NO. KAD PENGENALAN

ANGKA GILIRAN

JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN SPM 2010

3472/1

ADDITIONAL MATHEMATICS
Kertas 1
Sept.
2 Jam

Dua jam

ADDITIONAL MATHEMATICS

TINGKATAN 5

KERTAS 1

2 JAM

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Tulis **nombor kad pengenalan** dan **angka giliran** anda pada petak 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 sebelah.

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

Kertas soalan ini mengandungi **18** halaman bercetak.

[Lihat sebelah
SULIT

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

1 The following information refers to the sets P and Q.
Maklumat berikut adalah berkaitan dengan set P dan set Q.

$P = \{3, 5, 7\}$

$Q = \{5, 7, 8, 10, 13\}$

Based on the information above, the relation between set P and Q is defined by the set of ordered pairs {(3, 5), (3, 8), (5, 7) , (5, 13) , (7,13) }.
Berdasarkan maklumat di atas, hubungan antara set P dan set Q ditakrif dengan set pasangan tertib {(3, 5), (3, 8), (5, 7) , (5, 13) , (7,13)}.

State
Nyatakan

(a) the image of 5 ,
imej bagi 5,

(b) the type of the relation.
jenis hubungan itu.

[2 marks]
[2 *markah*]

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

(b) .....

1
2

---

2 Given that $f^{-1} : x \to \frac{3-4x}{2}$,

Diberi fungsi $f^{-1} : x \to \frac{3-4x}{2}$,

Find
Cari

(a) function $f(x)$,
fungsi $f(x)$,

(b) the value of $f(5)$.
nilai $f(5)$.

[3 marks]
[3 *markah*]

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

(b) .....

2
3

3 Given the function $h : x \to 2x - 1$ and $k : x \to 6x + 1$.
Diberi fungsi $h : x \to 2x - 1$ *dan* $k : x \to 6x + 1$.

Find the value of x when $hk(x) = 4$.
Cari nilai x *jika* $hk(x) = 4$.

[3 marks]
[3 *markah*]

3
3

Answer /*Jawapan:* x = ...

4 The straight line $y = p(1 - 2x)$ is a tangent to the curve $y - x^2 = 2$.
Garis lurus $y = p(1 - 2x)$ *adalah tangen kepada lengkung* $y - x^2 = 2$.

Find the possible values of p.
Cari nilai-nilai p *yang mungkin.*

[3 marks]
[3 *markah*]

4
3

Answer /*Jawapan:* p = ...

5 Solve the quadratic equation $2x^2 - 6x = x(x+3) - 4$.
Selesaikan persamaan kuadratik $2x^2 - 6x = x(x+3) - 4$.

Give your answer correct to four significant figures.
Berikan jawapan anda betul kepada empat angka bererti.

[3 marks]
[3 *markah*]

5
3

Answer /*Jawapan:* .....

6 Diagram 6 shows the graph of the function $y = (x+3)^2 - p$ where p is a constant.

Rajah 6 menunjukkan fungsi $y = (x+3)^2 - p$, *dengan keadaan p ialah pemalar.*

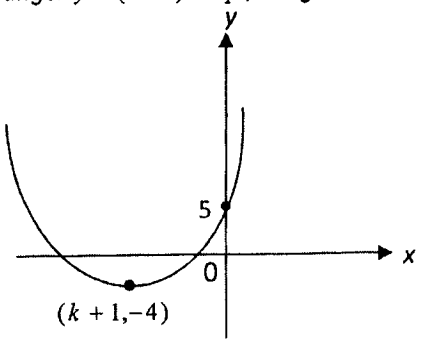


Diagram 6
Rajah 6

Given that $(k + 1, -4)$ is a minimum point of the curve $y = (x+3)^2 - p$. Find

Diberi $(k+1,-4)$ *ialah titik minimum kepada lengkung* $y = (x+3)^2 - p$. *Cari*

(a) the value of p and of k,
nilai p dan nilai k

(b) the equation of the axis of symmetry.
persamaan paksi simetri.

[3 marks]
[3 *markah*]

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

k = ...

(b) .....

6
3

---

7 Solve the equation $2^{4-x} - 2^{3-x} = \frac{1}{8}$.

Selesaikan persamaan $2^{4-x} - 2^{3-x} = \frac{1}{8}$.

[3 marks]
[3 *markah*]

Answer /*Jawapan:* x = ...

7
3

8 Solve the equation $\log_3(3x+2) - \log_3(x-1) = 2$.

Selesaikan persamaan $\log_3(3x+2) - \log_3(x-1) = 2$.

[3 marks]
[3 *markah*]

8 | 3

Answer /*Jawapan:* x = ...

---

9 Given that $\log_2 m = p$ and $\log_3 m = r$. Express $\log_m 18$ in terms of p and r.

Diberi $\log_2 m = p$ *dan* $\log_3 m = r$. *Ungkapkan* $\log_m 18$ *dalam sebutan* p *dan* r.

[4 marks]
[4 *markah*]

9 | 4

Answer /*Jawapan:* .....

---

10 The first three terms of an arithmetic progression are y, $2y-2$ and $2y+1$.
Tiga sebutan pertama suatu janjang aritmetik ialah y, $2y-2$ *dan* $2y+1$.

Find the value of y.
Cari nilai y.

[2 marks]
[2 *markah*]

10 | 2

Answer /*Jawapan:* y = ...

11 The sum of the first three terms of a geometric progression is 35 and the common ratio is 2. Find
Hasil tambah tiga sebutan pertama suatu janjang geometri ialah 35 dan nisbah sepunya ialah 2. Cari

(a) the first term of the progression,
sebutan pertama janjang tersebut,

(b) the eighth term.
sebutan ke lapan.

[3 marks]
[3 *markah*]

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

(b) .....

11
3

---

12 The sum of the first n term, S_n , of a geometric progression is given by
Hasil tambah n sebutan pertama, S_n, bagi suatu janjang geometri diberi oleh

$$S_n = 81\left[1-(\frac{2}{3})^n\right]$$

Find
Cari

(a) the common ratio of the geometric progression,
nisbah sepunya janjang geometri

(b) the sum to infinity of the progression
jumlah sehingga ketakterhinggaan

[4 marks]
[4 *markah*]

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

(b) .....

12
4

13 The variables x and y are related by the equation $y = px^{-\frac{1}{2}}$, where p is a constant. Diagram 13 shows the straight line graph obtained by plotting $\log_{10} y$ against $\log_{10} x$.

Pembolehubah x dan y dihubungkan oleh persamaan $y = px^{-\frac{1}{2}}$, dengan keadaan p ialah pemalar. Rajah 13 menunjukkan graf garis lurus yang diperoleh dengan memplot $\log_{10} y$ melawan $\log_{10} x$.

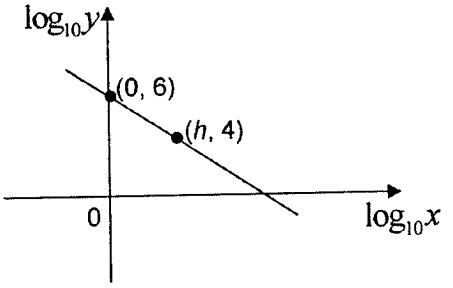


Diagram 13
Rajah 13

(a) Reduce the equation $y = px^{-\frac{1}{2}}$ to linear form.

Tukarkan persamaan $y = px^{-\frac{1}{2}}$ kepada bentuk linear.

(b) Find the value of
Cari nilai

(i) $\log_{10} p$,

(ii) h.

[4 marks]
[4 *markah*]

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

(b) (i) $\log_{10} p$ = ...

(ii) h = ...

13
4

14 Diagram 14 shows the straight line *PQR*.
Rajah 14 menunjukkan garis lurus PQR.

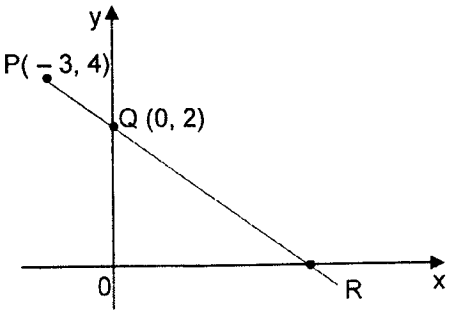


Diagram 14
Rajah 14

Find the equation of the straight line which is perpendicular to *PQR* and passes through point *P*.
Cari persamaan garis lurus yang berserenjang dengan PQR dan melalui titik P.

