use only

15.



The graph above shows points B (0 , *k*) and A (*h*, 3) . If $\overrightarrow{BA} = 7i - 5j$, find the value of *h* and of *k*.

Graf di atas menunjukkan titik B(0, k) dan titik A(h, 3). Jika $\overrightarrow{BA} = 7i - 5j$ *, cari nilai bagi h dan k.*

[3 marks]

[3 markah]

15

3

Answer/Jawapan : *h* = ……...……

k = ……

---

16. Given that $\overrightarrow{AB} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ and $\overrightarrow{AC} = \begin{pmatrix} 5h \\ 6h-8 \end{pmatrix}$, find the value of *h* if *A*, *B* and *C* are collinear.

[3 marks]

Diberi $\overrightarrow{AB} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ *dan* $\overrightarrow{AC} = \begin{pmatrix} 5h \\ 6h-8 \end{pmatrix}$ *, cari nilai h jika A, B dan C adalah segaris.*

[3 markah]

16

3

Answer/Jawapan : *h* =……..

For examiner's use only

17. Solve the equation $2\sin(x-45°)=1$ for $0° \le x \le 360°$.
Selesaikan persamaan $2\sin(x-45°)=1$ *bagi* $0° \le x \le 360°$.

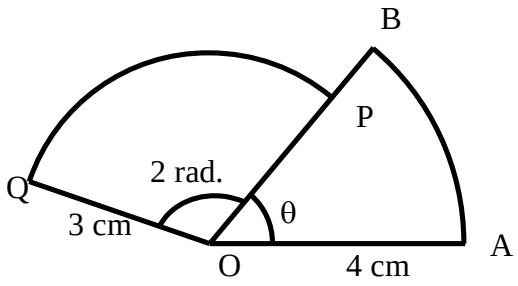
[3 *marks*]
[3 markah]

17

3

Answer/Jawapan: …..…….….....

18.



The diagram above shows two sectors OAB and OPQ which are equal in area. Given that OA = 4 cm, OQ= 3 cm, ∠AOB = θ radian and ∠POQ = 2 radian, find the value of θ.

[3 marks]

Rajah di atas menunjukkan dua sector OAB dan OPQ yang mempunyai luas yang sama. Diberi OA = 4 cm, OQ= 3 cm, ∠AOB = θ radian dan ∠POQ = 2 radian, cari nilai θ.

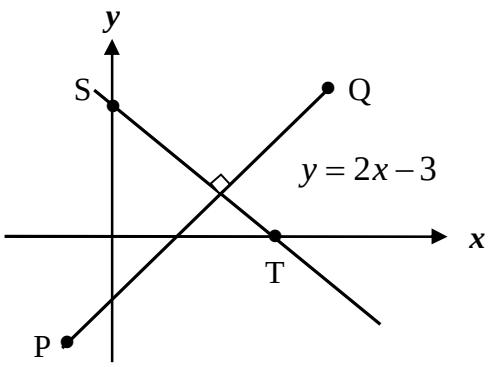
[3 markah]

18

3

Answer/Jawapan: θ =……

19.



The diagram above shows two perpendicular lines PQ and ST. S is the point (0, 8) and T is on the *x*-axis. Given the equation of PQ is $y = 2x - 3$, find

Rajah di atas menunjukkan dua garis lurus berserenjang PQ dan ST . S ialah titik (0, 8) dan T terletak pada paksi-x. Diberi persamaan PQ ialah y=2x−3, cari

(a) the equation of ST,
persamaan bagi ST,

(b) the coordinates of point T.
koordinat titik T.

[4 *marks*]
[4 markah]

19

4

Answer/Jawapan: (a) ……

(b) .....

---

20. Find the value of $f'(0)$ if $f(x) = (2x+1)(4-3x)^2$.

[4 marks]

Cari nilai $f'(0)$ *jika* $f(x) = (2x+1)(4-3x)^2$.

[4 markah]

20

4

Answer/Jawapan: …..…….…..…....

For examiner's use only

21. A curve with gradient function $\frac{dy}{dx} = \frac{x^3 - 8}{x^2}$ passes through the point (2, 11). Find the equation of the curve .

[3 marks]

Satu lengkung dengan fungsi kecerunan $\frac{dy}{dx} = \frac{x^3 - 8}{x^2}$ *melalui titik (2, 11). Cari persamaan bagi lengkung tersebut.*

[3 markah]

Answer/Jawapan: ……..

21

3

---

22. Given that $y = \frac{12}{x^2}$, find, in terms of p, the approximate change in y when *x* increases from 2 to 2 + p. [3 marks]

Diberi $y = \frac{12}{x^2}$ *, cari dalam sebutan p, perubahan kecil bagi y apabila x bertambah dari 2 ke 2 + p.*

[3 markah]

Answer/Jawapan: …….

22

3

23. The probability that an egg picked at random is rotten is 0.15. If a sample of 10 eggs is chosen at random, find the probability that 3 eggs of the sample chosen are rotten.
[2 marks]

Kebarangkalian sebiji telur dipilih secara rawak adalah rosak ialah 0.15. Jika satu sampel yang terdiri daripada 10 biji telur dipilih secara rawak, cari kebarangkalian bahawa tiga biji telur dari sampel yang dipilih adalah rosak.

[2 markah]

23

2

Answer/Jawapan: ……..

---

24. Three letters will be selected from the word " PHYSICS ". Find the number of possible selections if
Tiga huruf dipilih daripada perkataan "PHYSICS". Cari bilangan pilihan yang mungkin jika

a) no condition is imposed,
tiada syarat dikenakan,

b) all the three letters selected must be different.
ketiga-tiga huruf yang dipilih mesti berbeza.

[3 marks]
[3 markah]

24

3

Answer/Jawapan: (a) ……

(b) ……

25. A random variable X is normally distributed with mean 92 and standard deviation 5. Find the value of
Satu pembolehubah rawak X bertaburan normal dengan min 92 dan sisihan piawai 5. Cari nilai bagi

(a) the z-score if $X = 100$.
skor z jika X = 100.

(b) $P(X \geq 88)$.

[4 *marks*]
[4 markah]

Answer/Jawapan: (a) ……

(b)…….

25

4

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

BLANK PAGE
HALAMAN KOSONG

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 4.
   Satu senarai rumus disediakan di halaman 3 hingga 4.

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.

SULIT

3472/2
Additional Mathematics
Kertas 2
September 2010
2 jam 30 minit

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA

SEKOLAH MENENGAH

NEGERI KEDAH DARUL AMAN

PEPERIKSAAN PERCUBAAN SPM 2010

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 your marks.*

5. *The diagrams provided are not drawn according to scale unless stated.*

6. *The marks allocated for each question and sub - part of a question are shown in brackets.*

7. *You may use a* ***non-programmable*** *scientific calculator.*

8. *A list of formulae is provided in page 2 and 3.*

This question paper consists of **19** printed pages.

