SULIT

PEPERIKSAAN BERSAMA SEKOLAH-SEKOLAH MENENGAH
NEGERI PAHANG

NAMA _____ TINGKATAN _____

PEPERIKSAAN PERCUBAAN 2010 3472/1

ADDITIONAL MATHEMATICS

Kertas 1
September 2010
2 jam **Dua jam**

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
3. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan dalam bahasa Inggeris atau bahasa Melayu.*
4. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

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

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

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

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

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

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

CALCULUS
KALKULUS

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

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

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

4 Area under a curve
Luas di bawah lengkung

$= \int_a^b y \, dx \quad or(atau) \quad \int_a^b x \, dy$

5 Volume generated
Isipadu janaan

$= \int_a^b \pi y^2 \, dx \quad or\,(atau) \quad \int_a^b \pi x^2 \, dy$

STATISTICS
STATISTIK

1 $\bar{x} = \dfrac{\Sigma x}{N}$

2 $\bar{x} = \dfrac{\Sigma fx}{\Sigma f}$

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

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

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

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

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

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

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

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

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

12 $Mean / \min,\ \mu = np$

13 $\sigma = \sqrt{npq}$

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

GEOMETRY
GEOMETRI

1 Distance/*jarak*

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

2 Mid point / *Titik tengah*

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

3 A point dividing a segment of a line

Titik yang membahagi suatu tembereng garis

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

4 Area of a triangle/ *Luas segitiga* =

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

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

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

TRIGONOMETRY
TRIGONOMETRI

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

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

Luas sektor, $L = \frac{1}{2}j^2\theta$

3 $\sin^2 A + \cos^2 A = 1$

$\sin^2 A + k\text{os}^2 A = 1$

4 $\sec^2 A = 1 + \tan^2 A$

$\text{se}k^2 A = 1 + \tan^2 A$

5 $co\sec^2 A = 1 + \cot^2 A$

$ko\text{se}k^2 A = 1 + k\text{ot}^2 A$

6 $\sin 2A = 2\sin A\cos A$

$\sin 2A = 2\sin A\, kos\, A$

7 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2\cos^2 A - 1$
$= 1 - 2\sin^2 A$

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

8 $\sin(A \pm B) = \sin A\cos B \pm \cos A\sin B$

$\sin(A \pm B) = \sin A\, kos\, B \pm ko\text{s}\, A\sin B$

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

$ko\text{s}(A \pm B) = k\text{os}\, A\, k\text{os}\, B \mp \sin A\sin B$

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

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

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

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

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

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

SULIT

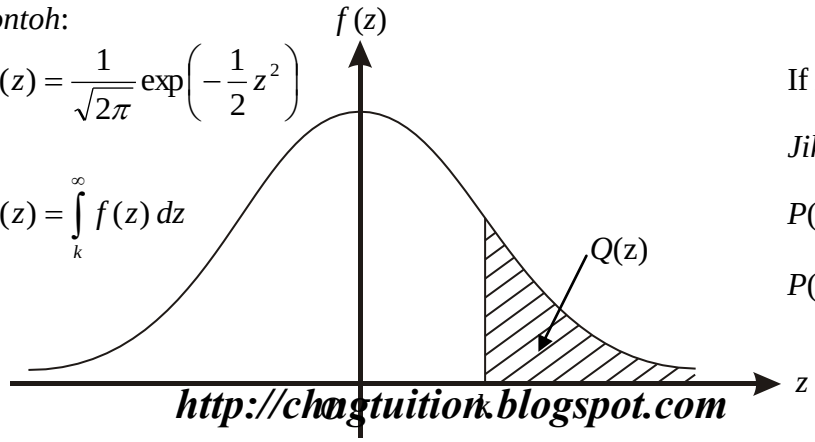
THE UPPER TAIL PROBABILITY Q(z) FOR THE NORMAL DISTRIBUTION N(0,)
***KEBARANGKALIAN HUJUNG ATAS Q(z) BAGI TABURAN NORMAL* N(0, 1)**

z	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
											Minus / *Tolak*								
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641	4	8	12	16	20	24	28	32	36
0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247	4	8	12	16	20	24	28	32	36
0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859	4	8	12	15	19	23	27	31	35
0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483	4	7	11	15	19	22	26	30	34
0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121	4	7	11	15	18	22	25	29	32
0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776	3	7	10	14	17	20	24	27	31
0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451	3	7	10	13	16	19	23	26	29
0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148	3	6	9	12	15	18	21	24	27
0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867	3	5	8	11	14	16	19	22	25
0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611	3	5	8	10	13	15	18	20	23
1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379	2	5	7	9	12	14	16	19	21
1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170	2	4	6	8	10	12	14	16	18
1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985	2	4	6	7	9	11	13	15	17
1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823	2	3	5	6	8	10	11	13	14
1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681	1	3	4	6	7	8	10	11	13
1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559	1	2	4	5	6	7	8	10	11
1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0..0475	0.0465	0.0455	1	2	3	4	5	6	7	8	9
1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367	1	2	3	4	4	5	6	7	8
1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294	1	1	2	3	4	4	5	6	6
1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233	1	1	2	2	3	4	4	5	5
2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183	0	1	1	2	2	3	3	4	4
2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143	0	1	1	2	2	2	3	3	4
2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110	0	1	1	1	2	2	2	3	3
2.3	0.0107	0.0104	0.0102								0	1	1	1	1	2	2	2	2
				0.00990	0.00964	0.00939	0.00914				3	5	8	10	13	15	18	20	23
								0.00889	0.00866	0.00842	2	5	7	9	12	14	16	16	21
2.4	0.00820	0.00798	0.00776	0.00755	0.00734						2	4	6	8	11	13	15	17	19
						0.00714	0.00695	0.00676	0.00657	0.00639	2	4	6	7	9	11	13	15	17
2.5	0.00621	0.00604	0.00587	0.00570	0.00554	0.00539	0.00523	0.00508	0.00494	0.00480	2	3	5	6	8	9	11	12	14
2.6	0.00466	0.00453	0.00440	0.00427	0.00415	0.00402	0.00391	0.00379	0.00368	0.00357	1	2	3	5	6	7	9	9	10
2.7	0.00347	0.00336	0.00326	0.00317	0.00307	0.00298	0.00289	0.00280	0.00272	0.00264	1	2	3	4	5	6	7	8	9
2.8	0.00256	0.00248	0.00240	0.00233	0.00226	0.00219	0.00212	0.00205	0.00199	0.00193	1	1	2	3	4	4	5	6	6
2.9	0.00187	0.00181	0.00175	0.00169	0.00164	0.00159	0.00154	0.00149	0.00144	0.00139	0	1	1	2	2	3	3	4	4
3.0	0.00135	0.00131	0.00126	0.00122	0.00118	0.00114	0.00111	0.00107	0.00104	0.00100	0	1	1	2	2	2	3	3	4

Example / *Contoh*:

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

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



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

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

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

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

SULIT

Rajah 1 *menunjukkan pemetaan fungsi f dan diikuti fungsi g.*

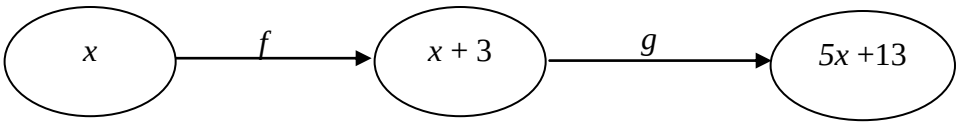


Diagram 1

Rajah 1

Find the value of

Cari nilai bagi

(a) f^{-1} (4)

(b) *gf* (0)

[2 marks]

[*2 markah*]

1

2

Answer/*Jawapan* :(*a*) ……

(*b*)……..

2. Given the functions $g(x) = 3x + n$ and $g^{-1}(x) = 2kx - \frac{2}{3}$, where *n* and *k* are constants.

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

Diberi fungsi $g(x) = 3x + n$ *dan* $g^{-1}(x) = 2kx - \frac{2}{3}$ *,dengan keadaan n dan k adalah pemalar, cari nilai n dan nilai k.*

[3 marks]

[3 *markah*]

2

3

Answer/*Jawapan* : *n* =.....

k= .....

3. Two functions are defined by $f : x \to px - 1$, and $g : x \to x^2 + 3x + 1$

Given that $gf(x) = 4x^2 + px + q$. Find the values of *p* and of *q.*

Dua fungsi ditakrif sebagai $f : x \to px - 1$, *dan* $g : x \to x^2 + 3x + 1$

Diberi $gf(x) = 4x^2 + px + q$, *cari nilai p dan nilai q.*

[3marks]

[3 *markah*]

3

3

Answer/*Jawapan* : *p*= ……*q*=……..……

---

4. Solve the quadratic equation $2x(x-4) = (1-x)(x+2)$.

Give your answer correct to four significant figures.

Selesaikan persamaan kuadratik. $2x(x-4) = (1-x)(x+2)$

Berikan jawapan anda betul kepada empat angka bererti.

[3 marks]

[3 *markah*]

4

3

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

SULIT

5. Find the range of values of *x* for $4x^2 + 3 < 7x$.

Cari julat nilai x bagi $4x^2 + 3 < 7x$

[3 marks]

[3 *markah*]

5

3

Answer/*Jawapan* : …….....

.

6. Diagram 6 shows the graph of $f(x) = a(x+p)^2 + q$ where *a, p* and *q* are constants

The curve *y*= *f*(*x*) has a maximum point at (4, -5).

Rajah 6 *menunjukan graf* $f(x) = a(x+p)^2 + q$ *dengan keadaan a, p dan q adalah pemalar .Lengkung y = f*(*x*) *mempunyai titik maksimum pada* (4, -5).

Sate

Nyatakan

(a) the range of the values of *a,*

julat nilai a,

(b) the value of *p,*

nilai p,

(c) the value of *q,*

nilai q,

(d). the equation of the axis of symmetry.

persamaan paksi simetri.

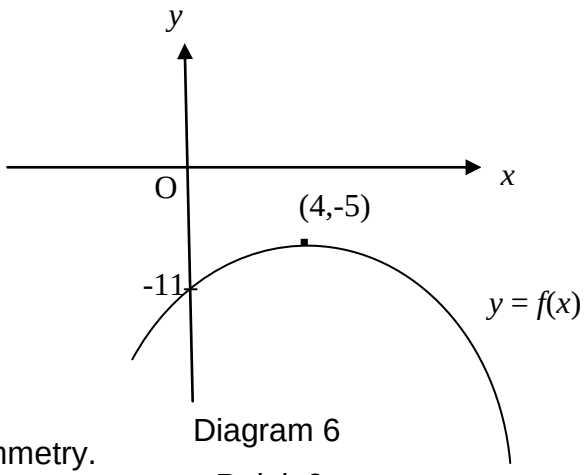


Diagram 6

Rajah 6

[4 marks]

[4 *markah*]

6

4

Answer/*Jawapan* : a) ……..

b) *p*=…… ….

c) *q*=……..…..

d)……..….