[3 marks]
[3 *markah*]

14

3

Answer /*Jawapan:* .....

---

15 Diagram 15 shows vector **OA** drawn on a Cartesian plane.
*Rajah 15 menunjukkan vektor **OA** dilukis pada suatu satah Cartesan.*

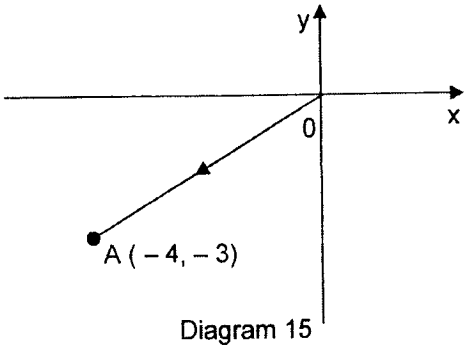


Diagram 15
Rajah 15

(a) Express **OA** in the form $x\boldsymbol{i} + y\boldsymbol{j}$,
*Ungkapkan **OA** dalam bentuk $x\boldsymbol{i} + y\boldsymbol{j}$,*

(b) Find the unit vector in the direction of **OA** .
*Cari vektor unit dalam arah **OA**.*

[2 marks]
[2 *markah*]

15

2

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

(b) .....

16 The following information refers to the vectors $\underset{\sim}{a}$, $\underset{\sim}{b}$, $\underset{\sim}{p}$, $\underset{\sim}{q}$ and $\underset{\sim}{r}$.

Maklumat berikut adalah berkaitan dengan vektor-vektor $\underset{\sim}{a}$, $\underset{\sim}{b}$, $\underset{\sim}{p}$, $\underset{\sim}{q}$ dan $\underset{\sim}{r}$.

$$\underset{\sim}{p} = 3\underset{\sim}{a} + 4\underset{\sim}{b}$$

$$\underset{\sim}{q} = 2\underset{\sim}{a} - \underset{\sim}{b}$$

$$\underset{\sim}{r} = m\underset{\sim}{a} + (m-n)\underset{\sim}{b}$$

where m and n are constants.

di mana m *dan* n *adalah pemalar.*

By using the information given, find the values of m and n when $\underset{\sim}{r} = 4\underset{\sim}{p} - 2\underset{\sim}{q}$.

Dengan menggunakan maklumat yang diberi, cari nilai m *dan nilai* n *jika* $\underset{\sim}{r} = 4\underset{\sim}{p} - 2\underset{\sim}{q}$.

[3 marks]
[3 *markah*]

16 / 3

Answer /*Jawapan*: m = ...

n = ...

---

17 Solve the equation $1 - 2\cos 2x = \cos x$ for $0° \le x \le 360°$.
Selesaikan persamaan $1 - 2\cos 2x = \cos x$ *for* $0° \le x \le 360°$.

[4 marks]
[4 *markah*]

17 / 4

Answer /*Jawapan*: x = ...

18 Diagram 18 shows a circle $ABCD$ with centre O.
Rajah 18 menunjukkan sebuah bulatan $ABCD$ berpusat O.

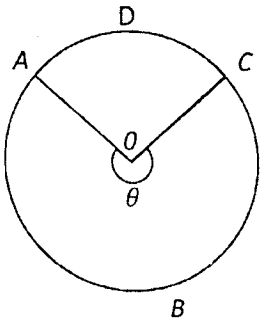


Diagram 18
Rajah 18

Given the length of the arc ABC is 30 cm and the angle of the sector ADC is 100°. Find
Diberi panjang lengkok ABC ialah 30 cm dan sudut sektor ADC ialah 100°. Cari

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

(a) the value of θ, in radian, correct to four significant figures,
nilai θ, dalam radian, betul kepada empat angka bererti,

(b) the length, in cm, of the radius of the circle.
panjang, dalam cm, *jejari bulatan itu.*

[3 marks]
[3 *markah*]

Answer/*Jawapan*: (a) θ = ... radian

(b) .....cm

18
3

---

19 Given that $f(x) = 2(x+1)^3$, find
Diberikan bahawa $f(x) = 2(x+1)^3$, cari

(a) $f'(x)$,

(b) the value of $f''(4)$.
nilai bagi $f''(4)$.

[4 marks]
[4 *markah*]

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

(b) .....

19
4

20 The radius of a circle increases at the rate of 0.4 cms^{-1}. Find the rate of change of the area of the circle when the radius is 10 cm.
Jejari suatu bulatan bertambah dengan kadar 0.4 cms^{-1}. Cari kadar perubahan luas bulatan apabila jejari ialah 10 cm.

[3 marks]
[3 *markah*]

20
3

Answer /*Jawapan:* .....

---

21 Given that $\int_1^2 h(x)\,dx = 3$.
Diberi bahawa $\int_1^2 h(x)\,dx = 3$.

Find
Cari

(a) $\int_2^1 h(x)dx$

(b) the value of k if $\int_1^2 [h(x) + k]\,dx = 7$
nilai k jika $\int_1^2 [h(x) + k]\,dx = 7$

[4 marks]
[4 *markah*]

21
4

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

(b) k = ...

22 A committee of 6 people is to be chosen from 5 men and 7 women. Find the number of ways the committee can be formed if

Satu jawatankuasa terdiri dari 6 orang hendak dipilih dari 5 orang lelaki dan 7 orang perempuan. Cari bilangan cara yang berlainan jawatankuasa itu dapat dibentuk jika

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

(b) the committee must has at most 2 men
jawatankuasa itu mengandungi selebih-lebihnya 2 orang lelaki

[4 marks]
[4 *markah*]

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

(b) .....

22

4

---

23 The mean of a set of 8 numbers is 10. When two numbers k and k^2 are added to the set, the mean remains unchanged. Find the possible values of k.

Min bagi satu set yang mengandungi 8 nombor ialah 10. Apabila dua nombor k dan k^2 ditambah ke dalam set nombor-nombor itu, minnya tidak berubah. Cari nilai-nilai k yang mungkin.

[3 marks]
[3 *markah*]

Answer /*Jawapan:* k = ...

23

3

24 Table 24 shows the number of coloured cards in a box.
Jadual 24 menunjukkan bilangan kad berwarna dalam sebuah kotak.

Colour *Warna*	Number of cards *Bilangan kad*
Green *Hijau*	4
Black *Hitam*	5
Red *Merah*	6

Table 24
Jadual 24

Two cards are drawn at random from the box. Find the probability that both cards are **not** the same colour.
*Dua kad dikeluarkan secara rawak dari kotak itu. Cari kebarangkalian bahawa kedua-dua kad itu **tidak** sama warna.*

[3 marks]
[3 *markah*]

24
3

Answer /*Jawapan:* .....

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

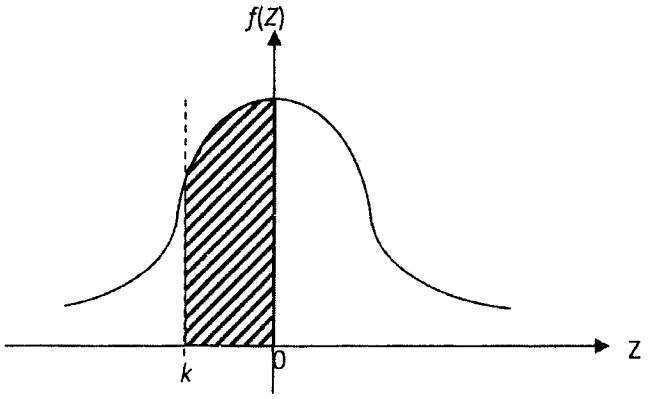


Diagram 25
Rajah 25

The probability represented by the area of the shaded region is 0.1554. Find
Kebarangkalian yang diwakili oleh luas kawasan berlorek ialah 0.1554. Cari

(a) the value of k,
nilai k,

(b) $P(Z > k)$

[4 marks]
[4 *markah*]

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

(b) .....