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

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

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

CALCULUS

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

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

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 of revolution

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

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

GEOMETRY

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

2. Mid point

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

3. Division of line segment by a point

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

4. Area of triangle

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

5. $\left|\underset{\sim}{r}\right| = \sqrt{x^2 + y^2}$

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

STATISTICS

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

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

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

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

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

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

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

12. Mean, $\mu = np$

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. $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$
9. $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$
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. $a^2 = b^2 + c^2 - 2bc \cos A$
14. Area of triangle $= \dfrac{1}{2} ab \sin C$

Section A
Bahagian A

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

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

1. Solve the following simultaneous equations :

   Selesaikan persamaan serentak berikut :

   $$x + 2y - 10 = 0$$
   $$y^2 + xy - 24 = 0 .$$

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

2. The table below shows the ages of a group of members in a club.

   Jadual di bawah menunjukkan umur bagi sekumpulan ahli dalam suatu kelab.

Age (year) *Umur (Tahun)*	21 - 25	26 - 30	31 - 35	36 - 40	41 - 45
Number of members *Bilangan ahli*	1	4	7	*k*	3

   (a) Find the maximum value of k if the modal age is 31 – 35. [1 *mark*]

   (b) Given $k = 5$, calculate the value of
   (i) the mean,
   (ii) the variance,
   (iii) the median.

   [7 *marks*]

   (a) Cari nilai maksimum bagi k *jika mod umur ialah 31 – 35 .* [1 *markah*]

   (b) Diberi $k = 5$ *, hitungkan nilai bagi*
   (i) min,
   (ii) varians,
   (iii) median.

   [7 *markah*]

3. Given that the equation of a curve is $y = \frac{1}{3}x^3 - x^2 + 2$ and $\frac{dy}{dx} = 3$ at point *P* and point *Q*.
Find

(a) the coordinates of *P* and of *Q*.
(b) the equation of the normal to the curve at these points. [6 *marks*]

Diberi bahawa persamaan suatu lengkung ialah $y = \frac{1}{3}x^3 - x^2 + 2$

dan $\frac{dy}{dx} = 3$ *pada titik P dan titik Q.*

Cari

(a) koordinat titik P dan titik Q,
(b) persamaan normal kepada lengkung pada titik-titik itu. [6 *markah*]

4. (a) Sketch the graph of $y = |3\sin 2x| - 1$ for $0 \le x \le 2\pi$. [4 *marks*]

(b) Hence, using the same axes, sketch a suitable straight line to find the number of solutions for the equation

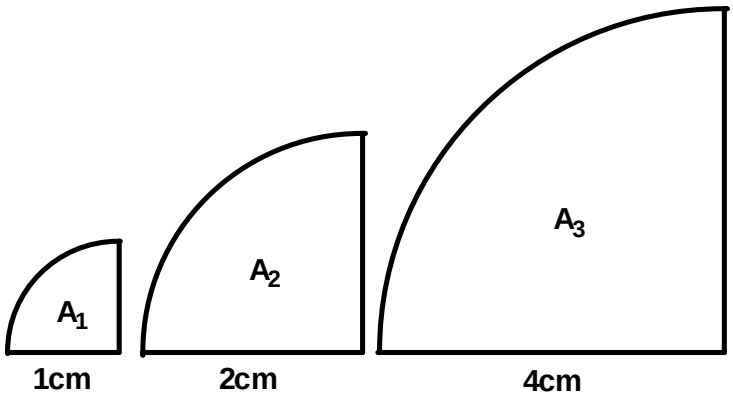
$$|3\sin 2x| + \frac{3x}{2\pi} = 2 \quad \text{for } 0 \le x \le 2\pi .$$

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

(a) *Lakar graf bagi* $y = |3\sin 2x| - 1$ *untuk* $0 \le x \le 2\pi$. [4 *markah*]

(b) *Seterusnya, dengan menggunakan paksi yang sama, lakar satu garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan* $|3\sin 2x| + \frac{3x}{2\pi} = 2$ *untuk* $0 \le x \le 2\pi$.
Nyatakan bilangan penyelesaian itu. [3 *markah*]

5.



The diagram above shows the first three of an infinite series of quadrants. The radius of the first quadrant is 1 cm and its area is represented by A_1. The radius of the second quadrant is twice the radius of the first quadrant and its area is represented by A_2. The radius of the third quadrant is twice the radius of the second quadrant and its area is represented by A_3. The radius of each subsequent quadrant is double the measurements of its previous one.

(a) State the common ratio.
(b) Find the area of the sixth quadrant.
(c) Calculate the sum of the area from the third quadrant to the sixth quadrant, in terms of π. [6 *marks*]

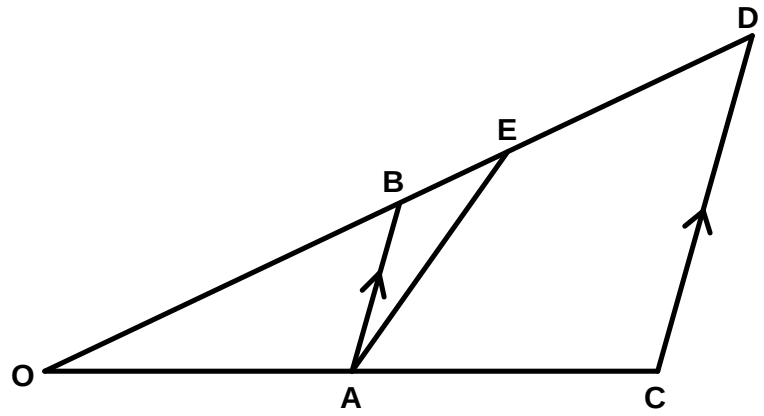
Rajah di atas menunjukkan tiga suku bulatan pertama untuk suatu siri tak terhingga bagi suku bulatan. Panjang jejari suku bulatan pertama ialah 1 cm *dan luasnya diwakili oleh* A_1. *Panjang jejari suku bulatan kedua ialah dua kali panjang jejari suku bulatan pertama dan luasnya diwakili oleh* A_2. *Panjang jejari suku bulatan ketiga ialah dua kali panjang jejari suku bulatan kedua dan luasnya diwakili oleh* A_3. *Jejari suku bulatan yang berikutnya adalah dua kali ganda ukuran jejari suku bulatan sebelumnya.*

(a) Nyatakan nisbah sepunya.

(b) Cari luas suku bulatan keenam.

(c) Hitung hasil tambah luas dari suku bulatan ketiga hingga suku bulatan keenam dalam sebutan π. [6 *markah*]

6.



The diagram above shows triangle OCD. It is given that $\overrightarrow{OA} = 3\underset{\sim}{a}$, $\overrightarrow{CD} = 12\underset{\sim}{b}$, AB is parallel to CD and $OA = \frac{1}{2}OC$.

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

(i) $\overrightarrow{OD}$ (ii) $\overrightarrow{AB}$ [3 *marks*]

(b) Given $\overrightarrow{AE} = \underset{\sim}{a} + k\underset{\sim}{b}$ and $\overrightarrow{BE} = h\overrightarrow{BD}$, where h and k are constants. Find the value of h and of k. [5 *marks*]

Rajah di atas menunjukkan segitiga OCD. Diberi bahawa $\overrightarrow{OA} = 3\underset{\sim}{a}$, $\overrightarrow{CD} = 12\underset{\sim}{b}$, *AB adalah selari dengan CD dan* $OA = \frac{1}{2}OC$.