7. Given that $p = \log_m 3$ and $q = \log_m 4$, express $\log_{12} 36$ in terms of m *and n.*

Diberi $p = \log_m 3$ *dan* $q = \log_m 4$ *, ungkapkan* $\log_{12} 36$ *dalam sebutan m dan n*.

[3 marks]

[3 *markah*]

Answer/*Jawapan* : .....

7

3

8. Given that $2^{2x}(8^y) = 2$ and $9^x(3^y) = 27$. Find the value of x and of *y*.

Diberi $2^{2x}(8^y) = 2$ *dan* $9^x(3^y) = 27$ *.Cari nilai x dan nilai y .*

[3 marks]

[3 *markah*]

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

y =.....

8

3

9

SULIT

9. The sum of the first *n* terms of an arithmetic progression is given by

$S_n = 3n^2 + 13n$.

Diberi hasil tambah n sebutan pertama bagi suatu janjang aritmetik ialah

$S_n = 3n^2 + 13n$.

Find

Cari

(*a*) the common difference,

beza sepunya,

(*b*) the ninth term.

sebutan kesembilan.

[3 *marks*]

[3 *markah*]

9

3

Answer/Jawapan : (a)……..……,……...

(b)……..……

---

10. The first three terms of a sequence are 4, *y* , 9. Find the positive value of *y* such that the sequence is

Tiga sebutan pertama suatu jujukan ialah 4, *y*, 9. *Cari nilai positif y supaya jujukan itu merupakan suatu*

(a) an arithmetic progression, [2 marks]

janjang aritmetik [2 *markah*]

(b) a geometric progression.

janjang geometri

10

2

Answer/*Jawapan* : (a) *y* =……..……...

(b) *y*=…….....

11. Given $\frac{1}{p} = 0.16666666\ldots$

$= 0.1 + h + k + m\ldots$ where, *h,k,m form a geometric series.*

Diberi $\frac{1}{p} = 0.16666666\ldots.$

$= 0.1 + h + k + m\ldots$ *yang mana h,k,m membentuk stau siri geometri*

(a) Find the value of *h* and of *k*,

Cari nilai h dan nilai k,

(b) Hence, find the value of *p.* [3 marks]

. *Seterusnya, cari nilai p.* [3 *markah*]

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

(*b*) *p* =……..

11

3

---

12. Given that the coordinates of point *A* is (1,3) and point *B* is (4,1). A point *P*(*x,y*) moves such that 2*AP* = *PB*. Find the equation of the locus of *P*.

Diberi bahawa koordinat titik A adalah (1,3) *dan titik B adalah (*4,1).*Satu titik P(x,y) bergerak dengan keadaan 2AP = PB.Cari persamaan lokus P.*

[3 marks]

[3 *markah*]

12

3

Answer/*Jawapan* …….....

11

13. Diagram 13 shows a straight line graph of $\frac{y}{x}$ against x^2.

Rajah 13 *menunjukkan graf garis lurus* $\frac{y}{x}$ *melawan* x^2.

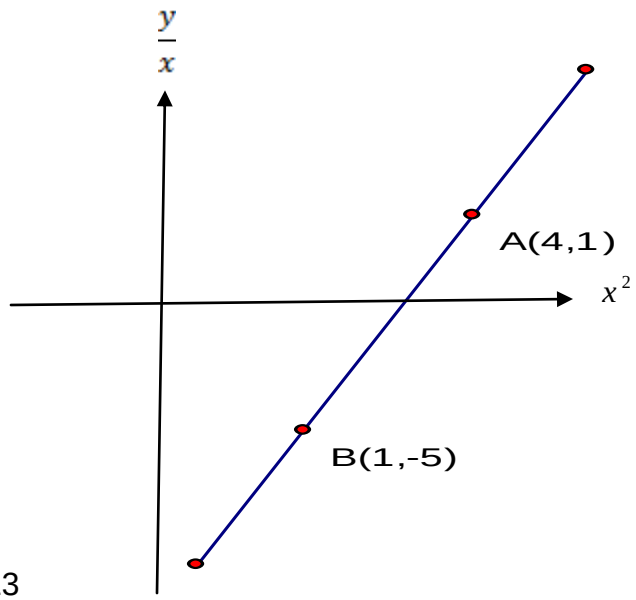


Diagram 13

Rajah 13

Given that $y = hx^3 + kx$, where k and h are constants. Calculate the value of h and of k.

Diberi $y = hx^3 + k$, *yang mana* k *dan* h *adalah pemalar. Cari nilai* h *dan nilai* k.

[3 marks]

[3 *markah*]

13

3

Answer/*Jawapan* : h=……

k=……..

14. The equation of a straight line *PQ* is $\frac{x}{3}+\frac{y}{2}=1$

Find the equation of the straight line that is parallel to *PQ* and passes through the point (-6,3)

Diberi persamaan garis lurus PQ ialah $\frac{x}{3}+\frac{y}{2}=1$.

Cari persamaan garis lurus yang selari dengan PQ dan melalui titik (-6,3).

[3 marks]

[3 *markah*]

14

3

Answer/*Jawapan* : .....

15. Given that $\overrightarrow{OP}$ = -7i + 4j, $\overrightarrow{OQ}$= 2i + 2j and $\overrightarrow{OR}$ = -5i + 6j , find the value of *h* and *of k* such that $\overrightarrow{OR} = h\overrightarrow{PO} + k\overrightarrow{OQ}$

Diberi $\overrightarrow{OP}$ *= -7i + 4j ,* $\overrightarrow{OQ}$*= 2i + 2j dan* $\overrightarrow{OR}$ *= -5i + 6j, cari nilai h dan nilai k supaya* $\overrightarrow{OR} = h\overrightarrow{PO} + k\overrightarrow{OQ}$

[4 marks]

[4 *markah*]

15

4

Aswer/*Jawapan* : *h* =.....

k =.....

SULIT

16. In Diagram 16 ,*OPQR* is a parallelogram . *T* and *U* are the midpoints of *RQ* and *OT* respectively. Given $\overrightarrow{OP}$ = **a** and $\overrightarrow{OR}$ = ***b*** , express $\overrightarrow{OU}$ in terms of ***a*** and ***b***.

Dalam Rajah 16*, OPQR ialah segiempat selari.Titik T dan U adalah titik tengah bagi RQ dan OT masing-masing. Diberi bahawa* $\overrightarrow{OP}$ = ***a*** *dan* $\overrightarrow{OR}$ = ***b*** *.Ungkapkan* $\overrightarrow{OU}$ *dalam sebutan* ***a*** *and* ***b***

[3 marks]

[3 *markah*]

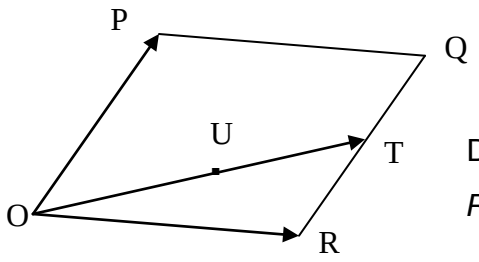


Diagram 16

Rajah 16

16

3

Answer/*Jawapan* :……

17. Solve the equation 3 cos 2*x* + 4cos *x* + 1 = 0 , for 0° ≤ x ≤ 360°

Selesaikan persamaan bagi 3*kos* 2*x* + 4*kos x* + 1 = 0 *, bagi* 0° ≤ x ≤ 360°

[4 marks]

[4 *markah*]

17

4

Answer/*Jawapan :* ……

SULIT

18. Diagram 18 (i) shows a semicircle *ABC* where *AC* is the diameter.

Diagram 18 (ii) shows a sector *POQ* with centre *O*.

Rajah 18 (i) *menunjukkan semibulatan ABC yang mana AC adalah diameternya.*

Rajah 18 (ii) *menunjukkan sektor POQ berpusat O.*

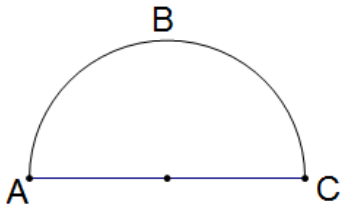


Diagram 18(i)
Rajah 18(i)

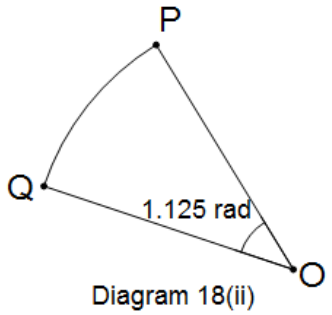


Diagram 18(ii)
Rajah 18(ii)

Given that both the semicircle *ABC* and the sector *POQ* have the same perimeter, *AC* = 14 cm and ∠*POQ* = *1.125 radians.* Find the radius of sector *OPQ.* [3 marks]

Diberi kedua-dua semibulatan ABC dan sektor POQ mempunyai perimeter yang sama, AC = 14 cm *dan* ∠*POQ* = *1.125 radians . Cari jejari sektor OPQ.*

(Use π= 3.142) [3 *markah*]

(Gunakan π= 3.142*)*

Answer/*Jawapan* : ……

18

3

19. Given that $V = 2t^2(12 - t)$, *calculate the maximum value of V.*

Diberi $V = 2t^2(12 - t)$, *Cari nilai maksimum bagi V.*

[4 marks]

[4 *markah*]

19

4

Answer/*Jawapan:*……

SULIT

20. The total surface area of a closed cylinder is given by $A = 2\pi r^2 + 30\pi r$, where r is the radius of the cylinder. Find the small change in the total surface area of the cylinder when its radius changes from 3 cm to 3.05 cm. Give your answer in terms of π.

Jumlah luas permukaan bagi sebuah silinder tertutup adalah $A = 2\pi r^2 + 30\pi r$, *dimana r merupakan jejari silinder tersebut. Cari tokokan kecil luas permukaan silinder itu apabila jejarinya berubah daripada* 3 *cm ke* 3.05 *cm. Berikan jawapan anda dalam sebutan* π. [3 marks]

[3 *markah*]

20

3

Answer/*Jawapan* : ……

21. (a) Given that $\frac{d}{dx}\left(\frac{x^2}{x-1}\right) = f(x)$, find the value of $\int_0^2 [x - f(x)]dx$

Diberi $\frac{d}{dx}\left(\frac{x^2}{x-1}\right) = f(x)$, *cari nilai bagi* $\int_0^2 [x - f(x)]dx$

(b) Find the value of $\int_1^2 \left(\frac{2}{x^2} + 6x^2\right)dx$ [4 marks]

Cari nilai bagi $\int_1^2 \left(\frac{2}{x^2} + 6x^2\right)dx$ [4 *markah*]

21

4

Answer/*Jawapan* : (a)……

(b)……

22 A set of data contains 10 numbers. The mean of these numbers is 15 and the variance is 22.2.

Satu Set data mengandungi 10 *nombor. Min bagi 10 nombor ini adalah* 15 *dan varians adalah* 22.2

(a) Find the sum of their squares for these 10 numbers.