25
4

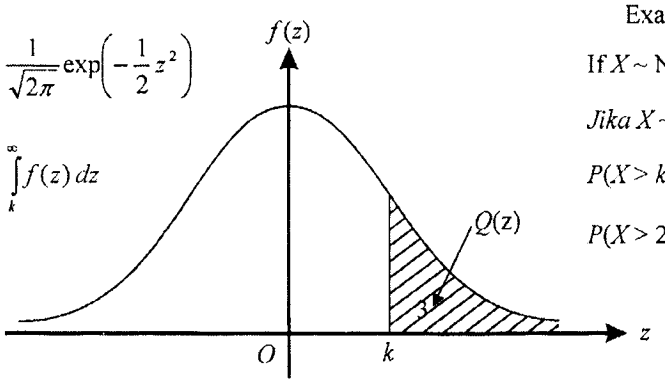
END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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

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

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

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

Additional Mathematics
Kertas 2
Sept 2010

$2\frac{1}{2}$ jam

Nama : .....

Tingkatan : .....

JABATAN PELAJARAN NEGERI JOHOR
PEPERIKSAAN PERCUBAAN SPM 2010

ADDITIONAL MATHEMATICS
KERTAS 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tulis Nama dan Tingkatan anda pada ruangan yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Inggeris atau Bahasa Melayu.*
5. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Nombor Soalan	Markah Penuh	Markah Diperolehi
1	5	
2	5	
3	7	
4	7	
5	8	
6	8	
7	10	
8	10	
9	10	
10	10	
11	10	
12	10	
13	10	
14	10	
15	10	
Jumlah		

Kertas soalan ini mengandungi 19 halaman bercetak.

Section A
Bahagian A

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

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

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

$$x-2y=1$$
$$x+1=\frac{4}{y}$$

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

2 Given a quadratic function $f(x)=1-8x+2x^2=2(x+m)^2+mk$, where m and k are constants.
Diberi fungsi kuadratik $f(x)=1-8x+2x^2=2(x+m)^2+mk$, *dengan keadaan* m *dan* k *adalah pemalar.*

(a) State
Nyatakan

(i) the value of m and k,
nilai m dan k,

(ii) the minimum point.
titik minimum.

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

(b) Hence, sketch the graph of $f(x)=1-8x+2x^2$.
Seterusnya, lakar graf $f(x)=1-8x+2x^2$.

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

3 Bijak Book Store launched a sale for exercise book from January 2009 to December 2009. Bijak Book Store sold 500 exercise books in January 2009 and its sales increased constantly by 50 exercise books every subsequent month.
Bijak Book Store melancarkan jualan buku latihan dari bulan Januari 2009 sehingga bulan Disember 2009.Bijak Book Store telah menjual 500 buah buku latihan dalam bulan Januari 2009 dan jualannya bertambah secara malar sebanyak 50 buah buku setiap bulan berikutnya

(a) (i) Determine the number of exercise books sold by the Bijak Book Store in the month of June, [2 *marks*]
Tentukan jumlah buku latihan yang berjaya dijual oleh Bijak Book Store pada bulan Jun, [2 *markah*]

(ii) Bijak Book Store sold 1000 books in the n^{th} month. Find the value of n. [2 *marks*]
Bijak Book Store telah menjual 1000 buah buku pada bulan ke-n. Cari nilai n. [2 *markah*]

(b) Given that the Bijak Book Store earns a profit of 8 cents from each of the exercise books sold. Find the total profit gained by the Bijak Book Store in the year of 2009. [3 *marks*]
Diberi bahawa Bijak Book Store mendapat keuntungan sebanyak 8 sen bagi setiap buku yang dijual. Kirakan jumlah keuntungan yang diperolehi oleh Bijak Book Store sepanjang tahun 2009. [3 *markah*]

4 Table 4 shows the distribution of the heights of plants in an orchard.
Jadual 4 menunjukkan taburan ke tinggian pokok-pokok di sebuah ladang.

Height of plants *Ketinggian pokok-pokok* (cm)	Frequency *Kekerapan*
5 – 9	4
10 – 14	*p*
15 – 19	17
20 – 24	10
25 – 29	15
30 – 35	9

Table 4
Jadual 4

Given the median is 21.5.
Diberi median adalah 21.5.

(a) Find the value of *p*. [4 *marks*]
Kirakan nilai p. [4 *markah*]

(b) Use graph paper to answer this question.
Gunakan kertas graf untuk menjawab soalan ini.

Using a scale of 2 cm to 5 cm on the horizontal axis and 2 cm to 2 units on the vertical axis, draw a histogram to represent the frequency distribution of the height of plants in the orchard.
Dengan menggunakan skala 2 cm kepada 5 cm pada paksi mengufuk dan 2 cm kepada 2 unit pada paksi mencancang, lukis histogram untuk menunjukkan taburan kekerapan ketinggian pokok-pokok tersebut.

From the graph, find the modal height of the plants. [3 *marks*]
Daripada graf, tentukan mod ketinggian pokok-pokok. [3 *markah*]

5 (a) Prove that $\cot x - \tan x = 2\cot 2x$. [2 *marks*]
Buktikan bahawa $\cot x - \tan x = 2\cot 2x$. [2 *markah*]

(b) (i) Sketch the graph of $y = 2\sin\frac{3x}{2}$ for $0 \le x \le 2\pi$.

Lakarkan graf $y = 2\sin\frac{3x}{2}$ *untuk* $0 \le x \le 2\pi$.

(ii) Hence, using the same axes, sketch a suitable straight line to find the number of solutions for the equation $\sin\frac{3x}{2} = \frac{1}{2} - \frac{x}{4\pi}$ for $0 \le x \le 2\pi$.

Seterusnya, dengan menggunakan paksi yang sama, lakar garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan
$\sin\frac{3x}{2} = \frac{1}{2} - \frac{x}{4\pi}$ *untuk* $0 \le x \le 2\pi$. [6 *marks*]
[6 *markah*]

6 Solutions by scale drawing will not be accepted.
Penyelesaian secara lukisan berskala tidak diterima.

Diagram 6 shows a triangle ABC.
Rajah 6 menunjukkan segitiga ABC.

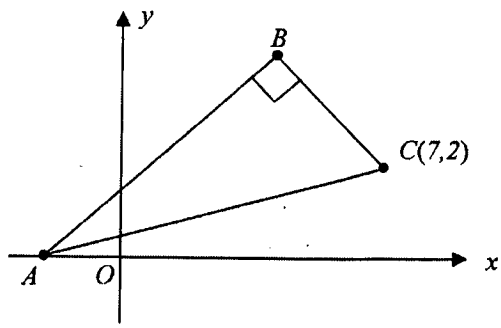


Diagram 6
***Rajah* 6**

The equation of AB is $2y = x + 12$.
Persamaan garis lurus AB ialah $2y = x + 12$.

(a) Find
Cari

(i) the equation of BC, [3 *marks*]
persamaan garis lurus BC, [3 *markah*]

(ii) the coordinates of B. [2 *marks*]
koordinat bagi B. [2 *markah*]

(b) The straight line BC is extended to a point D such that $BC : CD = 3 : 1$.
Find the coordinates of D. [3 *marks*]
Garis lurus BC diperpanjangkan ke titik D dengan keadaan $BC : CD = 3 : 1$.
Cari koordinat bagi titik D. [3 *markah*]

Section B

***Bahagian* B**

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

Answer any **four** questions from this section.

Jawab mana-mana **empat** *soalan daripada bahagian ini.*

7 In Diagram 7, the straight line PAQ is a normal to the curve $y = 4 - x^2$ at point $A(1, 3)$
Dalam Rajah 7, garis lurus PAQ adalah normal kepada lengkung $y = 4 - x^2$ pada titik $A(1, 3)$.

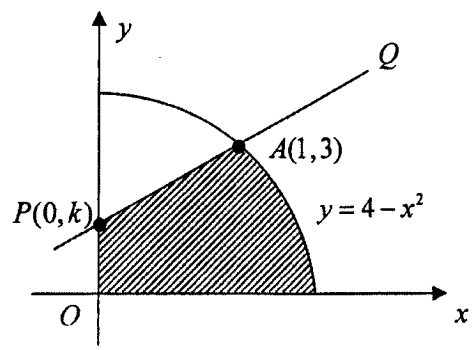


Diagram 7
Rajah 7

Find
Cari

(a) the value of k, [3 *marks*]
nilai k, [3 *markah*]

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

(c) the volume generated in terms of π, when the region bounded by the curve, the y-axis and y = 3 is revolved 360° about the y-axis. [3 *marks*]

Isipadu janaan, dalam sebutan π, apabila rantau yang dibatasi oleh lengkung itu, paksi-y dan y = 3 dikisarkan melalui 360° pada paksi-y. [3 *markah*]

8 Table 8 shows the values of two variables, x and y, obtained from an experiment. Variables x and y are related by the equation $2y - a = \frac{b}{x}$, where a and b are constants.