(a) Ungkapkan dalam sebutan $\underset{\sim}{a}$ *dan / atau* $\underset{\sim}{b}$ *:*

(i) $\overrightarrow{OD}$ *(ii)* $\overrightarrow{AB}$ [3 *markah*]

(b) Diberi $\overrightarrow{AE} = \underset{\sim}{a} + k\underset{\sim}{b}$ *dan* $\overrightarrow{BE} = h\overrightarrow{BD}$, *dengan keadaan h dan k ialah pemalar. Cari nilai h dan nilai k.* [5 *markah*]

Section B
Bahagian B
[40 *marks*]
[40 *markah*]

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

7.

x	1	2	3	4	5	6
y	4.5	7.4	12.0	20.1	33.3	54.6

The table shows the values of two variables, x and y, obtained from an experiment. Variables x and y are related by the equation $y = A^{kx+1}$, where A and k are constants.

(a) Based on the table above, construct a table for the values of $\log_{10} y$. [1 *mark*]

(b) Plot $\log_{10} y$ against x, using a scale of 2 cm to 1 unit on the x-axis and 2 cm to 0.2 unit on the $\log_{10} y$-axis. Hence draw the line of best fit. [3 *marks*]

(c) Use your graph in 7(b) to find the value of

(i) x when $y = 10$,

(ii) A,

(iii) k. [6 *marks*]

Jadual menunjukkan nilai-nilai bagi dua pembolehubah, x dan y, yang diperoleh daripada satu eksperimen. Pembolehubah x dan y dihubungkan oleh persamaan $y = A^{kx+1}$, *dengan keadaan A dan k adalah pemalar*

(a) Berdasarkan jadual di atas, bina satu jadual bagi nilai-nalai $\log_{10} y$. [1 *markah*]

(b) Plot $\log_{10} y$ *melawan x, dengan menggunakan skala* 2 cm *kepada* 1 unit *pada paksi-x dan* 2 cm *kepada* 0.2 unit *pada paksi-* $\log_{10} y$. *Seterusnya, lukis garis lurus penyuaian terbaik.* [3 *markah*]

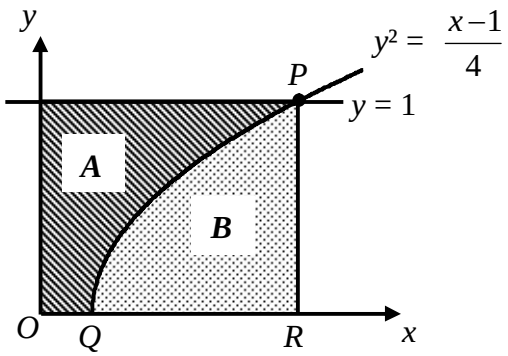
(c) Gunakan graf di 7(b) untuk mencari nilai

(i) x apabila y = 10,

(ii) A,

(iii) k. [6 *markah*]

8.



The diagram shows part of a curve $y^2 = \frac{x-1}{4}$ which intersects the straight line $y = 1$ at point *P*. Point *Q* and point *R* are on the *x*-axis such that *PR* is parallel to the *y*-axis.

(a) Find the coordinates of *P* and of *Q*. [2 *marks*]

(b) Calculate the area of the shaded region ***A***. [4 *marks*]

(c) The shaded region ***B*** is revolved through 360^o about the *x*-axis. Find the volume of revolution, in terms of π. [4 *marks*]

Rajah menunjukkan lengkung $y^2 = \frac{x-1}{4}$ *yang menyilang garis lurus* $y = 1$ *pada titik P. Titik Q dan titik R terletak pada paksi-x dengan keadaan PR adalah selari dengan paksi-y.*

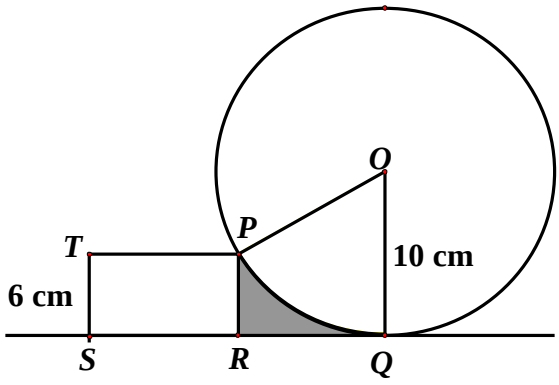
(a) *Carikan koordinat titik P dan titik Q.* [2 *markah*]

(b) *Hitungkan luas rantau berlorek* ***A***. [4 *markah*]

(c) *Rantau berlorek* ***B*** *dikisarkan melalui* 360^o *pada paksi-x.*

Cari isipadu kisaran, dalam sebutan π. [4 *markah*]

9.



The diagram shows a circle with centre O and radius 10 cm touching a rectangle $PRST$ at P. SRQ is a straight line and TS = 6 cm. Use $\pi = 3.142$ and give the answers correct to two decimal places. Calculate

(a) $\angle POQ$, in radian, [2 *marks*]

(b) the length, in cm, of the major arc PQ, [3 *marks*]

(c) the area, in cm^2, of the shaded region. [5 *marks*]

Rajah menunjukkan sebuah bulatan berpusat O dengan jejari 10 cm *menyentuh segiempat tepat PRST di P. SRQ ialah garis lurus dan TS* = 6 cm. *Guna* $\pi = 3.142$ *dan beri jawapan betul kepada dua tempat perpuluhan.*

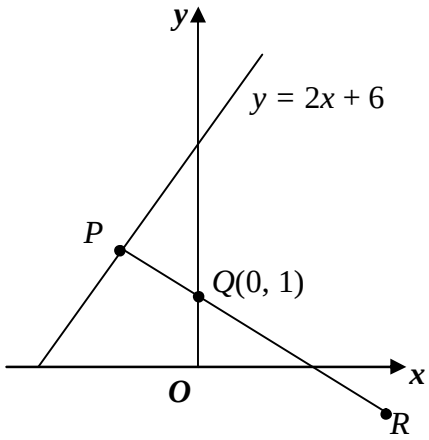
Hitung

(a) $\angle POQ$, *dalam radian,* [2 *markah*]

(b) *panjang, dalam cm, lengkok major PQ,* [3 *markah*]

(c) *luas, dalam* cm^2, *kawasan berlorek.* [5 *markah*]

10.



Solution by scale drawing is not accepted.
The diagram shows two perpendicular lines $y = 2x + 6$ and PQR intersecting each other at point P.

(a) Find the equation of the line PQR [2 *marks*]

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

(c) It is given that $PR = 3\,PQ$, find the coordinates of R. [2 *marks*]

(d) A point $S(x, y)$ moves such that its distance from point R is always half its distance from point P.
(i) Find the equation of the locus of S.
(ii) Hence, determine whether this locus intercepts the y-axis or not. [4 *marks*]

Penyelesaian secara lukisan berskala tidak diterima.
Rajah menunjukkan dua garis lurus serenjang $y = 2x + 6$ *dan* PQR *yang bersilang pada titik* P.