Cari hasiltambah kuasadua 10 nombor ini.

(b) If a number is added to this set of data, such that the mean does not change , find the variance of this new set of numbers. [3 marks]

Jika satu nombor ditambah ke nombor set data ini, dan nilai min nya tidak berubah, cari varians bagi nombor set data yang baru.

[3 *markah*]

Answer/*Jawapan* (a) …….. ……..

(b)……

22

3

23. Diagram 23 shows five cards of different letters.

Rajah 23 *menunjukan lima keping kad huruf yang berlainan.*

B	A	G	U	S

Diagram 23

Rajah 23

(a) Find the number of possible arrangements, in a row, of all the cards.

Carikan bilangan cara susunan yang mungkin, dalam satu baris, semua kad itu.

(b) Find the number of these arrangements in which the letters *U* and *A* are **not** side by side.

Carikan bilangan cara susunan itu dengan keadaan huruf U dan huruf A adalah ***tidak*** *bersebelahan.* [4 marks]

[4 *markah*]

Answer/ *Jawapan:*(a)……

(b)……

23

4

SULIT

24. A box contains *x* blue marbles and 6 red marbles. Two marbles are chosen at random from the box. Find the value of *x* if the probability of getting both marbles red is $\frac{1}{3}$ [4 marks]

Sebuah kotak mengandungi x biji guli biru dan 6 biji guli merah. Dua biji guli dipilih secara rawak dari kotak itu. Carikan nilai x jika kebarangkalian kedua-dua guli berwarna merah ialah $\frac{1}{3}$. [4 *markah*]

24

4

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

25. *X* is a random variable of a normal distribution with a mean of 10 and a variance of 9. Find the value of *r* such that $P(X < r) = 0.975$.

X adalah suatu taburan normal dengan min 10 dan sisihan piawai 9.

Cari nilai r dengan keadaan $P(X < r) = 0.975$.

[3 marks]

[3 *markah*]

25

3

Answer/*Jawapan* :: *r* =……

END OF QUESTION PAPER

KERTAS SOALAN TAMAT

3472/2
Form Five
Additional Mathematics
Paper 2
September 2010
2 ½ hours

PEPERIKSAAN BERSAMA SEKOLAH-SEKOLAH NEGERI PAHANG

PEPERIKSAAN PERCUBAAN SPM 2010

ADDITIONAL MATHEMATICS

Paper 2
Two hours and thirty minutes

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*

2. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Malaysia.*

Kertas soalan ini mengandungi **19** halaman bercetak.

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

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

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

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

CALCULUS
KALKULUS

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

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

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

4 Area under a curve
Luas di bawah lengkung

$= \int_a^b y \, dx \quad or(atau) \quad \int_a^b x \, dy$

5 Volume generated
Isipadu janaan

$= \int_a^b \pi y^2 \, dx \quad or(atau) \quad \int_a^b \pi x^2 \, dy$

STATISTICS
STATISTIK

1 $\bar{x} = \dfrac{\Sigma x}{N}$

2 $\bar{x} = \dfrac{\Sigma fx}{\Sigma f}$

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

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

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

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

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

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

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

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

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

12 $Mean/\min,\ \mu = np$

13 $\sigma = \sqrt{npq}$

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

GEOMETRY
GEOMETRI

1 Distance/*jarak*

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

2 Mid point / *Titik tengah*

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

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

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

4 Area of a triangle/ *Luas segitiga* =

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

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

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

TRIGONOMETRY
TRIGONOMETRI

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

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

Luas sektor, $L = \frac{1}{2}j^2\theta$

3 $\sin^2 A + \cos^2 A = 1$

$\sin^2 A + kos^2 A = 1$

4 $\sec^2 A = 1 + \tan^2 A$

$sek^2 A = 1 + \tan^2 A$

5 $cosec^2 A = 1 + \cot^2 A$

$kosek^2 A = 1 + kot^2 A$

6 $\sin 2A = 2 \sin A \cos A$

$\sin 2A = 2 \sin A \, kos A$

7 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2\cos^2 A - 1$
$= 1 - 2\sin^2 A$

$kos\ 2A = kos^2 A - \sin^2 A$
$= 2\,kos^2 A - 1$
$= 1 - 2\sin^2 A$

8 $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$

$\sin(A \pm B) = \sin A \, kos B \pm kos A \sin B$

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

$kos(A \pm B) = kos A \, kos B \mp \sin A \sin B$

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

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

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

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

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

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

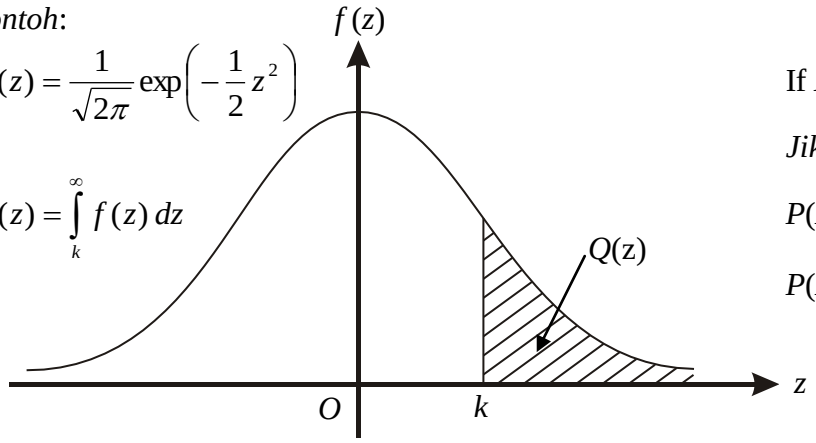
THE UPPER TAIL PROBABILITY Q(z) FOR THE NORMAL DISTRIBUTION N(0,)
***KEBARANGKALIAN HUJUNG ATAS Q(z) BAGI TABURAN NORMAL* N(0, 1)**

z	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
											Minus / *Tolak*								
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641	4	8	12	16	20	24	28	32	36
0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247	4	8	12	16	20	24	28	32	36
0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859	4	8	12	15	19	23	27	31	35
0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483	4	7	11	15	19	22	26	30	34
0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121	4	7	11	15	18	22	25	29	32
0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776	3	7	10	14	17	20	24	27	31
0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451	3	7	10	13	16	19	23	26	29
0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148	3	6	9	12	15	18	21	24	27
0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867	3	5	8	11	14	16	19	22	25
0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611	3	5	8	10	13	15	18	20	23
1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379	2	5	7	9	12	14	16	19	21
1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170	2	4	6	8	10	12	14	16	18
1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985	2	4	6	7	9	11	13	15	17
1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823	2	3	5	6	8	10	11	13	14
1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681	1	3	4	6	7	8	10	11	13
1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559	1	2	4	5	6	7	8	10	11
1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0..0475	0.0465	0.0455	1	2	3	4	5	6	7	8	9
1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367	1	2	3	4	4	5	6	7	8
1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294	1	1	2	3	4	4	5	6	6
1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233	1	1	2	2	3	4	4	5	5
2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183	0	1	1	2	2	3	3	4	4
2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143	0	1	1	2	2	2	3	3	4
2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110	0	1	1	1	2	2	2	3	3
2.3	0.0107	0.0104	0.0102								0	1	1	1	1	2	2	2	2
				0.00990	0.00964	0.00939	0.00914				3	5	8	10	13	15	18	20	23
								0.00889	0.00866	0.00842	2	5	7	9	12	14	16	16	21
2.4	0.00820	0.00798	0.00776	0.00755	0.00734						2	4	6	8	11	13	15	17	19
						0.00714	0.00695	0.00676	0.00657	0.00639	2	4	6	7	9	11	13	15	17
2.5	0.00621	0.00604	0.00587	0.00570	0.00554	0.00539	0.00523	0.00508	0.00494	0.00480	2	3	5	6	8	9	11	12	14
2.6	0.00466	0.00453	0.00440	0.00427	0.00415	0.00402	0.00391	0.00379	0.00368	0.00357	1	2	3	5	6	7	9	9	10
2.7	0.00347	0.00336	0.00326	0.00317	0.00307	0.00298	0.00289	0.00280	0.00272	0.00264	1	2	3	4	5	6	7	8	9
2.8	0.00256	0.00248	0.00240	0.00233	0.00226	0.00219	0.00212	0.00205	0.00199	0.00193	1	1	2	3	4	4	5	6	6
2.9	0.00187	0.00181	0.00175	0.00169	0.00164	0.00159	0.00154	0.00149	0.00144	0.00139	0	1	1	2	2	3	3	4	4
3.0	0.00135	0.00131	0.00126	0.00122	0.00118	0.00114	0.00111	0.00107	0.00104	0.00100	0	1	1	2	2	2	3	3	4

Example / *Contoh*:

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

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



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

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

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

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

Section A

Bahagian A

[40 marks]

[40 *markah*]

Answer **all** questions.

*Jawab **semua** soalan.*

1. Solve the simultaneous equations $2y - x = 4$ and $y^2 - 3xy = 6$. Give your answers correct to two decimal places.

   Selesaikan persamaan serentak $2y - x = 4$ *dan* $y^2 - 3xy = 6$. *Berikan jawapan anda betul kepada dua tempat perpuluhan.*

   [5 marks]

   [5 m*arkah*]

2. Given the curve $y = 3x^2 - 4x + 3$, find the value of $\frac{dy}{dx}$ at point $P(1, 2)$.

   Diberi lengkung $y = 3x^2 - 4x + 3$, *cari nilai bagi* $\frac{dy}{dx}$ *pada titik* $P(1,2)$.