Jadual 8 menunjukan nilai dua pembolehubah, x dan y didapati daripada satu eksperimen. Pembolehubah x dan y dihubungkan dengan persamaan, $2y - a = \frac{b}{x}$, dengan keadaan a dan b adalah pemalar.

x	1	2	4	5	6	8
y	6.00	3.90	3.00	2.80	2.75	2.50

Table 8
Jadual 8

(a) Plot xy against x, using a scale of 2 cm to 1 unit on the x-axis, and 1 cm to 1 unit on the y-axis.
Hence, draw the line of best fit. [4 *marks*]
Plotkan graf xy lawan x, dengan menggunakan skala 2 cm *kepada* 1 unit *pada paksi- x dan* 1 *cm kepada* 1 *unit pada paksi- y.*
Seterusnya, lukiskan garis lurus penyuaian terbaik. [4 *markah*]

(b) Use your graph in 8(a), to find the value of
Gunakan graf anda di 8(a), *untuk mencari niilai*
(i) *a*,
(ii) *b*,
(iii) y when $x = 2.7$. [6 *marks*]
y *apabila* $x = 2.7$. [6 *markah*]

9 Diagram 9 shows triangle OPQ. The straight line OA intersect the straight line PB at point X.
Rajah 9 menunjukkan segitiga OPQ. Garis lurus OA bersilang dengan garis lurus PB di titik X.

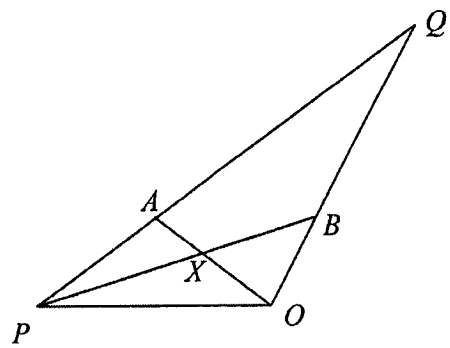


Diagram 9
Rajah 9

It is given that $\vec{OB} = \frac{1}{4}\vec{OQ}$, $\vec{PA} = \frac{1}{5}\vec{PQ}$, $\vec{OP} = 5\underset{\sim}{p}$ and $\vec{OB} = 3\underset{\sim}{q}$.

Diberi bahawa $\vec{OB} = \frac{1}{4}\vec{OQ}$, $\vec{PA} = \frac{1}{5}\vec{PQ}$, $\vec{OP} = 5\underset{\sim}{p}$ *dan* $\vec{OB} = 3\underset{\sim}{q}$.

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

Ungkapkan dalam sebutan $\underset{\sim}{p}$ *dan/atau* $\underset{\sim}{q}$:

(i) $\vec{PB}$,

(ii) $\vec{OA}$. [3 *marks*]
[3 *markah*]

(b) (i) If $\vec{PX} = m\vec{PB}$, express $\vec{PX}$ in terms of m, $\underset{\sim}{p}$ and $\underset{\sim}{q}$.

Jika $\vec{PX} = m\vec{PB}$, *nyatakan* $\vec{PX}$ *dalam sebutan* m, $\underset{\sim}{p}$ *dan* $\underset{\sim}{q}$.

(ii) If $\vec{XA} = n\vec{OA}$, express $\vec{XA}$ in terms of n, $\underset{\sim}{p}$ and $\underset{\sim}{q}$. [2 *marks*]

Jika $\vec{XA} = n\vec{OA}$, *nyatakan* $\vec{XA}$ *dalam sebutan* n, $\underset{\sim}{p}$ *dan* $\underset{\sim}{q}$. [2 markah]

(c) By using $\vec{PA} = \vec{PX} + \vec{XA}$, find the value of m and of n. [5 *marks*]

Dengan menggunakan $\vec{PA} = \vec{PX} + \vec{XA}$, *cari nilai* m *dan nilai* n.

[5 markah]

[Lihat sebelah
SULIT

10 Diagram 10 shows two circles, centre O and P. Both circles have radius 5 cm. OP is a line joining centre O and P.
Rajah 10 *menunjukkan dua buah bulatan masing-masing berpusat* O *dan* P. *Kedua-dua bulatan berjejari* 5 cm. OP *ialah garis lurus yang menyambungkan pusat* O *dan pusat* P.

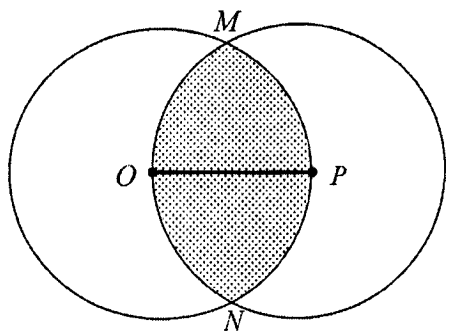


Diagram 10
***Rajah* 10**

(a) Show that $\angle MON = \frac{2}{3}\pi$ rad, [2 marks]

Tunjukkan bahawa, $\angle MON = \frac{2}{3}\pi$ rad, [2 *markah*]

(b) Hence, by using $\pi = 3.142$, calculate
Seterusnya, dengan menggunakan $\pi = 3.142$, *hitungkan*

(i) the perimeter of the shaded region, in cm, [3 marks]
perimeter bagi kawasan berlorek, dalam cm, [3 *markah*]

(ii) the area, in cm^2, of the shaded region. [5 marks]
luas, dalam cm^2, *bagi kawasan berlorek.* [5 *markah*]

11(a) A survey conducted in a certain school shows that one out of three students goes for tuition class.
Satu tinjauan yang dijalankan di sebuah sekolah ke atas murid-murid mendapati bahawa seorang daripada tiga orang pelajar menghadiri kelas tuisyen.

If 7 students are selected at random, calculate the probability that
Jika 7 orang pelajar daripada sekolah itu dipilih secara rawak, hitung kebarangkalian bahawa

(i) exactly 4 students go for tuition class,
tepat 4 orang pelajar pergi ke kelas tuisyen,

(ii) at least a student go for tuition class.
sekurang-kurangnya seorang pelajar menghadiri kelas tuisyen .

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

(b) The height of the players in a basketball team are found to be normally distributed with mean 160 cm and standard deviation 10 cm
Ketinggian pemain-pemain dalam satu pasukan bola keranjang adalah bertaburan secara normal dengan min 160 cm *dan sisihan piawai* 10 cm.

(i) A basketball player is chosen at random.
Seorang pemain bola keranjang dipilih secara rawak.

Find the probability that the height of the player is less than 155 cm
Cari kebarangkalian bahawa pemain tersebut mempunyai ketinggian kurang dari 155 cm.

(ii) It is found that 90% of the basketball players have height more than *h* cm . find the value of *h*.
Didapati bahawa 90% *pemain-pemain bola keranjang tersebut mempunyai ketinggian lebih dari h* cm, *cari nilai h.*

[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 An object moves along a straight line and passes through a fixed point *O*.
Its velocity, v ms^{-1}, is given by $v = 3t^2 - 12t - 15$, where t is the time, in seconds, after passing through point *O*. The particle stops instantaneously after *p* seconds.
Suatu objek bergerak di sepanjang suatu garis lurus dan melalui satu titik tetap O.
Halajunya, v ms^{-1}, *diberi oleh* $v = 3t^2 - 12t - 15$, *dengan keadaan* t *ialah masa, dalam saat, selepas melalui titik O. Objek tersebut berhenti seketika selepas p saat.*

Find
Cari

(a) the minimum velocity, in ms^{-1}, of the particle, [3 *marks*]
halaju minimum, dalam ms^{-1}, *objek tersebut,* [3 *markah*]

(b) the value of *p*, [2 *marks*]
nilai p, [2 *markah*]

(c) the displacement of the object when it is at instantaneous rest, [3 *marks*]
sesaran objek apabila ianya berehat seketika, [3 *markah*]

(d) the distance, in m, travelled by the object in the first 7 seconds. [2 *marks*]
jarak, dalam m, yang dilalui oleh objek dalam 7 saat pertama. [2 *markah*]

13 Table 13 shows the prices and the price indices of five ingredients A, B, C, D and E, to make a particular kind of snacks.
Jadual 13 menunjukkan harga-harga dan indeks harga bagi lima jenis bahan A, B, C, D dan E, bagi membuat sejenis makanan ringan.