(a) *Cari persamaan garis* PQR. [2 *markah*]

(b) *Cari koordinat* P. [2 *markah*]

(c) *Diberi bahawa* $PR = 3\,PQ$, *cari koordinat* R. [2 *markah*]

(d) *Suatu titik* $S(x, y)$ *bergerak dengan keadaan jaraknya dari titik* R *adalah sentiasa setengah daripada jaraknya dari titik* P.
(i) *Cari persamaan lokus* S.
(ii) *Seterusnya, tentukan sama ada lokus ini memintas paksi-y atau tidak.* [4 *markah*]

11. The masses of duck eggs from a farm have a normal distribution with a mean of 80 g and a standard deviation of 12 g.

(a) Find the probability that a duck egg chosen randomly from this farm has a mass of more than 65 g. [3 *marks*]

(b) The farm produces 4000 eggs daily and the eggs are graded as follow:

Grade	***A***	***B***	***C***
Mass, x (g)	$x > 92$	$65 \leq x \leq 92$	$x < 65$

(i) Calculate the number of eggs that belong to grade *C.*

(ii) Given that 200 of the eggs produced daily have a mass of less than m g. Find the value of m. [7 *marks*]

Jisim telur itik dari sebuah ladang adalah mengikut satu taburan normal dengan min 80 g *dan sisihan piawai* 12 g.

(a) *Cari kebarangkalian bahawa sebiji telur itik yang dipilih secara rawak dari ladang ini berjisim melebihi* 65 g. [*3 markah*]

(b) *Ladang ini menghasilkan* 4000 *biji telur setiap hari dan telur itu diberi gred seperti berikut :*

Gred	***A***	***B***	***C***
Jisim, x (g)	$x > 92$	$65 \leq x \leq 92$	$x < 65$

(i) Hitung bilangan telur gred C.

(ii) Diberi bahawa 200 daripada telur yang dihasilkan setiap hari mempunyai jisim kurang daripada m g. *Cari nilai* m. [*7 markah*]

Section C
Bahagian C
[20 *marks*]
[20 *markah*]

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

12. A particle moves in a straight line and passes through a fixed point O. The velocity of the particle, v ms^{-1}, is given by $v = t^2 - 4t - 5$, where t is the time, in s, after leaving O. [Assume motion to the right is positive.]
Find

(a) the initial velocity, in ms^{-1}, of the particle, [1 *mark*]

(b) the range of t during which the particle moves to the left, [3 *marks*]

(c) sketch the velocity-time graph of the motion of the particle for $0 \le t \le 6$, [2 *marks*]

(d) the total distance, in m, travelled by the particle in the first 6 seconds. [4 *marks*]

Suatu zarah bergerak di sepanjang suatu garis lurus melalui satu titik tetap O. Halaju zarah itu, v ms^{-1}, *diberi oleh* $v = t^2 - 4t - 5$, *dengan keadaan t ialah masa, dalam* s, *selepas melalui O.*
[*Anggapkan gerakan ke arah kanan sebagai positif*]
Cari

(a) halaju awal, dalam ms^{-1}, *bagi zarah itu,* [1 *markah*]

(b) julat bagi t semasa zarah itu bergerak ke arah kiri, [3 *markah*]

(c) lakarkan graf halaju-masa gerakan zarah itu untuk $0 \le t \le 6$, [2 *markah*]

(d) jumlah jarak yang dilalui, dalam m, *oleh zarah itu dalam* 6 *saat yang pertama.* [4 *markah*]

13. The table shows the price indices and respective weightages, in the year 2009 based on the year 2007, of four materials, *P, Q, R* and *S* in the production of a type of moisturizing cream.

Material *Bahan*	Price index in the year 2009 based on year 2007 *Indeks harga pada tahun* 2009 *berasaskan tahun* 2007	Weightage *Pemberat*
P	125	4
Q	120	*m*
R	80	5
S	150	*m* + 3

(a) If the price of material *P* in the year 2007 was RM60.00 , calculate its price in the year 2009. [2 *marks*]

(b) Given that the composite index for the production cost of the moisturizing cream in the year 2009 based on the year 2007 is 120. Find

(i) the value of *m*. [3 *marks*]

(ii) the price of the moisturizing cream in the year 2007 if its price in the year 2009 is RM30.00. [2 *marks*]

(c) Given that the price of material *Q* is estimated to increase by 15 % from the year 2009 to the year 2010, while the others remain unchanged. Calculate the composite index of the moisturizing cream in the year 2010 based on the year 2007. [3 *marks*]

Jadual di atas menunjukkan indeks harga dan pemberat masing-masing bagi tahun 2009 *berasaskan tahun* 2007 *bagi empat bahan P, Q, R dan S dalam penghasilan suatu jenis krim lembapan.*

(a) *Jika harga bagi bahan P pada tahun* 2007 *ialah* RM60.00*, hitungkan harga bagi bahan tersebut pada tahun* 2009.

[2 *markah*]

(b) *Diberi bahawa indeks gubahan bagi kos penghasilan krim lembapan itu pada tahun* 2009 *berasaskan tahun* 2007 *ialah* 120. Cari

(i) *nilai m,*

[3 *markah*]

(ii) *harga bagi krim lembapan pada tahun* 2007 *jika harganya pada tahun* 2009 *ialah* RM30.00.

[2 *markah*]

(c) *Diberi bahawa harga bagi bahan* Q *dijangka akan naik sebanyak* 15% *dari tahun* 2009 *ke tahun* 2010*, sementara lain-lain bahan harganya kekal. Hitung indeks gubahan bagi krim lembapan itu pada tahun* 2010 *berasaskan tahun* 2007.

[3 *markah*]

14. Use graph paper to answer this question.

The manager of a warehouse intends to order some chairs. The warehouse needs x units of office chairs and y units of dining chairs. The purchase of these chairs is based on the following constraints:

I : The number of dining chairs is at least 200 units.

II : The total numbers of chairs is not more than 800 units.

III : An office chair takes up four units of storage space while a dining chair occupies one unit of storage space. The maximum storage space available is 1400 units.

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

(b) Using a scale of 2 cm to 100 units on both axes, construct and shade the region $\boldsymbol{R}$ which satisfies all of the above constraints. [3 *marks*]

(c) Use your graph in **14**(b) to find

(i) the maximum number of dining chairs that could be ordered, if the manager plans to order only 150 units of office chairs,

(ii) the maximum total profit if the profit from an office chair is RM20.00 and from a dining chair is RM6.00. [4 *marks*]

Gunakan kertas graf untuk menjawab soalan ini.