   [2 marks]

   [2 *markah*]

   Hence , find,

   Seterusnya, cari

   (a) the equation of the tangent to the curve at point P, [2 marks]

   persamaan tangen kepada lengkung itu pada titik P, [2 *markah*]

   (b) the approximate change in y when x increases from 2 to 2.01. [2 marks]

   perubahan hampir nilai y bila x meningkat daripada 2 *kepada* 2.01. [2 *markah*]

3. Diagram 3 shows a triangle ABC. The straight line AP meets the straight line BC at P.

Rajah 3 *menunjukkan sebuah segitiga ABC. Garis lurus AP bertemu garis lurus BC di P.*

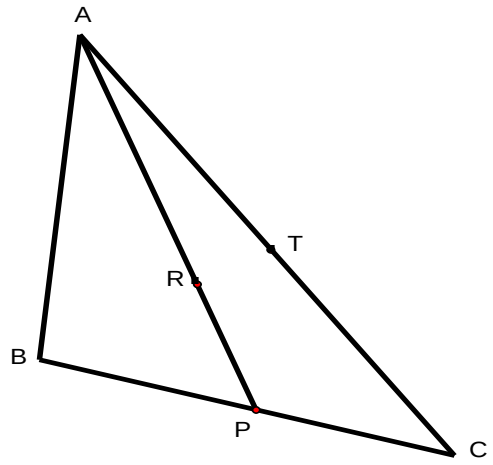


Diagram 3

Rajah 3

It is given that $\overrightarrow{BA} = \underline{x}, \overrightarrow{BP} = \underline{y}$, *P* and *T* are the midpoints of *BC* and *AC* respectively.

Diberi bahawa $\overrightarrow{BA} = \underline{x}, \overrightarrow{BP} = \underline{y}$, *P dan T adalah titik tengah bagi BC dan AC masing-masing.*

(a) Express in terms of $\underline{x}$ and/or $\underline{y}$.

Ungkapkan dalam sebutan $\underline{x}$ *dan/atau* $\underline{y}$.

(i) $\overrightarrow{AC}$

(ii) $\overrightarrow{BT}$

[3 marks]

[3 *markah*]

(b) It is given that $\overrightarrow{BR} = k\overrightarrow{BT}$ and $\overrightarrow{BR} + h\overrightarrow{AP} = \overrightarrow{BP}$, where *h* and *k* are constants. Find the value of *h* and of *k*.

Diberi bahawa $\overrightarrow{BR} = k\overrightarrow{BT}$ dan $\overrightarrow{BR} + h\overrightarrow{AP} = \overrightarrow{BP}$ *, dengan keadaan h dan k adalah pemalar. Cari nilai h dan nilai k.*

[4 marks]

[4 *markah*]

4. Table 4 shows the frequency distribution of the scores of a group of students in a contest.
Jadual 4 *menunjukkan taburan frekunsi bagi skor sekumpulan murid dalam satu pertandingan.*

Scores / *Skor*	Numbers of students / *Bilangan pelajar*
1 – 10	2
11 – 20	5
21 – 30	6
31 – 40	4
41 – 50	3

Table 4
Jadual 4

(a) Without drawing an ogive, find the interquartile range of the distribution.
Tanpa melukis ogif, carikan julat antara kuartil bagi taburan itu.

[3 marks]
[3 *markah*]

(b) *Use the graph paper to answer this question*
Using a scale of 2 cm to 10 scores on the horizontal axis and 2 cm to 1 student on the vertical axis, draw a histogram to represent the frequency distribution of the scores. Find the mode score.
Gunakan kertas graf untuk menjawab soalan ini.
Dengan menggunakan skala 2 *cm kepada* 10 *skor pada paksi mengufuk dan* 2 *cm kepada seorang pelajar pada paksi mencancang, lukis sebuah histogram untuk mewakili taburan frekuensi bagi skor itu.*
Cari skor mod.

[4 marks]
[4 *markah*]

5. (a) Prove that $\tan^2 x + 2\cos^2 x - \sec^2 x = \cos 2x$. [2 marks]

Buktikan bahawa $\tan^2 x + 2\cos^2 x - \sec^2 x = \cos 2x$. [2 *markah*]

(b) (i) Sketch the graph of $y = 3\cos 2x - 1$ for $0 \le x \le 2\pi$.

Lakarkan graf $y = 3\cos 2x - 1$ *untuk* $0 \le x \le 2\pi$.

(ii) Hence, using the same axes, sketch a suitable straight line to find the number of solutions to the equation $3\left(\tan^2 x + 2\cos^2 x - \sec^2 x\right) = \frac{x}{\pi} - 2$ for $0 \le x \le 2\pi$.

Seterusnya, dengan menggunakan paksi yang sama, lakarkan graf garis lurus yang sesuai untuk mencari bilangan penyelesaian kepada persamaan $3\left(\tan^2 x + 2\cos^2 x - \sec^2 x\right) = \frac{x}{\pi} - 2$ *untuk* $0 \le x \le 2\pi$.

[6 marks]

[6 *markah*]

6. Diagram 6 shows part of several squares formed from a roll of wire of length 17.6 m.
Rajah 6 *menunjukkan sebahagian daripada beberapa segiempat sama yang dibentuk daripada segulung dawai yang panjangnya* 17.6 *m.*

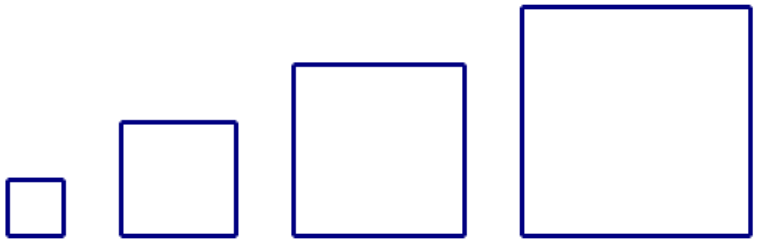


Diagram 6/ *Rajah* 6

The side of the smallest square is 3 cm. The measurement of the side of each subsequent square increases by 2 cm of its previous square.
Sisi segiempat sama yang terkecil berukuran 3 *cm.Ukuran bagi sisi segiempat sama yang berikutnya adalah bertambah sebanyak 2 cm ukuran sisi segiempat sama sebelumnya.*

(a) Find the maximum number of squares that can be formed. [3 marks]

Cari bilangan maksimum segiempat sama yang dapat dibentuk. [3 *markah*]

(b) Determine which square has a perimeter of 108 cm. [2 marks]

Tentukan segiempat sama yang keberapakah mempunyai perimeter 108 *cm.*

[2 *markah*]

(c) Find the perimeter of the largest square. [2 marks]

Carikan perimeter bagi segiempat sama terbesar. [2 *markah*]

Section B

Bahagian B

[40 marks]

[40 *Markah*]

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

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

7. Use graph paper to answer this question.

Gunakan kertas graf untuk menjawab soalan ini.

Table 7 shows the values of two variables, *x* and *y*, obtained from an experiment. The variables *x* and *y* are related by the equation $y = k(x-2)^n$, where *k* and *n are* constants.

Jadual 7 *menunjukkan nilai-nilai bagi dua pembolehubah , x dan y, yang diperoleh daripada suatu eksperimen. Pembolehubah x dan y dihubungkan oleh persamaan* $y = k(x-2)^n$ *, dengan k dan n adalah pemalar.*

x	4	5	6	7	8
y	3.48	4.82	5.89	7.25	8.39

Table 7

Jadual 7

(a) Based on Table 7, construct a table for the values of $\log_{10}(x-2)$ and $\log_{10} y$.

Berdasarkan Jadual 7*, bina satu jadual bagi nilai-nilai* $\log_{10}(x-2)$ *dan* $\log_{10} y$ *.*

[2 marks]

[2 *markah*]

(b) Plot $\log_{10} y$ against $\log_{10}(x-2)$, by using a scale of 2 cm to 0.1 unit on both axes. Hence , draw the line of best fit. [3 marks]

Plot $\log_{10} y$ *melawan* $\log_{10}(x-2)$ *, dengan menggunakan skala* 2 *cm kepada* 0.1 *unit pada kedua-dua paksi. Seterusnya, lukiskan garis lurus penyuaian terbaik.*

[3 *markah*]

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

Guna graf anda dari 7*(b), untuk mencari nilai*

(i) *k*

(ii) *n* [5 marks]

[5 *markah*]

8. Diagram 8 shows the straight line, $y = x - 3$ intersecting the curve $y^2 = x + 9$ at points *P* and *R*. The curve intersects the y- axis at point Q and R.

Rajah 8 *menunjukkan garis lurus,* $y = x - 3$ *yang menyilang dengan lengkung* $y^2 = x + 9$ *pada titik P dan titik R.Lengkung itu bersilang paksi –y di titik Q dan R.*

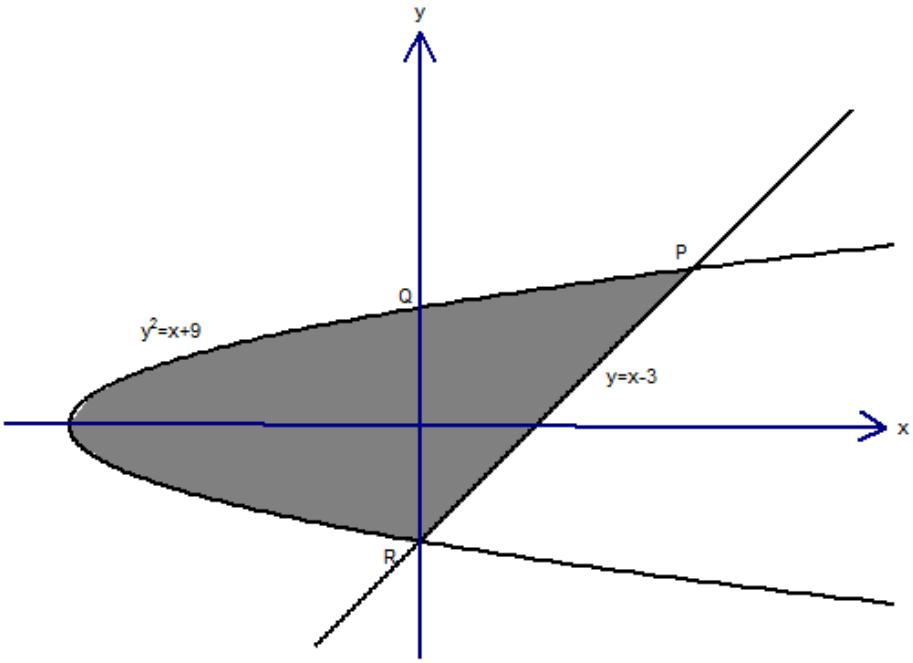


Diagram 8

Rajah 8

Find

Cari

(*a*) *the coordinates of P* and of *Q,* [3 marks]

koordinat titik P dan titik Q, [3 *markah*]

(*b*) the area of the shaded region, [4 marks]

luas kawasan berlorek, [4 *markah*]

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

isipadu janaan, dalam sebutan π, apabila r*antau yang dibatasi oleh lengkung itu dengan paksi-y dikisarkan melalui* $360°$ *pada paksi-y.* [3 *markah*]

9. Solution by scale drawing is not accepted.

Penyelesaian secara lukisan berskala tidak diterima.