Ingredient *Bahan*	Price RM for the year *Harga RM pada tahun*		Price index for the year 2008 based on the year 2006 *Indeks harga pada tahun 2008 berasaskan tahun 2006*
	2006	2008	
A	1.50	1.80	120
B	2.00	2.80	140
C	p	4.50	150
D	4.00	3.20	80
E	2.00	2.20	q

Table 13
***Jadual* 13**

Diagram 13 shows a pie chart which represents the relative quantity of the ingredient used.
Rajah 13 menunjukan carta pai yang mewakili kuantiti bahan yang digunakan.

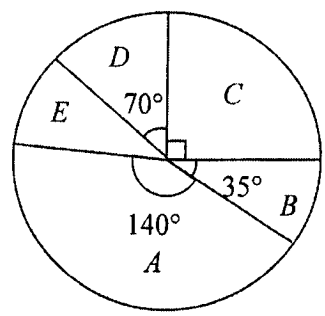


Diagram 13
***Rajah* 13**

(a) Find the value of p and q, [3 marks]
Carikan nilai p dan nilai q, [3 *markah*]

(b) Calculate the composite index for the cost of making the snacks in the year 2008 based on the year 2006. [3 *marks*]
Hitung indeks gubahan bagi kos penghasilan makanan ringan pada tahun 2008 *berasaskan tahun* 2006. [3 *markah*]

(c) The price of each ingredient increases by 25 % from the year 2008 to the year 2010. Given that the cost of making the snacks in the year 2006 is RM30, calculate the corresponding cost in the year 2010. [4 *marks*]
Harga setiap bahan meningkat sebanyak 25% *dari tahun* 2008 *ke tahun* 2010. *Diberi harga membuat setiap produk makanan pada tahun* 2006 *adalah* RM 30, *hitungkan harga kos tersebut pada tahun* 2010.

[4 *markah*]

14 Diagram 14 shows a triangle ACD.
Rajah 14 menunjukkan sebuah segitiga ACD.

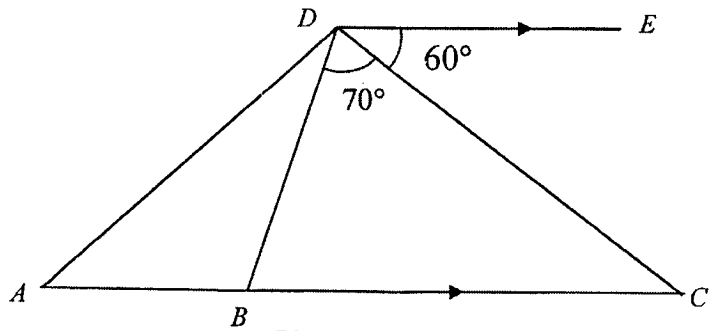


Diagram 14
Rajah 14

Given that DE and BC are parallel lines. ABC is a straight line, BC = 10 cm, and AB = 4 cm.
Rajah 14 menunjukkan segitiga ACD. Diberi bahawa DE dan BC adalah garis selari, ABC ialah garis lurus dengan BC =10 cm *dan* AB = 4 cm.

(a) Find, in cm, the length of BD,
Kirakan, dalam cm, *panjang BD,* [3 *marks*]
[3 *markah*]

(b) Find
Cari

(i) the length of AD, in cm,
panjang AD, dalam cm,

(ii) $\angle BAD$. [4 marks]
[4 *markah*]

(c) $A'B'D'$ is a triangle has the same measurement as triangle ABD that is $A'B' = AB$, $B'D' = BD$, $\angle BDA = \angle B'D'A'$, but different in shape from triangle ABD.
$A'B'D'$ ialah segitiga yang sama ukuran dengan segitiga ABD dengan keadaan $A'B' = AB$, $B'D' = BD$, $\angle BDA = \angle B'D'A'$, tetapi bentuk yang berbeza dari segitiga ABD.

(i) Sketch the triangle $A'B'D'$,
Lakarkan segitiga $A'B'D'$,

(ii) Calculate in cm^2, the area of triangle $A'B'D'$.
Kira, dalam cm^2, *luas segitiga $A'B'D'$.*

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

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

A florist produces x rosette A and y rosette B in her shop.
The cost of making a rosette A is RM 6 and a rosette B is RM 9.
Seorang penjual bunga menghasilkan x roset jenis A dan y roset jenis B di kedainya.
Kos membuat satu roset A ialah RM 6 *dan satu roset B ialah* RM 9.

The production of her shop is based on the following constraints:
Pengeluaran roset di kedainya adalah berdasarkan kekangan-kekangan berikut :

I Minimum number of rosette in her shop is 200.
Bilangan minimum roset di kedainya adalah 200.

II The maximum allocation of production is RM 1620.
Peruntukan maksimum penghasilan roset ialah RM 1620.

III The number of rosette A is not more than 2 times the number of rosette B.
Bilangan roset A adalah tidak melebihi 2 kali bilangan roset B.

(a) Write three inequalities, other than $x \geq 0$ and $y \geq 0$, which satisfy all the constraints above. [3 *marks*]
Tulis tiga ketaksamaan, selain $x \geq 0$ *dan* $y \geq 0$, *yang memenuhi semua kekangan di atas.* [3 *markah*]

(b) By using the scale of 2 cm to 20 rosets on both axes, construct and shade the region R which satisfies the above constraints. [3 *marks*]
Dengan menggunakan skala 2 cm *kepada* 20 roset *di kedua-dua paksi, bina dan lorek rantau R yang memenuhi semua kekangan di atas.* [3 *markah*]

(c) Use your graph in 15(b), to find
Gunakan graf anda di 15(b), *untuk mencari*

(i) the range of number of rosette B produced if she has 120 rosette of A in her shop ,
julat bilangan roset B yang dihasilkan jika penjual bunga itu mempunyai 120 *roset A di kedainya.*

(ii) the maximum profit can be obtained by the florist if all the rosettes are sold out, given that a rosette A is sold at RM 7 and a rosette B is sold at RM 12.
Jumlah keuntungan maksimum yang boleh diperoleh olehnya jika dia dapat menjual kesemua roset apabila satu roset A dijual pada harga RM 7 *dan satu roset B dijual pada harga* RM 12.

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

END OF QUESTION PAPER

No.		Penyelesaian	Sub-markah	Markah penuh
1	(a)	7,13 (ignore any bracket)	1	2
	(b)	Many to many	1	
2	(a)	$\frac{3-2x}{4}$ $y=\frac{3-4x}{2}$	2 B1	3
	(b)	$-\frac{7}{4}$	1	
3		$\frac{1}{4}$ $2(6x+1)-1=4$ $2(6x+1)-1$	3 B2 B1	3
4		-2 , 1 $(2p)^2-4(1)(2-p)=0$ $x^2+2px+2-p=0$	3 B2 B1	3
5		8.531 , 0.4689 $\frac{-(-9)\pm\sqrt{(-9)^2-4(1)(4)}}{2(1)}$ $x^2-9x+4=0$	3 B2 B1	3
6	(a)	$k=-4$, $p=4$	1 , 1	3
	(b)	$x=-3$	1	
7		6 $\frac{1}{2^x}=\frac{1}{64}$ $\frac{1}{2^x}(16-8)=\frac{1}{8}$	3 B2 B1	3

8		$\frac{11}{6}$ $\frac{3x+2}{x-1}=9$ $\frac{3x+2}{x-1}$ or $9(x-1)$ or $\frac{3x+2}{9}$	3 B2 B1	3
9		$\frac{2p+r}{pr}$ $\frac{log_2 2}{log_2 m}+2\frac{log_3 3}{log_3 m}$ $log_m 2+2log_m 3$ $log_m 2+log_m 3^2$ or $\frac{\log 2}{\log 3}$ or $\frac{\log 3}{\log m}$	4 B3 B2 B1	4
10		$y=5$ $2y+1-(2y-2)=2y-2-y$ or equivalent.	2 B1	2
11	(a)	5 $a(1+2+2^2)=35$ @ $\frac{a[2^3-1]}{2-1}=35$	2 B1	3
	(b)	640	1	
12	(a)	$\frac{2}{3}$ $S_1=27$ or $S_2=45$	2 B1	4
	(b)	81 $\frac{27}{1-\frac{2}{3}}$	2 B1	

