

SEKOLAH-SEKOLAH MENENGAH ZON A KUCHING

**PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2012**

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
3. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*
4. *Calon dikehendaki menceraikan halaman 18 dan diikat sebagai muka hadapan bersama-sama dengan kertas jawapan.*

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.

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

ALGEBRA

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

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

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

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

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

$$6 \quad \log_a \frac{m}{n} = \log_a m - \log_a n$$

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

$$8 \quad \log_a b = \frac{\log_c b}{\log_c a}$$

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

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

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

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

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

CALCULUS KALKULUS

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

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

$$3 \quad \frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$$

4 Area under a curve / Luas di bawah lengkung

$$= \int_a^b y \, dx \text{ or (atau)}$$

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

5 Volume generated / Isi padu kisanan

$$= \int_a^b \pi y^2 \, dx \text{ or (atau)}$$

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

GEOMETRY GEOMETRI

1 Distance / Jarak

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

2 Midpoint / Titik Tengah

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

3 A point dividing a segment of a line

Titik yang membahagi suatu tembereng garis

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

4. Area of triangle / Luas segi tiga

$$= \frac{1}{2} |(x_1 y_2 + x_2 y_3 + x_3 y_1) - (x_2 y_1 + x_3 y_2 + x_1 y_3)|$$

$$5 \quad |\mathbf{r}| = \sqrt{x^2 + y^2}$$

$$6 \quad \hat{\mathbf{r}} = \frac{x\mathbf{i} + y\mathbf{j}}{\sqrt{x^2 + y^2}}$$

STATISTICS
STATISTIK

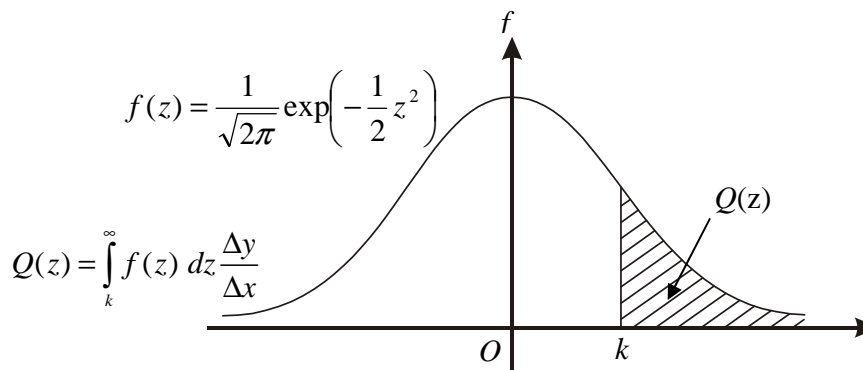
- | | |
|--|---|
| <p>1 $\bar{x} = \frac{\sum x}{N}$</p> <p>2 $\bar{x} = \frac{\sum fx}{\sum f}$</p> <p>3 $\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{N}} = \sqrt{\frac{\sum x^2}{N} - \bar{x}^2}$</p> <p>4 $\sigma = \sqrt{\frac{\sum f(x - \bar{x})^2}{\sum f}} = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2}$</p> <p>5 $m = L + \left(\frac{\frac{1}{2}N - F}{f_m} \right) C$</p> <p>6 $I = \frac{Q_1}{Q_0} \times 100$</p> | <p>7 $\bar{I} = \frac{\sum w_i I_i}{\sum w_i}$</p> <p>8 ${}^n P_r = \frac{n!}{(n-r)!}$</p> <p>9 ${}^n C_r = \frac{n!}{(n-r)! r!}$</p> <p>10 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$</p> <p>11 $P(X=r) = {}^n C_r p^r q^{n-r}, p+q=1$</p> <p>12 Mean / Min $\mu = np$</p> <p>13 $\sigma = \sqrt{npq}$</p> <p>14 $z = \frac{X - \mu}{\sigma}$</p> |
|--|---|