Diagram 9 shows the straight line *KL*, $3x+2y-4=0$, which is perpendicular to line *MN*. *KL* meets *MN* at point *L* which lies on the *y*-axis where else point *N* and *K* lie on the *x*-axis.

Rajah 9 *menunjukkan garis lurus KL,* $3x+2y-4=0$ *yang berserenjang dengan garis MN. KL bertemu MN pada titik L yang berada diatas paksi-y manakala titik N dan K berada di atas paksi-x.*

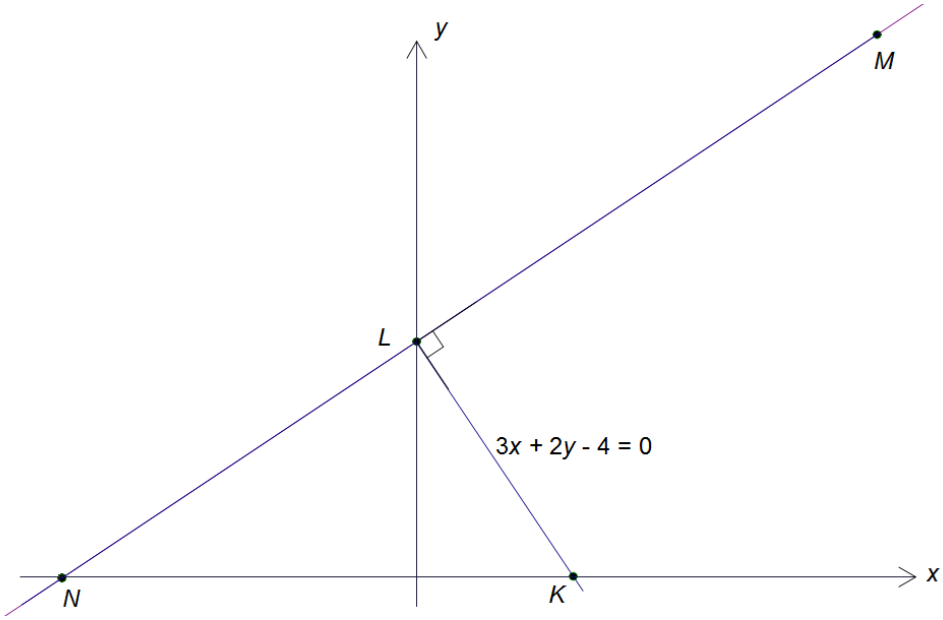


Diagram 9 / *Rajah* 9

(a) Find the equation of the straight line *MN.* [3 marks]

Cari persamaan garis lurus MN. [3 *markah*]

(b) Given that $ML:LN=2:1$, find

Diberi $ML:LN=2:1$, *cari*

(i) the coordinates of *M,*

koordinat M,

(ii) the area of triangle *KLN.* [4 marks]

luas segitiga KLN. [4 *markah*]

(c) A point *W* moves such that its distance from point *M* is twice its distance from point *K*. Find the equation of the locus of *W.*

Suatu titik W bergerak dengan keadaan jaraknya dari titik M adalah dua kali jaraknya dari titik K. Carikan persamaan locus W.

[3 marks]

[3 *markah*]

10. (a) A group of hockey trainees are practicing scoring through penalty strokes. Each trainee is given 8 tries. The probability that a trainee scores a goal from the penalty stroke is *p. A*fter the training session, it is found that the mean number of goals scored is 6.4.

Sekumpulan pelatih Hoki sedang menjalankan latihan menjaringkan gol melalui pukulan penalti. Setiap pelatih diberi 8 *kali percubaan. Kebarangkalian seorang pelatih menjaringkan gol dari pukulan penalti ialah p. Selepas sesi latihan didapati bahawa min jaringan gol ialah* 6.4.

(i) Find the value of *p*.

Cari nilai p.

(ii) If a trainee is chosen at random, find the probability that he scores at least three goals.

Jika seorang pelatih dipilih secara rawak, cari kebarangkalian bahawa pelatih tersebut menjaringkan sekurang-kurangnya tiga gol.

[4 marks]

[4 *markah*]

(c) It is found that the masses of sweets produced by a factory are normally distributed with a mean of μ g and a standard deviation of σ g.

If 6.68% of the sweets have masses exceeding 5.3 g and 15.87 % of the sweets have masses less than 4.8 g, find the value of μ and of σ.

Didapati bahawa jisim gula-gula yang dikeluarkan oleh sebuah kilang adalah mengikut taburan normal dengan min μ *g dan sisihan piawai* σ *g.*

Jika 6.68% *dari gula-gula tersebut mempunyai jisim melebihi*5.3 g *dan* 15.87 % *mempunyai jisim kurang dari* 4.8 g*, cari nilai* μ *dan nilai* σ.

[6 marks]

[6 *markah*]

11. Diagram 11 shows sector *OQR* with centre O and sector *RSP* with centre *R* and radius of 3 cm.

Rajah 11 *menunjukkan sektor OQR berpusat O dan sektor RSP berpusat R dan berjejari* 3 *cm.*

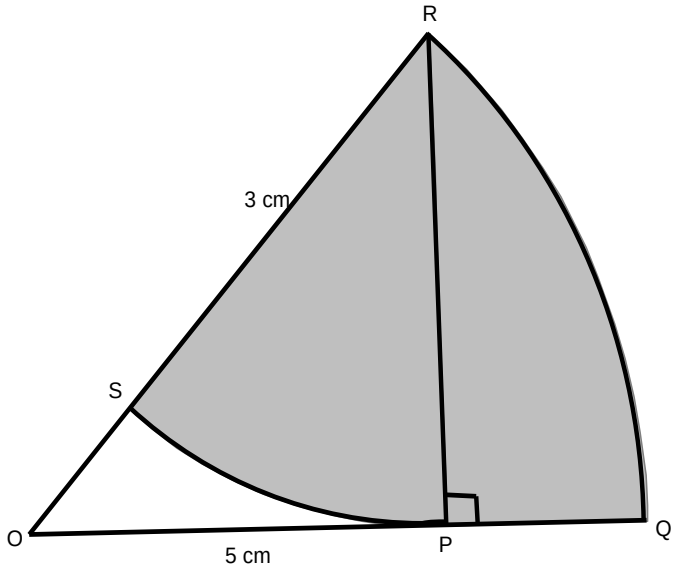


Diagram 11

Rajah 11

It is given that *OP* = 5 cm. Use $\pi = 3.142$ and give your answers correct to two decimal places,

Diberi bahawa OP = 5 cm. *Guna* $\pi = 3.142$ *dan beri jawapan anda betul kepada dua tempat perpuluhan,*

calculate,

hitung ,

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

$\angle QOR$, dalam radian, [2 *markah*]

(b) the perimeter, in cm, of the shaded region, [4 marks]

perimeter, dalam cm, kawasan berlorek, [4 *markah*]

(c) the area, in cm^2, of the shaded region. [4 marks]

luas, dalam cm^2*, kawasan berlorek.* [4 *markah*]

Section C

Bahagian C

[40 marks]

[40 *markah*]

12. Diagram 12 shows a quadrilateral *PQRS* such that $\angle PQR$ is an acute angle.

Rajah 12 *menunjukkan sisi empat PQRS dengan keadaan* $\angle PQR$ adalah tirus.

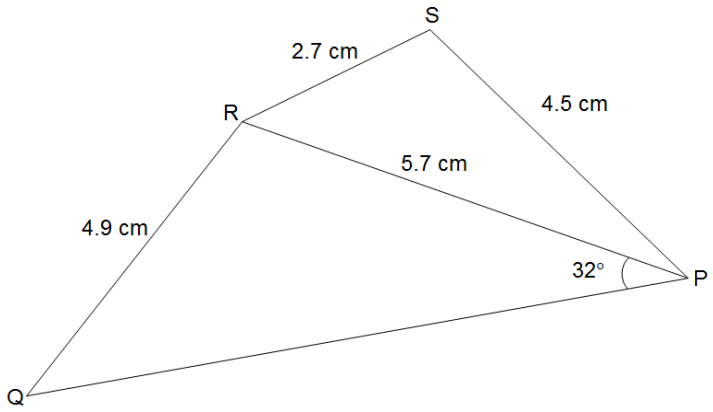


Diagram 12

Rajah 12

Calculate

Hitungkan

(a) $\angle PQR$, [2 marks]

$\angle PQR$, [2 *markah*]

(b) $\angle PSR$, [3 marks]

$\angle PSR$, [3 *markah*]

(c) the length, in cm, of *PQ* , [2 marks]

panjang, dalam cm, bagi PQ [2 *markah*]

(d) the area, in cm^2, of the quadrilateral *PQRS* . [3 marks]

luas , dalam cm^2 *, untuk sisiempat PQRS.* [3 *markah*]

13. Table 13 shows the prices and the price indices of four ingredients, *A, B, C* and *D* used in making banana cakes. Figure 13 is a pie chart which represents the relative amount of the ingredients *A, B, C* and *D* used.

Jadual 13 *menunjukkan harga-harga dan indek harga bagi empat bahan-bahan A, B, C dan D yang digunakan dalam membuat kek pisang. Rajah* 13 *ialah carta pie yang mewakili kuantiti relatif penggunaan bahan-bahan A, B, C dan D.*

Ingredient *Bahan*	Price per kg (RM) *Harga per kg (*RM)		Price index for the year 2007 based on the year 2005 *Harga indeks pada tahun* 2007 *berdasarkan tahun* 2005
	Year 2005	Year 2007	
A	12	*y*	150
B	*x*	24	120
C	14	28	*z*
D	10	13	130

Table 13 / *Jadual* 13

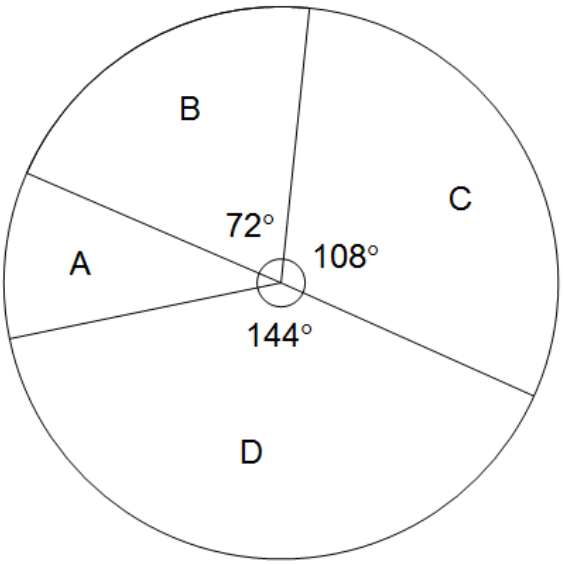


Diagram 13 / *Rajah* 13

(a) Find the value of

Cari nilai

(i) *x*

(ii) *y*

(iii) *z*

[3 marks]

[3 *markah*]

(b) Calculate the composite index for the cost of making banana cakes in the year 2007 based on the year 2005. [3 marks]

Hitungkan indek gubahan bagi kos membuat kek pisang pada tahun 2007 *berasaskan tahun* 2005. [3 *markah*]

(c) The cost of making banana cakes in the year 2007 is RM 3 322.
Calculate the corresponding cost in the year 2005.