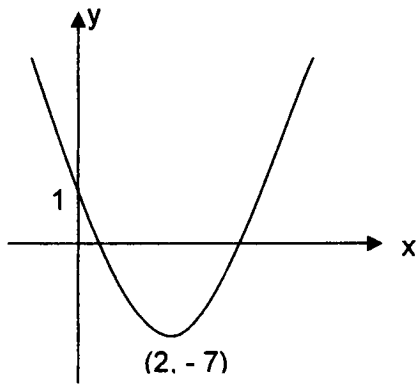
13	(a)	$\log y = \log p - \frac{1}{2}\log x$	1	4
	(b)	(i) 6	1	
		(ii) $h = 4$	2	
		$\frac{6-4}{0-h} = -\frac{1}{2}$ or $4 = 6 - \frac{1}{2}(h)$	B1	
14		$y = \frac{3}{2}x + \frac{17}{2}$ or equivalent	3	3
		$y - 4 = \frac{3}{2}(x + 3)$ or equivalent	B2	
		$m_2 = \frac{3}{2}$ or $m_1 = -\frac{2}{3}$	B1	
15.	(a)	$-4i - 3j$	1	2
	(b)	$\frac{-4i - 3j}{5}$	1	
16		$m = 8$ and $n = -10$	3	3
		$m = 8$ or $n = -10$	B2	
		$m = 12 - 4$ or $m - n = 16 + 2$	B1	
17		$x = 41.41^0, 180^0, 318.59^0$	4	4
		$\cos x = 0.75$, $\cos x = -1$	B3	
		$(4\cos x - 3)(\cos x + 1) = 0$	B2	
		$2(2\cos^2 x - 1) + \cos x - 1 = 0$	B1	
18	(a)	4.538 rad	1	3
	(b)	6.611	2	
		r(4.538)=30	B1	
19	(a)	$6(x + 1)^2$	2	4
		$2[3(x + 1)^2]$	B1	
	(b)	60	2	
		$12(x + 1)$	B1	

20		8π $20\pi(0.4)$ $2\pi r$	3 B2 B1	3
21	(a)	-3	1	4
	(b)	4 $3+[2k-k]=7$ $\int_1^2 h(x)dx + \int_1^2 k\,dx$ or $[kx]$	3 B2 B1	
22	(a)	924 ${}^{12}C_6$	2 B1	4
	(b)	462 ${}^{5}C_0\ {}^{7}C_6$ or ${}^{5}C_1\ {}^{7}C_5$ or ${}^{5}C_2\ {}^{7}C_4$	2 B1	
23		$k=4, -5$ $\frac{k+k^2+80}{10}=10$ $\frac{\sum x}{8}=10$ or $\sum x=80$	3 B2 B1	3
24		$\frac{74}{105}$ $1-\left[\left(\frac{4}{15}\right)\left(\frac{3}{14}\right)+\left(\frac{5}{15}\right)\left(\frac{4}{14}\right)+\left(\frac{6}{15}\right)\left(\frac{5}{14}\right)\right]$ or $1-\frac{{}^{4}C_2+{}^{5}C_2+{}^{6}C_2}{{}^{15}C_2}$ $\left(\frac{4}{15}\right)\left(\frac{3}{14}\right)$ or $\left(\frac{5}{15}\right)\left(\frac{4}{14}\right)$ or $\left(\frac{6}{15}\right)\left(\frac{5}{14}\right)$ or ${}^{4}C_2+{}^{5}C_2+{}^{6}C_2$	3 B2 B1	3

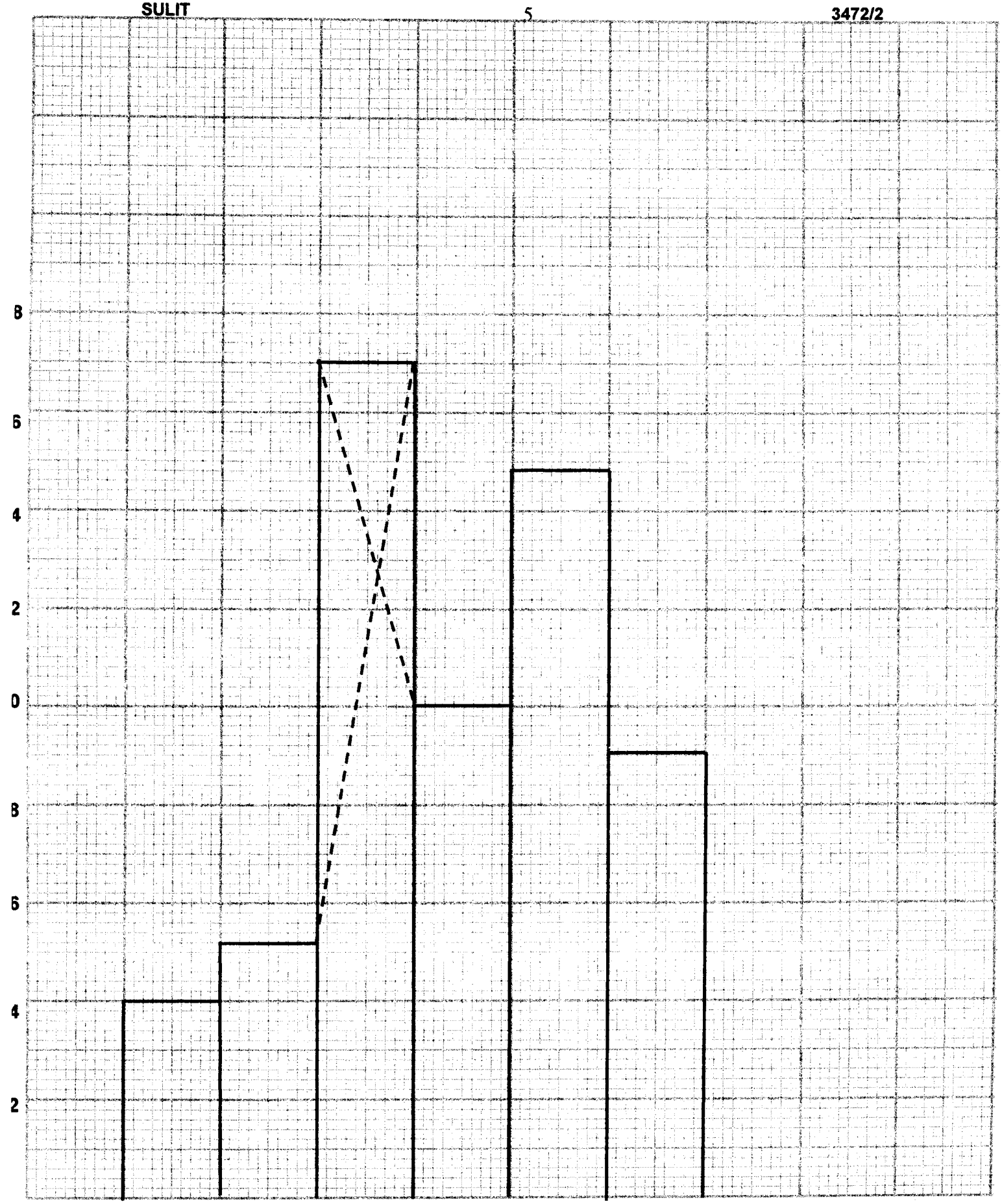
25	(a)	$k = -0.4$ $0.5 - 0.1554$ or 0.3446	2 B1	4
	(b)	0.6554 $0.1554+0.5$ or $1 - 0.3446$	2 B1	