TRIGONOMETRY
TRIGONOMETRI

- | | |
|--|---|
| <p>1 Arc length, $s = r\theta$
<i>Panjang lengkok, $s = j\theta$</i></p> <p>2 Area of sector, $A = \frac{1}{2}r^2\theta$
<i>Luas sector, $L = \frac{1}{2}j^2\theta$</i></p> <p>3 $\sin^2 A + \cos^2 A = 1$
$\sin^2 A + \cos^2 A = 1$</p> <p>4 $\sec^2 A = 1 + \tan^2 A$
$\sec^2 A = 1 + \tan^2 A$</p> <p>5 $\operatorname{cosec}^2 A = 1 + \cot^2 A$
$\operatorname{kosek}^2 A = 1 + \cot^2 A$</p> <p>6 $\sin 2A = 2 \sin A \cos A$
$\sin 2A = 2 \sin A \cos A$</p> <p>7 $\cos 2A = \cos^2 A - \sin^2 A$
$= 2 \cos^2 A - 1$
$= 1 - 2 \sin^2 A$
$\cos 2A = \cos^2 A - \sin^2 A$
$= 2 \cos^2 A - 1$
$= 1 - 2 \sin^2 A$</p> | <p>8 $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$</p> <p>9 $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$
$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$</p> <p>10 $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$
$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$</p> <p>11 $\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$</p> <p>12 $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$</p> <p>13 $a^2 = b^2 + c^2 - 2bc \cos A$
$a^2 = b^2 + c^2 - 2bc \cos A$</p> <p>14 Area of triangle / <i>Luas segi tiga</i>
$= \frac{1}{2} ab \sin C$</p> |
|--|---|

**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										Minus / Tolak									
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
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:

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

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

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

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

Section A
Bahagian A

[40 marks]

[40 markah]

Answer **all** questions.

Jawab **semua** soalan.

- 1 Solve the simultaneous equations $x - 2y = 1$ and $x^2 - 5y^2 + xy = 6$.
Give the answers correct to three decimal places. [5 marks]
*Selesaikan persamaan serentak $x - 2y = 1$ and $x^2 - 5y^2 + xy = 6$.
Beri jawapan betul kepada tiga tempat perpuluhan.* [5 markah]
- 2 Given $f(x) = 9 - 6x - 2x^2$ can be expressed in the form of $f(x) = b - a(x + p)^2$ where a , b and p are constants.
Diberi $f(x) = 9 - 6x - 2x^2$ dapat diungkapkan dalam bentuk $f(x) = b - a(x + p)^2$ dengan keadaan a , b and p ialah pemalar.
- (a) State the value of a , b and p .
Nyatakan nilai a , b and p . [5 marks]
[5 markah]
- (b) Sketch the graph of $f(x) = 9 - 6x - 2x^2$. [2 marks]
Lakarkan graf bagi $f(x) = 9 - 6x - 2x^2$. [2 markah]

3

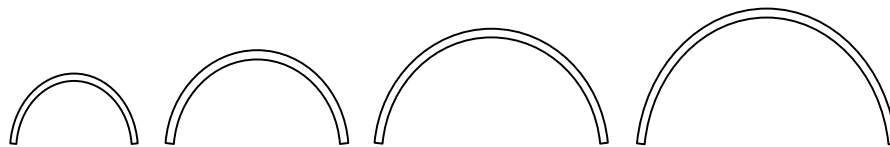


Diagram 3

Rajah 3

A strip of metal is cut and bent to form some semicircles. The diagram 3 shows the first four semicircles formed. The radius of the smallest semicircle is 5 cm. The radius of each subsequent semicircle is increased by 8 cm. [Use $\pi = \frac{22}{7}$]

Satu jalur logam dipotong dan dibengkok untuk membentuk beberapa semi bulatan. Rajah 3 menunjukkan empat semi bulatan pertama yang telah dibentuk. Jejari semi bulatan yang terkecil ialah 5 cm. Jejari semi bulatan yang berikutnya bertambah sebanyak 8 cm setiap satu. [Guna $\pi = \frac{22}{7}$]

- (a) If the radius of the largest semicircle is 77 cm, find the number of semi circles formed. [3 marks]

Jika jejari bagi semi bulatan yang terbesar ialah 77 cm, cari bilangan semi bulatan yang telah dibentuk. [3 markah]

- (b) Calculate the total cost needed to form all the semicircles in 3(a) if the cost of the metal strip is RM7 per meter. [4 marks]

Hitungkan jumlah kos yang diperlukan untuk membentuk semua semi bulatan dalam 3(a) jika kos jalur logam ialah RM7 semeter. [4 markah]

- 4 (a) Prove that $\cot x = \frac{\tan 2x}{\sec 2x - 1}$. [3 marks]