Seorang pengurus gudang ingin membeli dua jenis kerusi, iaitu kerusi pejabat dan kerusi dewan makan. Gudang tersebut memerlukan x *unit kerusi pejabat dan* y *unit kerusi dewan makan. Pembelian kerusi-kerusi tersebut adalah berdasarkan kekangan berikut:*

I : Bilangan kerusi dewan makan sekurang-kurangnya 200 *unit.*

II : Jumlah kerusi tidak melebihi 800 *unit.*

III : Satu kerusi pejabat memerlukan empat unit ruang menyimpan dan satu kerusi dewan makan memerlukan satu unit ruang menyimpan. Ruang menyimpan maksimum yang boleh dibekal ialah 1400 *unit.*

(a) *Tuliskan tiga ketaksamaan, selain* $x \geq 0$ *dan* $y \geq 0$, *yang memenuhi semua kekangan di atas.* [3 *markah*]

(b) *Menggunakan skala* 2 cm *kepada* 100 *unit pada kedua-dua paksi, bina dan lorek rantau* ***R*** *yang memenuhi semua kekangan di atas.* [3 *markah*]

(c) *Gunakan graf anda di* 14(b) *untuk mencari*

(i) bilangan maksimum kerusi dewan makan yang boleh dibeli jika pengurus tersebut bercadang untuk membeli hanya 150 *unit kerusi pejabat,*

(ii) keuntungan maksimum keseluruhannya jika keuntungan yang diperoleh dari satu unit kerusi pejabat ialah RM20.00 *dan dari satu unit kerusi dewan makan ialah* RM6.00. [4 *markah*]

15. The diagram shows a parallelogram *PQRS*. *T* is a point on *RS* such that *RT* = 9 cm. Given that the area of triangle *SQR* is 42.28 cm^2 . Find

(a) the length, in cm, of *TQ*,

[2 *marks*]

(b) $\angle$ *QTR*,

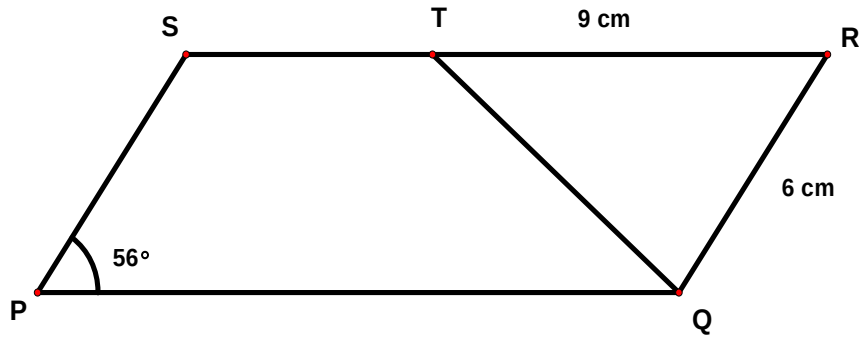
[2 *marks*]

(c) the length, in cm, of *ST*,

[3 *marks*]

(d) the area, in cm^2 , of quadrilateral *PQTS* .

[*3 marks*]



Rajah di atas menunjukkan segiempat selari PQRS. T ialah satu titik pada RS dengan keadaan RT = 9 cm. *Diberi bahawa luas segitiga SQR ialah* 42.28 cm^2 . Cari

(a) panjang, dalam cm, *TQ,*

[2 *markah*]

(b) $\angle$ *QTR,*

[2 *markah*]

(c) panjang, dalam cm, *ST,*

[3 *markah*]

(d) luas, dalam cm^2, *sisiempat PQTS.*

[3 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

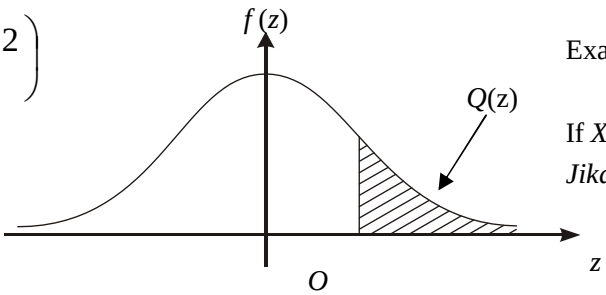
THE UPPER TAIL PROBABILITY Q(z) FOR THE NORMAL DISTRIBUTION N(0,1)

***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

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

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



Example / *Contoh*:

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

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

3472/1
Additional
Mathematics
Paper1
September 2010

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA SEKOLAH MENENGAH NEGERI KEDAH DARUL AMAN

PEPERIKSAAN PERCUBAAN SPM 2010

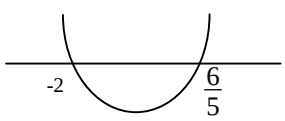
ADDITIONAL MATHEMATICS

MARKING SCHEME

Paper 1

.

SPM Trial Examination 2010 Kedah Darul Aman
Marking Scheme
Additional Mathematics Paper 1

Question	Solution/ Marking Scheme	Answer	Marks
1		(a) 8 (b) $0 \le f(x) \le 8$	1 1
2	(a) B1: $\frac{2+n}{3} = 5$	(a) 13 (b) $3x - 13$	2 1
3	(a) B1: $4g(x) + 2 = 5x - 2$ (b) B1: $\frac{5(4x+2)-4}{4} = 4$	(a) $\frac{5x-4}{4}$ (b) $\frac{1}{2}$	2 2
4	B2: $2\left(-\frac{1}{9}\right)^2 = \frac{k}{9}$ B1 : $\alpha + 2\alpha = -\frac{3}{9}$ *or* $\alpha \times 2\alpha = \frac{k}{9}$	$\frac{2}{9}$	3
5		(a) 3 (b) 11 (c) -7	1 1 1
6	B2:  B1: $(5x-6)(x+2)$	$-2 \le x \le \frac{6}{5}$	3
7	B2: $x + 3 = -4(2x+3)$ B1 : 2^{x+3} *or* $2^{-4(2x+3)}$	$x = -\frac{5}{3}$	3

Question	Solution/ Marking Scheme	Answer	Marks
8	B2: $\frac{117}{9}-\left(\frac{27}{9}\right)^2$ B1: $\frac{31-4}{9}$ *or* 3 *or* $133-4^2$ *or* 117	4	3
9	B3: $\frac{1}{3}+\frac{5}{6}$ B2: $\frac{\log_p p}{\log_p 2}+\frac{\log_q q}{\log_q 2}$ *or* $\frac{1}{\log_p 2}+\frac{1}{\log_{q2}}$ B1: $\log_2 pq=\log_2 p+\log_2 q$	$\frac{7}{6}$	4
10	(b) B2: $S_{10}=\frac{10}{2}[2(-6)+9(3)]$ B1: $a=-6$ *and* $d=3$	(a) -2 (b) 75	1 3
11	(a) B2: $r^3=27$ B1: $ar=6$ *or* $ar^4=162$	(a) 3 (b) 2	3 1
12	B2: $S_\infty=\frac{\frac{3}{8}}{1-(-\frac{1}{2})}$ B1: $r=-\frac{1}{2}$	$\frac{1}{4}$	3
13	B2 : $\frac{3x+11}{4}=2$ *and* $\frac{8+3y}{4}=17$ B1 : $\frac{3x+11}{4}=2$ *or* $\frac{8+3y}{4}=17$	(−1, 20)	3
14	B2 : $p=-1.2$ *or* $q=6.3$ B1 : $p=\frac{5.1-1.5}{1-4}$ *or* $5.1=q-1.2$ *or* $1.5=q-1.2(4)$	p = -1.2 q = 6.3	3
15	B2: h=7 or k=8 B1: $\overrightarrow{BA}=hi-(k-3)j$	h=7 k=8	3