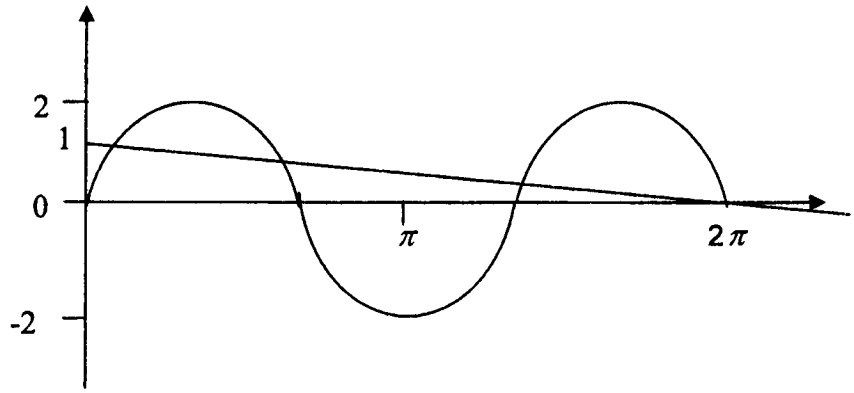
BAHAGIAN A

No	Solution	Sub marks	Total marks
1	$x = 1 + 2y$ Or $y = \frac{x-1}{2}$ Or $y = \frac{4}{x+1}$ Or $x = \frac{4}{y} - 1$ **P1** Eliminate x or y $*(1 + 2y)y + y = 4$ Or $x + 1 = \frac{4}{*(\frac{x-1}{2})}$ Or or equivalent $2y^2 + 2y - 4 = 0$ $x^2 - 9 = 0$ K1 K1 Solve the quadratic equation by using the factorization @ quadratic formula @ completing the square $(x - 3)(x + 3) = 0$ $(2y - 2)(y + 2) = 0$ N1 $x = 3, -3$ $y = -2, y = 1$ or $y = -2, y = 1$ or $x = 3, -3$ N1 **Note :** **OW-1** if the working of solving quadratic equation is not shown.	5	5

No	Solution	Sub marks	Total marks
2 a)	$2(x-2)^2-7$ K1 $m = -2$ N1 $k = \frac{7}{2}$ N1 OR equivalent method	3	
b)	 Shape : U P1 Minimum point : (2, -7) P1	2	5
3 a) i)	$d = 50$ Use $T_n = a + (n-1)d$ $T_6 = 500 + 5(50)$ K1 750 N1 OR other valid method.	2	
ii)	Use $T_n = a + (n-1)d = 1000$ K1 $\frac{1000-500}{50}+1$ 11. N1 Or November 2009.	2	

No	Solution	Sub marks	Total marks
b)	Use $S_n = \frac{n}{2}[2a + (n-1)d]$ $\frac{12}{2}[2(500) + (11)(50)]$ K1 9300 N1 *9300 x 0.08 = RM 744 N1 **Note :** If listing method is used all terms must be correctly listed, accept for correct answer.	3	7
4 a)	*L = 19.5 or *F = 21 + p or *f_m = 10 P1 Use median formula $21.5 = *19.5 + \left(\frac{\left(\frac{55+p}{2}\right) - *(21+p)}{*10}\right)5$ K1 With *f_m and F corresponding to *L K1 $8 = 13 - p$ p = 5 N1	4	
b)	Draw histogram with scale given. At least 6 bars. K1 Find the mode from his histogram. K1 17.75 N1 Accept in the range (17.50 – 18.00)	3	7



No	Solution	Sub marks	Total marks
5 a)	Use identity $\cos^2 x - \sin^2 x = \cos 2x$ or $2 \sin x \cos x = \sin 2x$ K1 N1 LHS = RHS ***No mistake allowed***	2	
b) i)	 Graph Sin 2 period in $0 \le x \le 2\pi$ P1 Amplitude 2 P1 Max = 2 and min = - 2 P1	3	
ii)	Drawing of the straight line from the equation involving x and y, either gradient OR y intercept of straight Line must be correct. K1 $y = 1 - \frac{x}{2\pi}$ N1 Straight line drawn correctly and Number of solutions = 4 N1 ***All must be correct***	3	8

No	Solution	Sub marks	Total marks
6 a) i)	$M_{BC} = -2$ P1 Use $y - y_1 = m(x - x_1)$ K1 Or equivalent method, and substitute $x = 7$ and $y = 2$ $y - 2 = -2(x - 7)$ N1 $y = -2x + 16$	3	
ii)	Solve simultaneous equation $y = \frac{1}{2}x + 6$ $y = -2x + 16$ $\frac{1}{2}x + 6 = -2x + 16$ K1 $x = 4, y = 8$ B (4, 8) N1	2	
b)	Use C (7, 2) = $[\frac{3(x)+1(4)}{4}, \frac{3(y)+1(8)}{4}]$ K1 $\frac{3(x)+1(4)}{4} = 7$ OR $\frac{3(y)+1(8)}{4} = 2$ K1 D (8, 0) N1 OW – 1 for correct answer without working.	3	8

BAHAGIAN B

No	Solution	Sub marks	Total marks
7 a)	$y = 4 - x^2$ $\frac{dy}{dx} = -2x$ K1 $= -2$ $m_{PQ} = ½$ $\frac{3-k}{1-0} = ½$ K1 N1 $k = \frac{5}{2}$	3	
b)	Integrate $(4 - x^2)$ K1 K1 Use limit $\int_1^{*2}$ in to $*[4x - \frac{(x)^3}{3}]$ A1 = $\frac{5}{3}$ A2 = find the area of Trapezium K1 $= ½(\frac{5}{2} + 3)(1) = \frac{11}{4}$ OR Area of shaded region = A1 + A2. $= \frac{53}{12}$ / 4.42 N1	4	
c)	Integrate πx^2 $\pi[4y - \frac{(y)^2}{2}]$ K1 K1 Use limit $\int_3^4$ in π $*[4y - \frac{(y)^2}{2}]$ N1 $½\pi$	3	10

No	Solution	Sub marks	Total marks
8 a)		1	

x	1.0	2.0	4.0	5.0	6.0	8.0
xy	6.00	7.80	12.00	14.00	16.50	20.00

N1

Note:
If table is not shown award N mark if all the points are plotted correctly.

Plot xy against x
(Correct axes and uniform scales) K1

6 *points plotted correctly N1

Line of best fit N1

3

b) $xy = \frac{a}{2}x + \frac{b}{2}$ P1

Or implied.