Kos membuat kek pisang pada tahun 2007 *ialah RM* 3 322.
Hitungkan kos yang sepadan pada tahun 2005. [2 marks]

[2 *markah*]

(d) The cost of making these cakes is expected to increase by 30 % from the year 2007 to the year 2009. Find the expected composite index for the year 2009 based on the year 2005.

Kos membuat kek tersebut dijangka meningkat 30 % *dari tahun* 2007 *ke tahun* 2009. *Cari nombor indeks gubahan yang dijangkakan pada tahun* 2009 *berasaskan tahun* 2005.

[2 marks]

[2 *markah*]

14. Use graph paper to answer this question.

Gunakan kertas graf untuk menjawab soalan ini.

Table 14 shows the fees charged for the computer courses, "Author ware" and " Flash" offered by Sky Multimedia Institute. The number of students enrolled for the" Author ware" course is *x* and for "Flash" course is *y*.

Jadual 14 *menunjukkan yuran yang dikenakan bagi kursus komputer " Author ware" dan "Flash" yang ditawarkan oleh Institut "Sky Multimedia". Bilangan pelajar yang daftar untuk kursus "Author ware" ialah x orang dan kursus "Flash" ialah y orang.*

Course/*Kursus*	Fees/*yuran*
Author ware	RM 420
Flash	RM 240

Table 14

Jadual 14

Enrolment of the students for the courses above follows the following constraints:
Pendaftaran pelajar untuk kursus di atas adalah berdasarkan kekangan berikut:

I. The total number of students enrolled for both courses is not more than 80
Jumlah pelajar yang mendaftar bagi kedua-dua kursus adalah tidak melebihi 80 *orang.*

II. The number of students enrolled for" Flash" is at least half the number of students enrolled for "Author ware".
Bilangan pelajar yang mendaftar kursus "Flash" adalah sekurang-kurangnya separuh daripada pelajar yang mendaftar untuk "Author ware".

III. The minimum amount of fees collected is RM 20 000.
Yuran minimum yang dikumpulkan ialah RM 20 000*.*

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

(b) Using a scale of 2 cm to 10 students for both axes, construct and shade the region ***R*** which satisfies all the above constraints. [3 marks]
Menggunakan skala 2 *cm kepada* 10 *orang pelajar pada kedua-dua paksi, bina dan lorek rantau* ***R*** *yang memenuhi semua kekangan di atas.* [3 *markah*]

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

(i) the range of students enrolled for the "Author ware" course if 30 students enrolled the "Flash" course, [2 marks]
julat pelajar yang mendaftar untuk kursus "Author ware" jika 30 *orang pelajar mendaftar untuk kursus "Flash",* [2 *markah*]

(ii) the maximum fees collected by Sky Multimedia Institute for the courses offered.
yuran maksimum yang dapat dikumpul oleh Institut Sky Multimedia untuk kursus- kursus yang ditawarkan.

[2 marks]
[2 *markah*]

15. A particle moves in a straight line and passes through a fixed point *O*. The velocity of the particle , *v* cms^{-1}, is given by $v = 10 + 8t - 2t^2$, where *t* is the time in s, after leaving *O*.
Suatu zarah bergerak disepanjang suatu garis lurus melalui satu titik tetap O. Halaju zarah itu , v cms^{-1}, *diberi oleh* $v = 10 + 8t - 2t^2$, *dengan keadaan t ialah masa dalam s melalui O.*

Find
Cari

(a) the initial velocity, in cms^{-1}, of the particle, [1 mark]
halaju awal, dalam cms^{-1} *, zarah itu,* [1 *markah*]

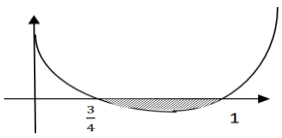
(b) the initial acceleration, in cms^{-2}, of the particle, [2 marks]
pecutan awal, dalam cms^{-2}, *zarah itu,* [2 *markah*]

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

(d) the distance, in cm, from *O* when the particle stops instantaneously.
jarak dalam cm, *dari O apabila zarah itu berhenti seketika.*
[4 marks]
[4 *markah*]

END OF QUESTIONS PAPER
KERTAS SOALAN TAMAT

JAWAPAN SPM TRIAL 2010
PAHANG SECONDARY SCHOOLS
FORM 5 ADDITIONAL MATHEMATICS PAPER 1
MARKING SCHEME

No Soalan	Answers/Jawapan	Marks
1	1 13	1 1
		2
2	$g^{-1}(x) = \frac{x}{3} - \frac{n}{3}$ k $= \frac{1}{6}$ or , n = 2 k $= \frac{1}{6}$ and n = 2	 B1 B2 3
		3
3	gf(x) = $(px-1)^2 + 3(px-1)+1$ $p^2 = 4$ or q = -1 p =±2 , q = -1	B1 B2 3
		3
4	$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(3)(-2)}}{2(3)}$ x = 2.591 or x = -0.2573 x = 2.591 and x = -0.2573	B1 B2 3
		3
5	(x-1)(4x-3)= 0  $\frac{3}{4}$ < x < 1	B1 B2 3
		3

6	(a) a < 0 (b) p = - 4 (c) q = - 5 (d) x = 4	1 1 1 1
		4
7	$\frac{\log_m 36}{\log_m 12}$ (changing to base m) $\frac{log_m 4 + log_m 3^2}{log_m 3 + log_m 4}$ or equivalent $\frac{q+2p}{q+p}$	B1 B2 3
		3
8	2x + 3y = 1 or 2x + y = 3 solve simultaneous linear equations x= 2 , y = -1	1 B2 3
		3
9	(a) d = 6 (b) $S_9 - S_8$ T_9=64	1 B1 2
		3
10	(a) y = $\frac{13}{2}$ (b) y = 6	1 1
		2
11	(a) h = 0.06 k= 0.006 (b) $S_\infty = \frac{0.06}{1-0.1}$ p = 6	1 B1 2
		3

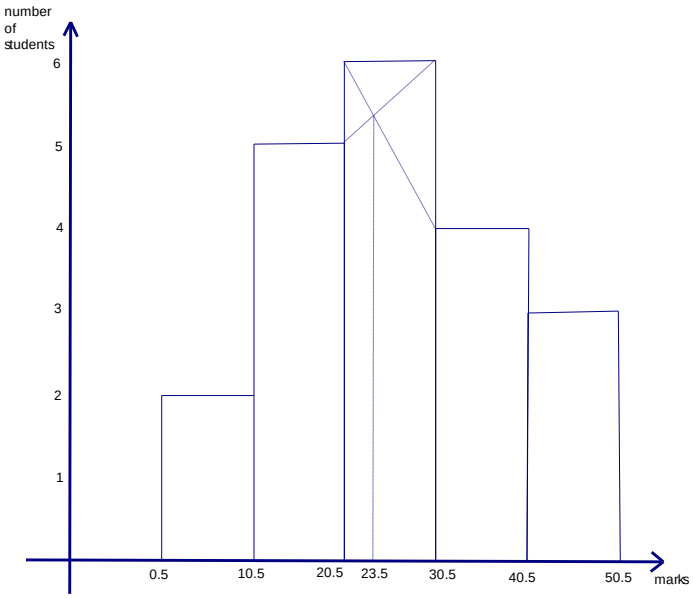
12	$\sqrt{(x-1)^2+(y-3)^2}$ or $\sqrt{(x-4)^2+(y-1)^2}$ $4[x^2 - 2x + 1 + y^2 - 6y + 9] = x^2 - 8x + 16 + y^2 - 2y + 1$ $3x^2 + 3y^2 - 22y + 23 = 0$	B1 B2 3
		3
13	$\frac{y}{x} = hx^2 + k$ h = 2 or k= -7 h = 2 and k = -7	B1 B2 3
		3
14	$m = \frac{-2}{3}$ $y - 3 = \frac{-2}{3}(x+6)$ or $3 = \frac{-2}{3}(-6)+C$ $y = \frac{-2}{3}x - 1$ or equivalent	B1 B2 3
		3
15	-5i + 6i = h(7i – 4j) + k(2i + 2j) -5 = 7h + 2k or 6 = - 4h + 2k h = -1 or k = 1 h = -1 and k = 1	B1 B2 B3 4
		4
16	$\overrightarrow{RT} = \frac{1}{2}a$ or $\overrightarrow{TQ} = \frac{1}{2}\underline{a}$ OT = b + ½ a $\frac{b}{2} + \frac{a}{4}$	B1 B2 3
		3
17	$3(2\cos^2 x - 1) + 4\cos x + 1 = 0$ $(\cos x + 1)(3\cos x - 1) = 0$ X = 180^0 or, 70.53° seen 70.53° , 180^0 , 289.47°	B1 B2 B3 4
		4

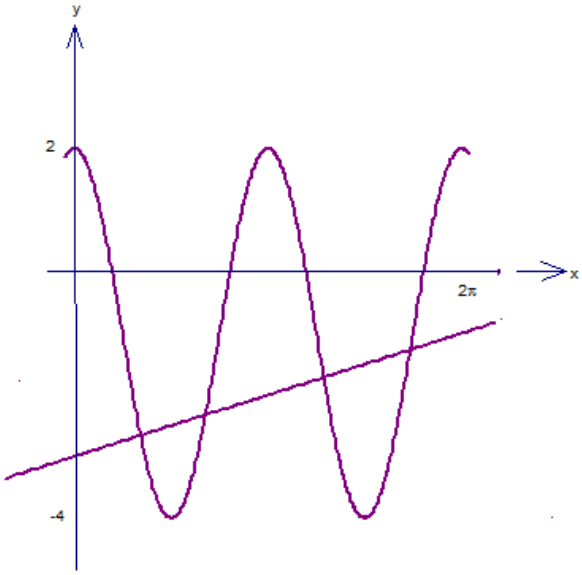
18	$14 + \frac{1}{2}(2 \times 3.142 \times 7)$ =35.994* 35.994*= 2 r + r (1.125) *follow through 11.52	B1 B2 3
		3
19	48 t- 6 t^2 6t(8-t) =0 Max V, V= 24 $(8)^2$ -2 $(8)^3$ 512	B1 B2 B3 4
		4
20	30π + 4πr or δr = 0.05 [30π + 4π(3)] (0.05) 2.1π cm²	B1 B2 3
		3
21	(a) $\left[\frac{x^2}{2}\right]_0^2$ or $\left[\frac{x^2}{x-1}\right]_0^2$ -2 (b) $\frac{2x^{-1}}{-1}$ or $\frac{6x^3}{3}$ 15	B1 2 B1 2
		4
22	(a) 2472 (b) $\frac{2472 * +15^2}{11} - (15)^2$ * follow through 20.18	1 B1 2
		3
23	a) 5! or $^5P_5$ 120 (a) 4! 2! or 48 72	B1 2 B1 2
		4