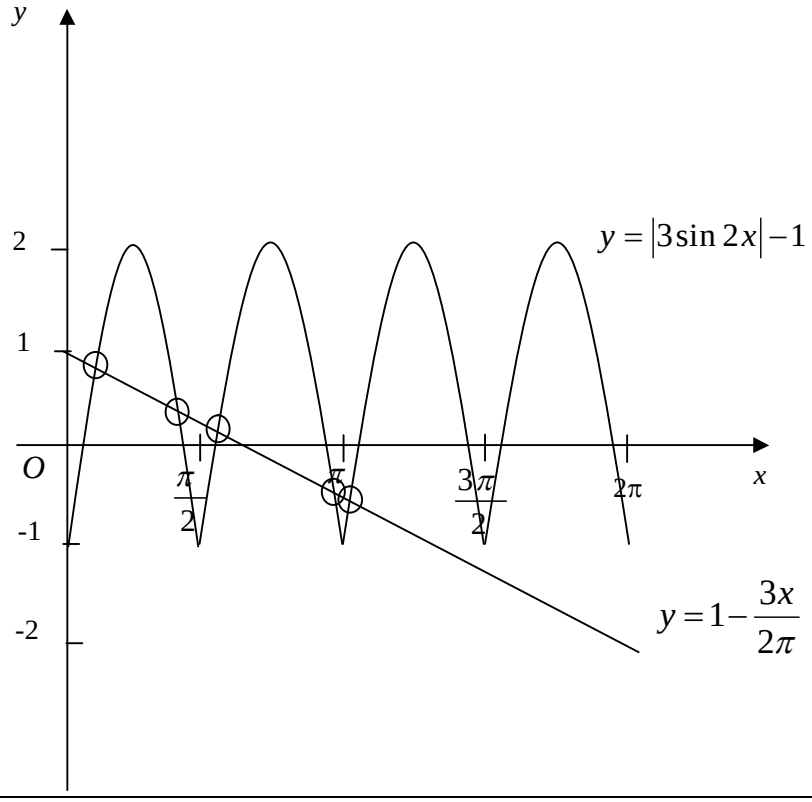
Question	Solution/ Marking Scheme	Answer	Marks
16	B2: $\frac{3}{2}=\frac{5h}{6h-8}$ B1: $\begin{pmatrix}3\\2\end{pmatrix}=k\begin{pmatrix}5h\\6h-8\end{pmatrix}$ or $\overrightarrow{AB}//\overrightarrow{AC}$	3	3
17	B2 : 75^0 *or* 195^0 B1 : $x-45^0=30^0$ *or* 150^0	$75^0, 195^0$	3
18	B2 : $\frac{1}{2}(3)^2(2) = \frac{1}{2}(4)^2\theta$ B1: $\frac{1}{2}(3)^2(2)$ *or* $\frac{1}{2}(4)^2\theta$	1.125 rad	3
19	(a) B1: $m=-\frac{1}{2}$ (b) B1: $0=-\frac{1}{2}x+8$	(a) $y=-\frac{1}{2}x+8$ (b) (16, 0)	2 2
20	B3: $-6(0+1)(4-0)+2(4-0)^2$ B2: $2(2x+1)(4-3x)(-3)+2(4-3x)^2$ B1: $2(2x+1)(4-3x)(-3)$ or $2(4-3x)^2$	8	4
21	B2 : $11=\frac{(2)^2}{2}-\frac{8(2)^{-1}}{-1}+c$ B1: $\frac{x^2}{2}$ *or* $\frac{8x^{-1}}{-1}$	$y=\frac{x^2}{2}+\frac{8}{x}+5$	3

Question	Solution/ Marking Scheme	Answer	Mark
22	B2 : $\delta y = -24(2)^{-3} \times p$ B1 : $\frac{dy}{dx} = -24x^{-3}$ *or* $\delta x = p$	-3p	3
23	B1: ${}^{10}C_3(0.15)^3(0.85)^7$	0.1298	2
24	(b) B1: ${}^7C_3 - {}^5C_1$ *or* $2\times{}^5C_2 + {}^5C_3$	(a) 35 (b) 30	1 2
25	(a) B1 : $\frac{100-92}{5}$ (b) B1 : $\frac{88-92}{5}$	(a) 1.6 (b)0.7881	2 2

END OF MARKING SCHEME

MARKING SCHEME
ADDITIONAL MATHEMATICS PAPER 2
SPM TRIAL EXAMINATION 2010

N0.	SOLUTION	MARKS
1	$x = 10 - 2y$ $y^2 + (10 - 2y)y = 24$ $y^2 - 10y + 24 = 0$ $(y-4)(y-6) = 0$ $y = 4$ *or* $y = 6$ $x = 2$ *or* $x = -2$	**P1** **K1 Eliminate x** **K1 Solve quadratic equation** **N1** **N1**
		5
2 **(a)**	$k = 6$	**P1**
(b)	Mid point 23 , 28 , 33 , 38 , 43	**P1**
(i)	Mean $= \frac{\sum fx}{\sum f} = \frac{1\times 23 + 4\times 28 + 7\times 33 + 5\times 38 + 3\times 43}{1+4+7+5+3}$ $= \frac{685}{20} = 34.25$	**K1 Use formula and calculate** **N1**
(ii)	Varian $= \frac{\sum fx^2}{\sum f} - \bar{x}^2$ $= \frac{1\times 23^2 + 4\times 28^2 + 7\times 33^2 + 5\times 38^2 + 3\times 43^2}{20} - 34.25^2$ $= \frac{24055}{20} - 34.25^2$ $= 29.69$	**K1 Use formula and calculate** **N1**
(iii)	Median , m $= L + \left(\frac{\frac{1}{2}N - F}{f_m}\right)C = 30.5 + \left(\frac{\frac{1}{2}(20) - 5}{7}\right)5$ $= 34.07$	**K1 Use formula and calculate** **N1**
		8

N0.	SOLUTION	MARKS
3	$y=\frac{1}{3}x^3-x^2+2$	
(a)	$\frac{dy}{dx}=x^2-2x=3$ $x^2-2x-3=0$ $(x+1)(x-3)=0$ $x=-1\ ,\ 3$ $x=-1 \qquad y=\frac{2}{3}$ $x=3 \qquad y=2$ $\left(-1,\frac{2}{3}\right)$ and $(3,2)$	**K1 Equate and solve quadratic equation** **N1 N1**
(b)	Equation of normals : $m_{normal}=-\frac{1}{3}$ $y-\frac{2}{3}=-\frac{1}{3}(x+1)$ $\qquad$ $y-2=-\frac{1}{3}(x-3)$ $y=-\frac{1}{3}x+\frac{1}{3}$ *or equivalent* $\qquad$ $y=-\frac{1}{3}x+3$ *or equivalent*	**K1 Use m_{normal} to form equations** **N1 N1**
		6
4 **(a)**		**P1 Modulus sine shape correct.** **P1 Amplitude = 3 [Maximum = 2 and Minimum = -1]** **P1 Two full cycle in $0 \le x \le 2\pi$** **P1 Shift down the graph**

N0.	SOLUTION	MARKS
4 (b)	$\lvert 3\sin 2x\rvert - 1 = 1 - \frac{3x}{2\pi}$ **or** $y = 1 - \frac{3x}{2\pi}$ Draw the straight line $y = 1 - \frac{3x}{2\pi}$ Number of solutions = **5**.	**N1 For equation** **K1 Sketch the straight line** **N1**
		7
5 **(a)**	Common ratio, $r = 4$	**N1**
(b)	$A_6 = \frac{1}{4}\pi(32)^2$ $= 256\pi$ *OR* $T_6 = ar^5 = \frac{1}{4}\pi(4)^5$ $= 256\pi$	**K1** **N1**
(c)	$S_6 - S_2$ $= \frac{\frac{1}{4}\pi(4^6 - 1)}{4-1} - \frac{\frac{1}{4}\pi(4^2 - 1)}{4-1}$ $= 341.25\pi - 1.25\pi$ $= 340\pi$	**K1 Use S_6 or S_2** **K1 Use $S_6 - S_2$** **N1**
		6