i) Use *m = $\frac{a}{2}$ K1

a = 4 N1

ii) From graph xy againt x

K1 $\frac{b}{2}$ = xy- intercept

b = 8 N1

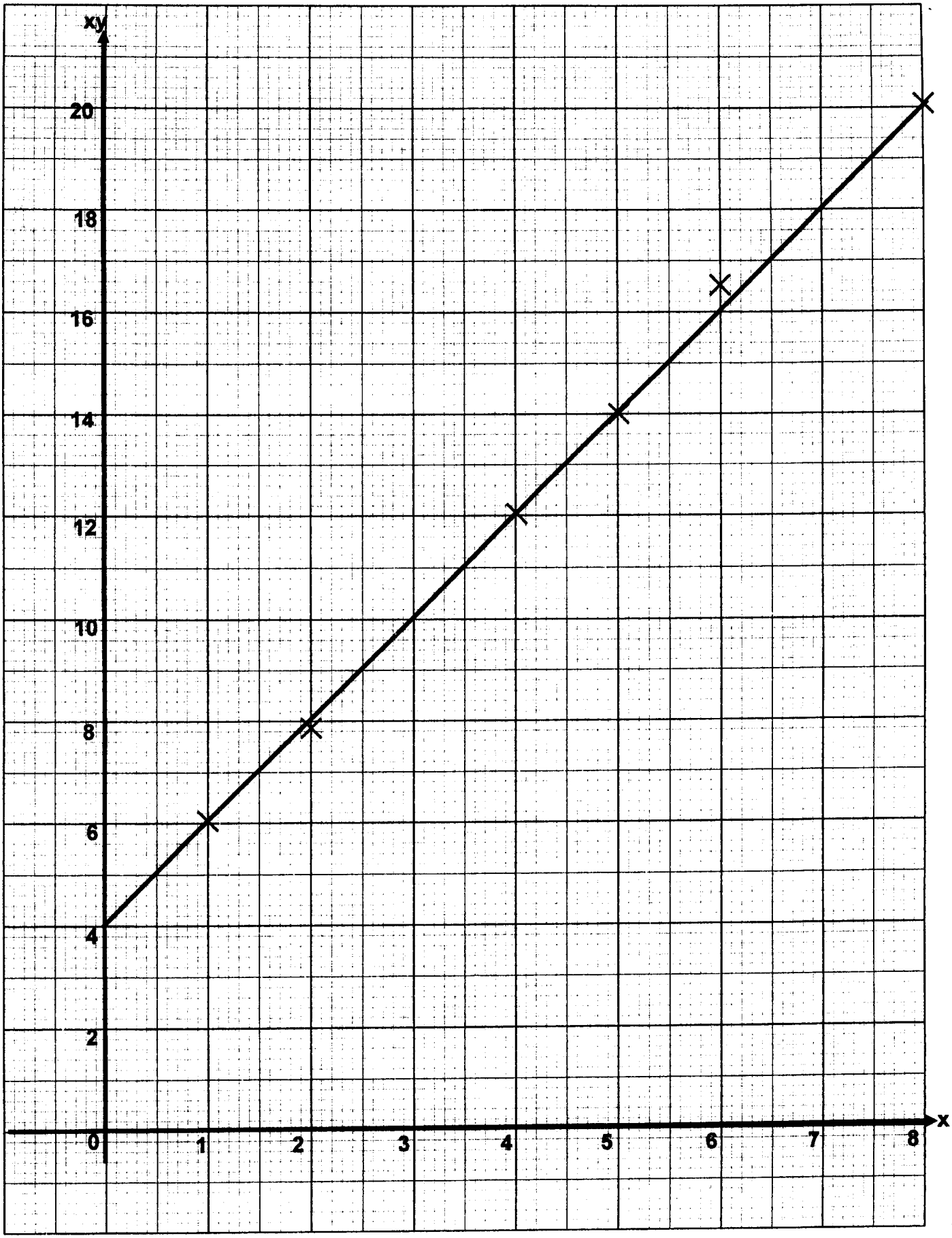
iii) xy = 9.4

y = 3.481 N1

6

Note:
SS – 1 if,
Part of the scale is not uniform at the x-axis and/0r the xy-axis.
OR not using the given scales. OR not using graph paper.

10



No	Solution	Sub marks	Total marks
9 a) i) ii)	Use the triangle law For $\overline{PB}$ or $\overline{OA}$ K1 $\overline{PB} = -5p + 3q$ N1 $\overline{OA} = 4p + \frac{12}{5}q$ N1	3	
b)i)	$\overline{PX} = -5mp + 3mq$ N1		
ii)	$\overline{XA} = 4np + \frac{12}{5}nq$ N1	2	
c)	$\overline{PA} = -p + \frac{12}{5}p$ OR $\overline{PA} = (4n - 5m)p + (3m + \frac{12}{5}n)q$ K1 Compare the coefficient of p and q. $4m - 5n = -1$ OR $3m + \frac{12}{5}n = \frac{12}{5}$ K1 K1 Solve the simultaneous Equation. N1 $n = \frac{3}{8}$, $m = \frac{1}{2}$ $m = \frac{1}{2}$, $n = \frac{3}{8}$ N1 ***(Both are correct)***	5	10

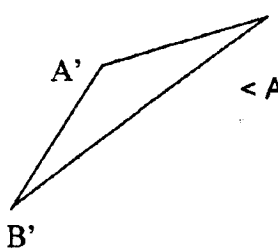
No	Solution	Sub marks	Total marks
10 a)	< MOP = 60° P1 <MON = 120° x $\frac{\pi}{180}$ = $\frac{2}{3}\pi$ rad P1	2	
b) i)	Use S = rθ to find the length of arc MO or ON or NP or PM K1 or use s = r θ to find the length of arc MPN or arc MON $5(\frac{\pi}{3})$ $5(\frac{2\pi}{3})$ Perimeter of the shaded region (5.2367 x 4) K1 or $(\frac{10\pi}{3}) \times 2$ 20.95 N1	3	
ii)	Use A1 = ½r²θ to find the area sector MOP Or NOP = ½ (25)($\frac{\pi}{3}$) K1 = 13.0917 Use A2 = ½r²sin60° to find the area Of triangle OPM or ONP = ½(25)sin60° K1 = 10.825 Area of segment PON or POM A1 – A2 K1 13.0917 – 10.825 = 2.26667 Area of shaded region 2(A1) + 2(area of segment) K1 2(13.0917) + 2(2.26667) 30.72 N1	5	
			10

No	Solution	Sub marks	Total marks
11 a) i)	$\frac{1}{3}$ or $\frac{2}{3}$ P1 Use Binomial formula K1 ${}^{7}C_{4}(\frac{1}{3})^{4}(\frac{2}{3})^{3}$ N1 0.1280		
ii)	Use $1 - P(x=0) = 1 - {}^{7}C_{0}(\frac{1}{3})^{0}(\frac{2}{3})^{7}$ K1 0.1733 N1	5	
b) i)	Use Z $P(Z < \frac{155-160}{10})$ K1 0..3085 N1	2	
ii)	$P(X > h) = 0.9$ $P(Z > \frac{h-160}{10})$ K1 $= -1.281$ // -1.282 K1 $\frac{h-160}{10} = -1.281$ // -1.282 h = 147.19 / 147.18 N1	3	
			10

BAHAGIAN C

No	Solution	Sub marks	Total marks
12 a)	Use $\frac{dv}{dt} = 0$, to find t K1 $6t - 12 = 0$ $t = 2$ Substitute t = 2 into V K1 $v = 3(2)^2 - 12(2) - 15$ $= -27$ N1	3	
b)	Use v = 0 to find t // p K1 $3t^2 - 12t - 15 = 0$ t = 5 s N1	2	
c)	Integrate v to find S K1 $s = \int (3t^2 - 12t - 15)\,dt$ K1 Substitute t = 5 or use the limit $s = \int_0^5 (3t^2 - 12t - 15)\,dt$ N1 = - 100 m	3	
d)	Use t = 5 or t = 7 to find S K1 - 100 m, - 56 m. or equivalent the distance traveled in the first 7 seconds 100 + (100 – 56) 144 N1	2	10

No	Solution	Sub marks	Total marks
13 a)	Use $\frac{4.50}{p} \times 100 = 150$ or $\frac{2.20}{2.00} \times 100 = q$ K1 p = 3.00 N1 q = 110 N1	3	
b)	$\sum IW = (120)28 + (140)7 + (150)18 + (80)14 + (110)5$ P1 Use $\bar{I} = \frac{\sum IW}{\sum W} = \frac{8710}{72}$ K1 N1 120.97	3	
c)	$\frac{x}{125} = \frac{120.97}{100}$ K1 x = 151.21 // 151.22 N1	2	
	$\frac{y}{151.21} = \frac{30}{100}$ K1 y = 45.36 N1	2	10

No	Solution	Sub marks	Total marks
14	<BCD = 60° or <CBD = 50° or <BDC = 70° P1		
a)	Use sine rule to find the length of BD K1 $\frac{BD}{Sin60°} = \frac{10}{Sin70°}$ BD = 9.216 N1	3	
b)i)	Use cosine rule to find the length of AD K1 $AD^2 = 4^2 + *(9.216)^2 - 2(4)(9.216)\cos130°$ AD = 12.18 N1	2	
ii)	Use sine rule to find the <BAD K1 $\frac{*9.216}{Sin < BAD} = \frac{*12.18}{Sin130°}$ < BAD = 35.12° // 35° 25' N1	2	
c)i)	 < A' obtuse P1		
ii)	Area of triangle A'B'D' = ½ (4)(9.216)sin20°50' K1 = 6.555 N1	3	
			10

No	Solution	Sub marks	Total marks
15 (a)	I. $x + y \geq$ **200 or equivalent** N1 II. $6x + 9y \leq 1620$ or equivalent N1 III. $x \leq 2y$ or equivalent N1	3	
(b)	Draw correctly at least one straight line from the *inequalities which invoves x and y. K1 Draw correctly all three *straight lines. Note : Accept dotted lines. N1 The correct region R shaded N1	3	
c) i)	$80 \leq y \leq 100$ N1		
ii)	Maximum point (60, 140) N1 Use $x + 3y$ for point in the *region R K1 RM480 N1	4	
	Note: SS – 1 if In (a) the symbol " = " is not used at all **or** more than three Inequalities are given. In (b) does not use the scale given **or** does not use graph paper **Or** interchange between the x-axis and the y-axis.		**10**