24	$\frac{6}{x+6}$ or $\frac{5}{x+5}$ $\frac{6}{x+6} \times \frac{5}{x+5} = \frac{1}{3}$ (x+15)(x-4)=0 4	B1 B2 B3 4
		4
25	1.96 $\frac{r-10}{3}$ = 1.96 r = 15.88	B1 B2 3
		3

SCHEME ANSWER OF PAPER 2

No.	PERATURAN PEMARKAHAN	MARKAH	MARKAH PENUH
1	x=2y-4 or $y = \frac{4+x}{2}$	1	
	Substitute x or y in equation 2		
	y^2-3(y)*(2y-4) =6 or $* \left(\frac{4+x}{2}\right)^2 - 3x\left(\frac{4+x}{2}\right) = 6$	1	
	or		
	$5y^2$ -12y +6 =0 or $5x^2$ +16x+8 =0		
	Solve quadratic equations by using a formula or completing the square		
	Using a formula $y = \left(\frac{-(-12)\pm\sqrt{(-12)^2-4(5)(6)}}{2(5)}\right)$	1	
	By completing the square $y^2 - \frac{12}{5}y + \left(\frac{-6}{5}\right)^2 - \left(\frac{-6}{5}\right)^2 + \frac{6}{5} = 0$	Or 1	
	y = 1.69, 0.71	1 0	
	x = -0.62, -2.58	1	5
2	$\frac{dy}{dx} = 6x - 4$	1	
	$x = 1, \frac{dy}{dx} = 2$	1	
	(a) Equation of the tangent y-2 = 2(x-1)	1	
	y =2x	1	
	(b) approximate change in x $\delta x = 0.01$	1	
	$\frac{dy}{dx} = 6(2) - 4$	or	
	=8	1	6
	$\delta y = 0.08$	1	
3	$\overrightarrow{BA} + \overrightarrow{AC} = \overrightarrow{BC}$ or $\overrightarrow{BA} + \overrightarrow{AT} = \overrightarrow{BT}$ or $\overrightarrow{BT} + \overrightarrow{TC} = \overrightarrow{BC}$ or another valid method	1	
i	$\overrightarrow{AC} = 2\underline{y} - \underline{x}$	1	
ii	$\overrightarrow{BT} = \frac{1}{2}\underline{x} + \underline{y}$	1	

	$\overrightarrow{AP} = \underline{y} - \underline{x}$ $\overrightarrow{BR} = k^{*}\left(\frac{1}{2}\underline{x} + \underline{y}\right)$ $\overrightarrow{BR} + h^{*}\left[\underline{y} - \underline{x}\right] = \underline{y}$ $\overrightarrow{BR} = (1-h)\underline{y} + hx$ Compare: $k = 1-h, \frac{1}{2}k = h$ $h = \frac{1}{3}, k = \frac{2}{3}$	1 1 2	7
4	(a) $Q_1 = 10.5 + \left[\frac{5-2}{5}\right](10)$ $Q_1 = 16.5$ $Q_3 = 30.5 + \left[\frac{15-13}{4}\right](10)$ =35.5 Interquartile range =35.5 -16.5 = 19  Score mode = *23.5	1 or 1 1 1 3 1	7

No.	PERATURAN PEMARKAHAN	MARKAH	MARKAH PENUH
5	*LHS* $= 2\cos^2 x + \left(\tan^2 - \sec^2 x\right)$ or any correct method $= 2\cos^2 x - 1$ $= \cos 2x$	1 1	
			
	Shape of cosine Amplitude (maximum and minimum) Shifted Straight line (gradient or y-intercept) for 3 cos 2x -1 = $\frac{x}{\pi} - 3$ or $y = \frac{x}{\pi} - 3$ Number of solutions = 4	1 1 1 1 1 1	8
6	(a) used formula $S_n = \frac{n}{2}\left[2a + (n-1)d\right]$ $a = 12$ $d = 20 - 12 = 8$ $S_n = \frac{n}{2}\left[2(12) + (n-1)8\right] = 1760$ $12n + 4n^2 - 4 - 1760 = 0$ $n^2 + 2n - 440 = 0$ $(n+22)(n-20) = 0$ n=20	1 1 1	

	(b) Used $T_n = a + (n-1)d$ $T_n = 108$ $108 = 12 + (n-1)8$ $n = 13$ (c) $T_{20} = 12 + 19(8)$ $T_{20} = 164$	1 1 1 1	7
	Section B		
7	$\log_{10}(x-2)$: 0.30, 0.48, 0.60, 0.70, 0.78 $\log_{10} y$: 0.54, 0.68, 0.77, 0.86, 0.92 Refer to the appendix 1 Minimum 1 point plotted correctly (Correct axes and uniform scales) 5 *points are correct plotted Line of best fit (at least 3 points lies on the straight line and the other must be balance) $y = k(x-2)^n$ $\log_{10} y = \log k + n\log(x-2)$ $\log_{10} y = n\log_{10}(x-2) + \log_{10} k$ $m = n = 0.80$ $c = 0.3 = \log_{10} k$ $k = 1.995$	1 1 1 1 1 1 1 1+1 1	10
8	$x = 0, y^2 = 9$ (a) $y = \pm 3$ $Q(0,3)$ solve simultaneous equations $y^2 = y + 3 + 9$ $(y+3)(y-4) = 0$ $y = -3 @ 4$ $x = 4 + 3 = 7$ $P(7,4)$	1 1 1	

	(b) $2\left[\int_0^3 (y^2-9)\,dy\right]$ or $\left[\frac{49}{2}-\int_3^4 (y^2-9)\,dy\right]$ area of shaded region $= 2\left[\int_0^3 x\,dy\right]+\left[\frac{1}{2}\times 7\times 7-\int_3^4 x\,dy\right]$ $= 2\left[\int_0^3 (y^2-9)\,dy\right]+\left[\frac{49}{2}-\int_3^4 (y^2-9)\,dy\right]$ $= 2\left[\frac{y^3}{3}-9y\right]_0^3+\frac{49}{2}-\left[\frac{y^3}{3}-9y\right]_3^4$ $= 2\left\{\left[\frac{3^3}{3}-9(3)\right]-0\right\}+\frac{49}{2}-\left\{\left[\frac{4^3}{3}-9(4)\right]-\left[\frac{3^3}{3}-9(3)\right]\right\}$ $= 57\frac{1}{6}$ (b) Volume of generated $V=\pi\int_{-3}^{3}(y^2-9)^2\,dy$ $V=\pi\left[\frac{y^5}{5}-\frac{18y^3}{3}+81y\right]_{-3}^{3}$ $V=\pi\left\{\left[\frac{3^5}{5}-\frac{18(3)^3}{3}+81(3)\right]-\left[\frac{(-3)^5}{5}-\frac{18(-3)^3}{3}+81(-3)\right]\right\}$ $= 259\frac{1}{5}\pi$	1 1 1 1 1 1 1	10
9	(a) $L(0,2)$ $m_1m_2=-1$ $m_2=\frac{2}{3}$ $y=\frac{2}{3}x+2$ Used formula a point dividing a segment of a line (b) (i) $(0,2)=\frac{2(-3)+1(x)}{3},\frac{2(0)+1(y)}{3}$ $M(6,6)$	1 1 1 1 1	

	(ii) use area of triangle $=\frac{1}{2}\left\|\left(\frac{8}{3}+6\right)\right\|$ $=\frac{13}{3}unit^2$ $WM=2WK$ (c) $(x-6)^2+(y-6)^2=4\left[\left(x-\frac{4}{3}\right)^2+(y-0)^2\right]$ $3x^2+3y^2+\frac{4}{3}x+12y-64\frac{8}{9}=0$	1 1 1 1 1	10
10	(a) mean, (i) $\mu p=(8)(p)=6.4$ $p=0.8$ (ii)find $P(X\geq 3)$ $=1-{}^8C_0(0.8)^0(0.2)^8-{}^8C_1(0.8)^1(0.2)^7-{}^8C_2(0.8)^2(0.2)^6$ or using $P(X\geq 3)=P(X=3)+P(X=4)+P(X=5)+P(X=6)+P(X=7)+P(X=8)$ $=0.9988$ or 0.99877 (b) use $P\left(z=\frac{5.3-\mu}{\sigma}\right)=0.0668$ or $P\left(z=\frac{4.8-\mu}{\sigma}\right)=0.1587$ $\frac{5.3-\mu}{\sigma}=1.5$ $\frac{4.8-\mu}{\sigma}=-1$ Solve simultaneous equation (until 1 variable left) $\sigma=0.2, \mu=5$	1 1 1 Or 1 1 1 Or 1 1 1 1 1+1	10
11 (a)	Used trigonometric ratios $\tan\theta=\frac{3}{5}$ $\theta=30.96^0$ $\theta=0.54\,\text{rad}$	1 1	2
(b)	Used Pythagoras Theorem to find OR $OR=\sqrt{3^2+5^2}=5.831$		