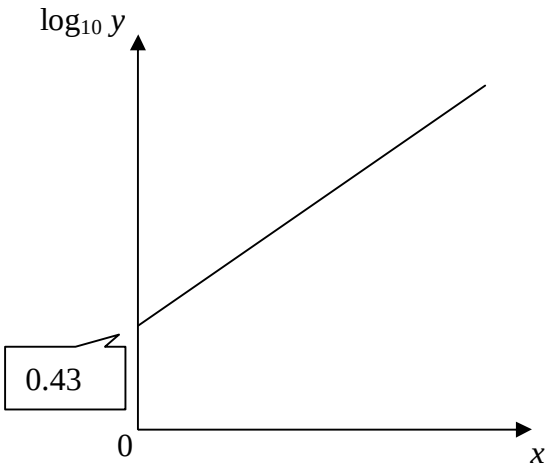
N0.	SOLUTION	MARKS
6		
(a)		**K1 for using vector triangle for a(i) or a(ii)**
(i)	$\overrightarrow{OD} = \overrightarrow{OC} + \overrightarrow{CD}$ $= 6\underset{\sim}{a} + 12\underset{\sim}{b}$	**N1**
(ii)	$\overrightarrow{AB} = \overrightarrow{OB} - \overrightarrow{OA}$ $= \frac{1}{2}\overrightarrow{OD} - \overrightarrow{OA}$ $= 3\underset{\sim}{a} + 6\underset{\sim}{b} - 3\underset{\sim}{a}$ $= 6\underset{\sim}{b}$	**N1**
	OR	
	$\overrightarrow{AB} = \frac{1}{2}\overrightarrow{CD} = 6\underset{\sim}{b}$ **[K1 N1]**	
(b)		
	$\overrightarrow{AE}$ $= \overrightarrow{AB} + \overrightarrow{BE}$ $= 6\underset{\sim}{b} + h\left(\frac{1}{2}\overrightarrow{OD}\right)$ $= 6\underset{\sim}{b} + h\left(3\underset{\sim}{a} + 6\underset{\sim}{b}\right)$	**K1 for using vector triangle and $\overrightarrow{BE}$**
	$\underset{\sim}{a} + k\underset{\sim}{b} = 3h\underset{\sim}{a} + (6 + 6h)\underset{\sim}{b}$	**K1**
	$3h = 1$ $h = \frac{1}{3}$ $k = 6 + 6h$ $= 6 + 6\left(\frac{1}{3}\right)$ $= 8$	**K1 for equating coefficients correctly** **N1 N1**
		8

N0.	SOLUTION	MARKS
7		
(a)		

x	1	2	3	4	5	6
$\log_{10} y$	0.65	0.87	1.08	1.30	1.52	1.74

N1 **6 correct values of log y**

(b)



K1 **Plot $\log_{10} y$ vs x**
Correct axes & uniform scale

N1 **6 points plotted correctly**

N1 **Line of best-fit**

(c) $\log_{10} y = (k \log_{10} A)\, x + \log_{10} A$ **P1**

(i) $x = 2.6$ **N1**

(ii) y-intercept $= \log_{10} y$ **K1**

$A = 2.69$ **N1**

gradient $= k \log_{10} A$ **K1**

$k = \dfrac{gradient}{\log_{10} A}$ *

$= 0.51$ **N1**

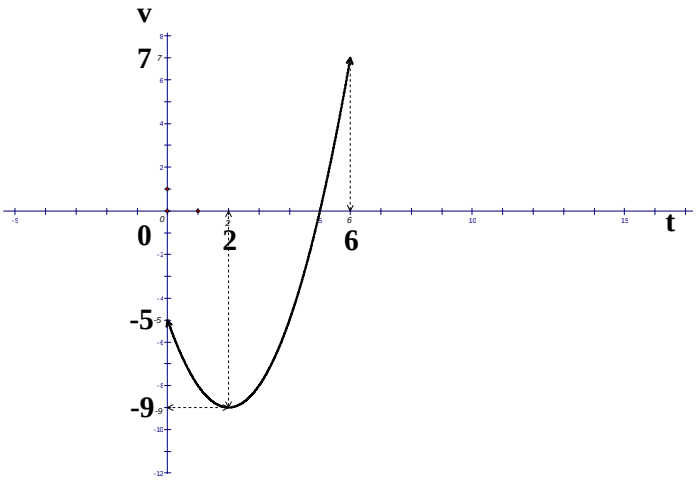
		10

N0.	SOLUTION	MARKS
8		
(a)	$P(5, 1)$	**P1**
	$Q(1, 0)$	**P1**
(b)	$A = \int_0^1 (4y^2 + 1)\, dy$	**K1 use** $\int x\, dy$
	$= \left[\frac{4y^3}{3} + y \right]_0^1$	**K1 correct limit** **K1 integrate correctly**
	$= \frac{7}{3}$ OR equivalent	**N1**
(c)	$V = \pi \int_1^5 \frac{x-1}{4}\, dx$	**K1 integrate** $\pi \int y^2\, dx$
	$= \frac{\pi}{4}\left[\frac{x^2}{2} - x \right]_1^5$	**K1 correct limit** **K1 integrate correctly**
	$= 2\pi$	**N1**
		10

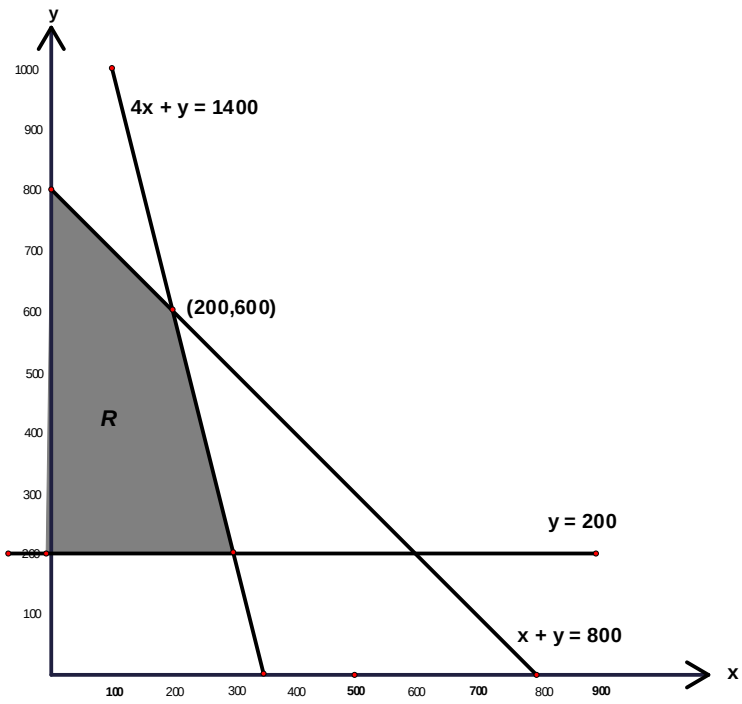
N0.	SOLUTION	MARKS
9		
(a)	$\cos \angle POQ = \frac{4}{10}$	**K1 Use ratio of trigonometry or equivalent**
	$\angle POQ$ = 1.16 rad.	**N1**
(b)		
	($2\pi - 1.16$) rad	**P1**
	PQ = 10 ($2\pi - 1.16$)	**K1 Use** $s = r\theta$
	= 51.24 cm	**N1**
(c)		
	$\sqrt{10^2 - 4^2}$	**P1**
	= 9.17 cm	
	Area of trapezium $POQR$ = $\frac{1}{2}(6+10)\times 9.17^*$	**K1**
	= 73.36 cm^2	
	Area of sector POQ = $\frac{1}{2}(10)^2\,(1.16)$	**K1 Use formula** $A = \frac{1}{2}r^2\theta$
	= 58 cm^2	
	Area of shaded region	
	= 73.36 – 58	**K1**
	= 15.36 cm^2	**N1**
		10