Buktikan kot $x = \frac{\tan 2x}{\sec 2x - 1}$. [3 markah]

- (b) (i) Sketch the graph of $y = 2 \cos 3x$ for $0 \leq x \leq \pi$. [3 marks]
Lakarkan graf bagi $y = 2 \cos 3x$ untuk $0 \leq x \leq \pi$. [3 markah]

- (ii) Hence, find the possible values of k such that the equation $\cos 3x + k = 0$ has only two solutions for $0 \leq x \leq \pi$. [2 marks]

Seterusnya, cari nilai-nilai k yang mungkin supaya persamaan $\cos 3x + k = 0$ mempunyai dua penyelesaian sahaja untuk $0 \leq x \leq \pi$. [2 markah]

- 5 Diagram 5 is a histogram showing the wages per day of a group workers in a firm. *Rajah 5 ialah histogram yang mewakili upah harian bagi sekumpulan pekerja dalam sebuah firma.*

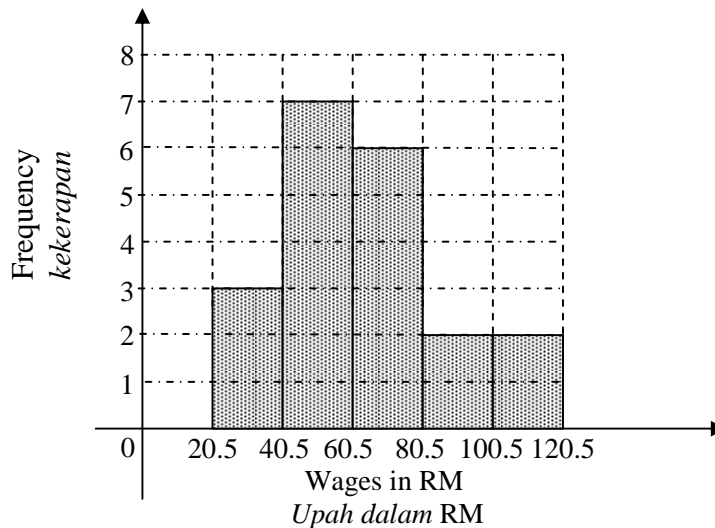


Diagram 5
Rajah 5

Based on the histogram, calculate
Berdasarkan kepada histogram, hitung

- (a) the mean wages per day of the worker. [3 marks]
min upah harian pekerja, [3 markah]
- (b) the variance of the distribution. [3 marks]
varians bagi taburan itu. [3 markah]

- 6 Diagram 6 shows a triangle OKL in which $\overline{OK} = \underline{a}$ and $\overline{OL} = \underline{b}$. P is a point on KL such that $KP = hKL$ in which h is a constant.

Rajah 6 menunjukkan sebuah segi tiga OKL dengan $\overline{OK} = \underline{a}$ dan $\overline{OL} = \underline{b}$. P ialah satu titik pada KL supaya $KP = hKL$ dengan keadaan h ialah pemalar.

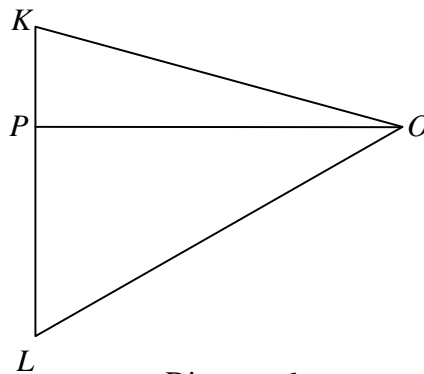


Diagram 6
 Rajah 6

- (a) Express \overline{OP} in terms of h , \underline{a} and \underline{b} . [3 marks]
Ungkapkan \overline{OP} dalam sebutan h , \underline{a} dan \underline{b} . [3 markah]
- (b) Given a vector $\underline{v} = (4h+8)\underline{a} + 3\underline{b}$ is parallel to \overline{OP} , calculate the values of h .
 Hence, by using the bigger value of h , find the ratio of $PL : KL$. [4 marks]
*Diberi satu vektor $\underline{v} = (4h+8)\underline{a} + 3\underline{b}$ adalah selari dengan \overline{OP} , hitung nilai-nilai h .
 Seterusnya, dengan menggunakan nilai h yang lebih besar, cari nisbah $PL : KL$.* [4 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.