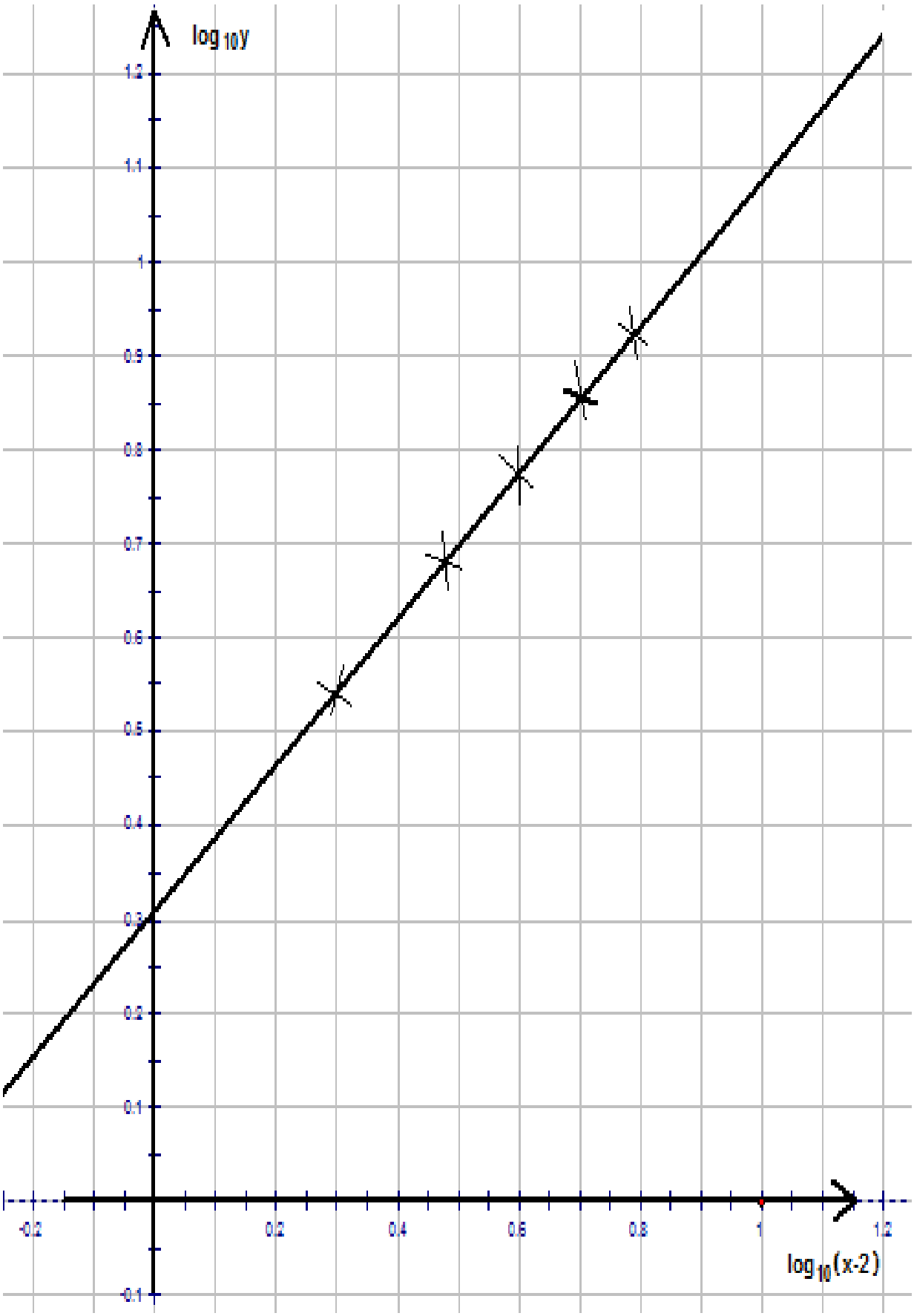
	$PQ = 5.831 - 5 = 0.831$ $QR = 5.831(0.54)$ $= 3.149$ Used trigonometric ratios to find ∠PRO tan ∠PRO = $\frac{5}{3}$ ∠ PRO = 59.04 or $\frac{\pi}{2} - 0.54$ $= 1.031r$ $SP = 3(1.031) = 3.093$ Perimeter of shaded region $= 3 + 3.093 + 0.831 + 3.149$ $= 10.073$ $= 10.07$	1 1 Or 1 1 1	4
(c)	Area of sector PRS $= \frac{1}{2}(3^2)(1.031)$ $= 4.6395$ Area of sector QOR $= \frac{1}{2}(5.831)^2(0.54)$ $= 9.1802$ Area of triangle OPR $= \frac{1}{2}(3)(5)$ $= 7.5$ Area of shaded region $= 9.182 - 7.5 + 4.6395$ =6.32	1 Or 1 Or 1 1 1	4
	Total marks		10
	Section C		
12	(a) <u>Used sine rule</u> $\frac{\sin Q}{5.7} = \frac{\sin 32}{4.9}$ $\sin Q = 0.6164$ $\angle PQR = 38.06$	1 1	

	(b) <u>Used cosine rule</u> $\cos S = \dfrac{4.5^2 + 2.7^2 - 5.7^2}{2(4.5)(2.7)}$ or equivalent $\cos S = -0.2037$ $\angle PSR = 101.75^0$ (c) <u>Used sine rule or cosine rule</u> $\dfrac{PQ}{\sin {}^{*}109.94°} = \dfrac{4.9}{\sin 32°}$ $PQ = 8.692$ (d) Area of triangle PQR $= \frac{1}{2}(4.9)(5.7)sin^{*}109.94$ * follow through Area of triangle PSR $= \frac{1}{2}(4.5)(2.7)\sin 101.75$ Area of PQRS $A_1 + A_2$ $= 13.13 + 5.948$ $= 19.08$	1 1 1 1 1 1 Or 1 1 1	10
13	$x = 20, y = 18, z = 200$ (b) Ingredient | $I_{2007/2005}$ | w | wI A | 150 | *36* | *5400* B | 120 | *72* | *8640* C | 200 | *108* | *21600* D | 130 | *144* | *18720* | | *360* | *54360* (b) <u>Used</u> $\bar{I} = \dfrac{\sum Iw}{\sum w}$ $\bar{I} = \dfrac{54360}{360}$ $\bar{I} = 151$	3 1 1 1	

	(c) $\frac{3322}{Q_{2005}} \times 100 = 151$ $Q_{2005} = 2200$ (d) $= \frac{130}{100} \times 151$ $= 196.3$	1 1 1 1	10
14	(a) $I. x + y \leq 80$ $II. y \geq \frac{1}{2}x$ $III. 420x + 240y \geq 20000$ $21x + 12y \geq 1000$ (b) Draw correctly at least one straight line* Draw correctly all three straight lines R correctly shaded. Refer to appendix 2 (c) (i) $31 \leq x \leq 50$ (ii) $= 420^{*}(53) + 240^{*}(26)$ $= 28500$ *or* $= 420^{*}(5) + 240^{*}(75)$ $= 20100$ The maximum fees collected is 28500	1 1 1 1 1 1 1+1 1 1	10
15	(a) $v_0 = 10$ (b) $a = 8 - 4t$ $a_0 = 8$ (c) v_{max}, $a = 0$, 8-4t =0 t = 2 $v_{max} = 10 + 8(2) - 2(2)^2$ $v_{max} = 18$	1 1 1 1 1 1	

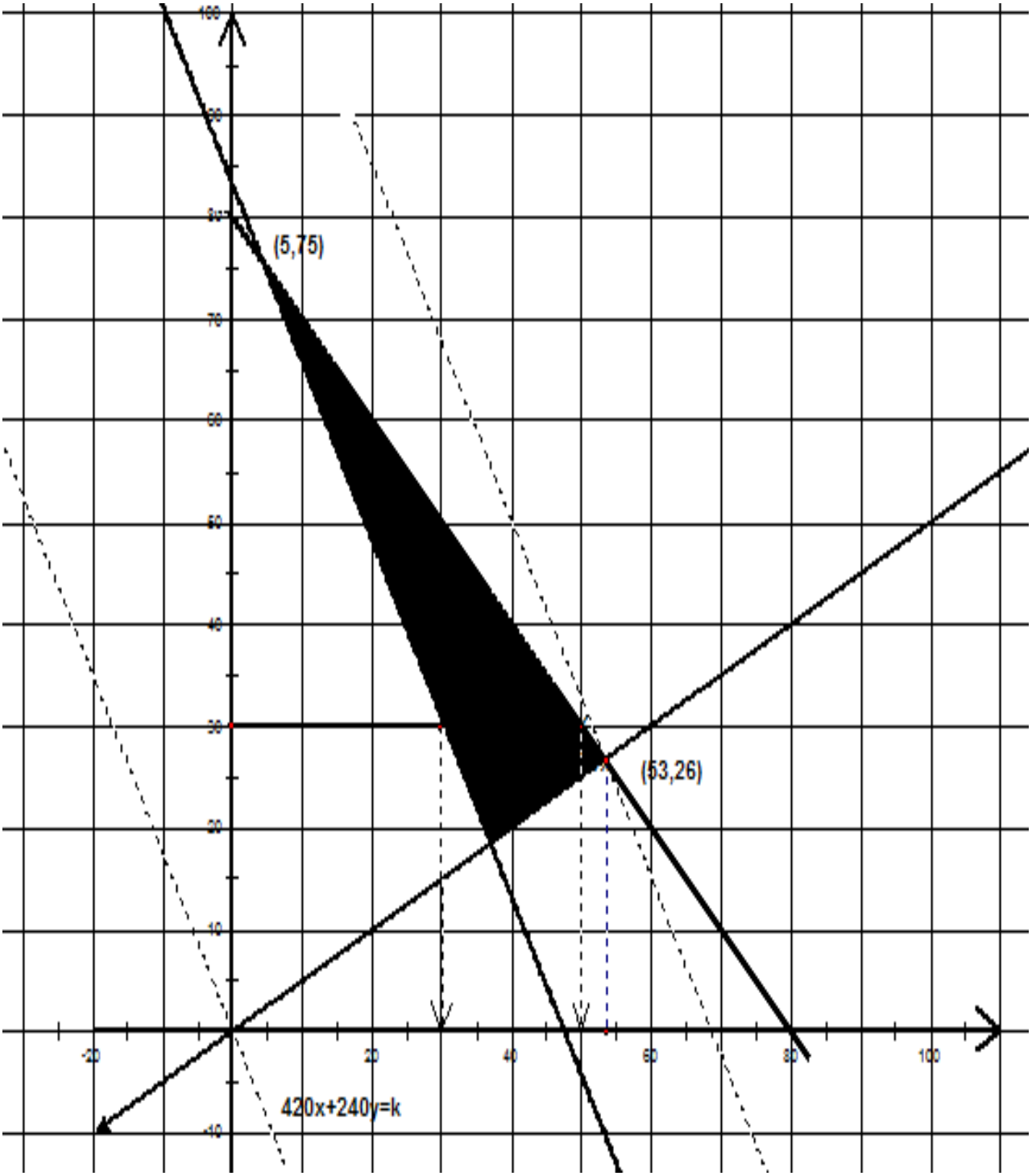
	(d) $s=\int v\,dt=\int\left(10+8t-2t^2\right)dt$ $s=10t+4t^2-\frac{2}{3}t^3$ At least two terms changes their index. Stops instantaneously, $v=0$ $10+8t-2t^2=0$ $(5-t)(1+t)=0$ $t=5 @ t=-1$ $s=10(5)+4(5)^2-\frac{2}{3}(5)^3$ $s=66\frac{2}{3}$ Or $\int_0^5(10+8t-2t^2)dt$ $=$ $[10t+4t^2-\frac{3}{2}t^3]_0^5$	1 1 1 1	10

Appendix 1
Graph 7(a)



Appendix 2

Graph 14(b)



END OF SCHEME ANSWER
SKEMA PEMARKAHAN TAMAT