N0.	SOLUTION	MARKS
10.		
(a)	Equation of str. line PQR :	
	$m = -\frac{1}{2}$	**K1**
	$y = -\frac{1}{2}x + 1$	**N1**
(b)	$2x + 6 = -\frac{1}{2}x + 1$	**K1 solving simultaneous equation**
	$P(-2, 2)$	**N1**
(c)	$\frac{1(x)+2(-2)}{1+2} = 0$ or $\frac{1(y)+2(2)}{1+2} = 1$	**K1 Use the ratio rule**
	$R(4, -1)$	**N1**
(d)		
(i)	$\sqrt{(x-4)^2+(y+1)^2} = \frac{1}{2}\sqrt{(x+2)^2+(y-2)^2}$	**K1 Use distance formula**
	$4[x^2 - 8x + 16 + y^2 + 2y + 1] = x^2 + 4x + 4 + y^2 - 4y + 4$	
	$x^2 + y^2 - 12x + 4y + 15 = 0$	**N1**
(ii)	*Substitute* $x = 0$, $y^2 + 4y + 15 = 0$ $b^2 - 4ac = (4)^2 - 4(1)(15)$ $= -44 < 0$	**K1 Substitute x = 0 and use $b^2 - 4ac$ to make a conclusion**
	$\Rightarrow$ No real root for y,	
	$\Rightarrow$ The locus does not intercept the y-axis.	**N1 if $b^2 - 4ac = -44$**

		10
N0.	**SOLUTION**	**MARKS**
11		
(a)	$\mu = 80,\ \sigma = 12$	
	$P(X \geq 65) = P(Z \geq \frac{65-80}{12})$	**K1 Use Z =** $\frac{X-\mu}{\sigma}$
	$= P(Z \geq -1.25)$	
	= 1 – 0.1056	**K1 Use 1 – Q(Z)**
	= 0.8944	**N1**
(b)	0.1056 × 4000	**K1**
	= 422 or 423	**N1**
(c)	$\frac{200}{4000} = 0.05$	**P1**
	Q(Z) = 0.05	
	Z = 1.645	**K1 Find value of *Z***
	$\frac{m-80}{12} = -1.645$	**K1 Use** $\frac{m-\mu}{\sigma}$
		K1 Use negative value
	m = 60.26 g	**N1**
		10

N0.	SOLUTION	MARKS
12		
(a)	**- 5 ms^{-1}**	**N1**
(b)	$v < 0$	**K1**
	$t^2 - 4t - 5 < 0$	**K1**
	$(t - 5)(t + 1) < 0$	
	$0 < t < 5$	**N1**
(c)		**P1 (for shape)** **P1 min(2,-9) , (6,7) &(0,-5) must be seen**
(d)	*Total dis* tan *ce*	
	$= \left\| \int_0^5 v\,dt \right\| + \int_5^6 v\,dt$	**K1 for** $\int_0^5$ *and* $\int_5^6$
	$= \left\| \left[\frac{t^3}{3} - 2t^2 - 5t \right]_0^5 \right\| + \left[\frac{t^3}{3} - 2t^2 - 5t \right]_5^6$	**K1 (for Integration; either one)**
	$= \left\| \left[\left(\frac{5^3}{3} - 2(5)^2 - 5(5) \right) - (0) \right] \right\| + \left[\left(\frac{216}{3} 2(36) - 30 \right) - \left(\frac{5^3}{3} - 2(5)^2 - 5(5) \right) \right]$	**K1 (for use and summation)**
	$= \left\| -33\frac{1}{3} \right\| + \left[-30 - (-33\frac{1}{3}) \right]$	
	$= 36\frac{2}{3}$ m	**N1**

		10
N0.	**SOLUTION**	**MARKS**
13		
(a)	$\frac{P_{09}}{60} \times 100 = 125$	**K1**
	$P_{09} = RM75$	**N1**
(b)		
(i)	$120 = \frac{(125 \times 4) + (120m) + (80 \times 5) + 150m + 450}{12 + 2m}$	**K1**
	$1440 + 240m = 1350 + 270m$	**K1 (use formula)**
	$m = 3$	**N1**
(ii)	$P_{07} = RM\,30 \times \frac{100}{120}$	**K1**
	$= RM\,25$	**N1**
(c)		
	120 + (120 × 0.15) = 138	**K1**
	$\bar{I}_{10/07} = \frac{(125 \times 4) + (138 \times 3) + (80 \times 5) + (150 \times 6)}{18}$	**K1**
	$= 123$	**N1**

		10
N0.	**SOLUTION**	**MARKS**
14		
(a)	$y \geq 200$	**N1**
	$x + y \leq 800$	**N1**
	$4x + y \leq 1400$	**N1**
(b)		
	• At least one straight line is drawn correctly from inequalities involving x and y.	**K1**
	• All the three straight lines are drawn correctly	**N1**
	• Region is correctly shaded	**N1**
(c)		
(i)	**650**	**N1**
(ii)	Maximum point **(200, 600)**	**N1**
	Maximum profit = 20(200) + 6(600)	**K1**
	= **RM 7600**	**N1**

		10
N0.	**SOLUTION**	**MARKS**
15		
(a)	$TQ^2 = 9^2 + 6^2 - 2(9)(6)\cos 56^o$	**K1**
	$TQ = 7.524$ cm	**N1**
(b)	$\frac{\sin \angle QTR}{6} = \frac{\sin 56^0}{7.524}$	**K1**
	$\angle QTR = 41^o 23'$	**N1**
(c)	$42.28 = \frac{1}{2}(RS)(6)\sin 56^o$	**K1**
	$RS = 17$	
	$ST = 17 - 9$ (or $ST + 9$ in formula of area)	**K1**
	$= 8$ cm	**N1**
(d)	$Area\ \Delta QTR = \frac{1}{2}(9)(6)\sin 56^0$	**K1**
	$= 22.38$ cm^2	
	Area of quadrilateral $PQTS = 2(42.28) - 22.38$	**K1**
	$= 62.18$ cm^2	**N1**
		10

END OF MARKING SCHEME