Variables x and y are related by the equation $y = (p+1)x^{\frac{n}{2}}$, where p and n are constants.
Jadual 7 menunjukkan nilai-nilai bagi dua pembolehubah, x dan y , yang diperolehi daripada suatu eksperimen. Pembolehubah x dan y dihubungkan oleh persamaan $y = (p+1)x^{\frac{n}{2}}$, dengan keadaan p dan n ialah pemalar.

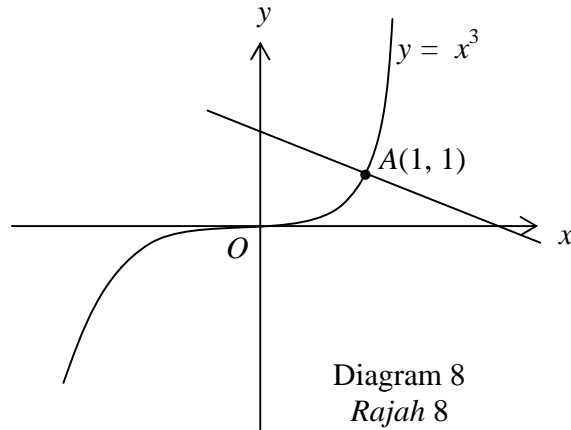
x	2.0	4.0	5.0	6.0	8.0	10.0
y	5.6	15.5	23	29	45.1	63

Table 7
Jadual 7

- (a) Based on Table 7, construct a table for the values of $\log_{10} x$ and $\log_{10} y$. [2 marks]
Berdasarkan Jadual 7, bina satu jadual untuk nilai-nilai $\log_{10} x$ dan $\log_{10} y$. [2 markah]
- (b) Plot $\log_{10} y$ against $\log_{10} x$ by using a scale of 2 cm to 0.10 unit on the $\log_{10} x$ -axis and 2 cm to 0.20 unit on the $\log_{10} y$ -axis. Hence, draw the line of best fit. [3 marks]
Plot $\log_{10} y$ melawan $\log_{10} x$ dengan menggunakan skala 2 cm kepada 0.10 unit pada paksi- $\log_{10} x$ dan 2 cm kepada 0.20 unit pada paksi- $\log_{10} y$. Seterusnya, lukis garis lurus penyuaian terbaik. [3 markah]
- (c) Use the graph in 7(b) to find the value of
Gunakan graf di 7(b) untuk mencari nilai
- (i) y when $x = 6.9$,
 y apabila $x = 6.9$,
- (ii) n ,
- (iii) p .

[5 marks]
[5 markah]

- 8 Diagram 8 shows the curve $y = x^3$ and the normal to the curve at the point $A(1, 1)$
Rajah 8 menunjukkan lengkung $y = x^3$ dan normal kepada lengkung itu pada $A(1, 1)$.



Calculate

Hitung

- (a) the equation of the normal to the curve at A, [3 marks]
persamaan normal kepada lengkung pada A, [3 markah]
- (b) the area of the region enclosed by the curve, the normal and the x -axis, [3 marks]
luas rantau yang dibatasi oleh lengkung, normal itu dan paksi- x , [3 markah]
- (c) the volume of the revolution, in terms of π , if the region in **8(b)** is rotated through 360° about the x -axis. [4 marks]
*isipadu kisanan, dalam sebutan π , jika rantau di **8(b)** dikisarkan melalui 360° pada paksi- x .* [4 markah]

9

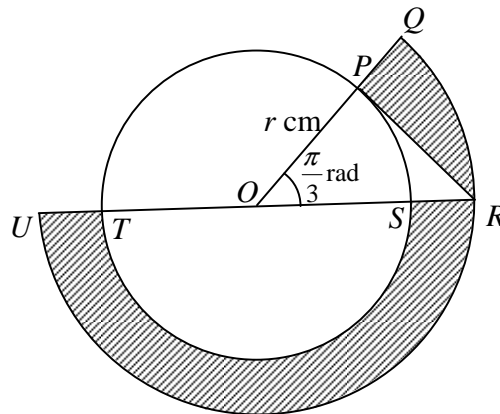


Diagram 9
Rajah 9

Diagram 9 shows a circle STP and an arc QRU with centre O and radius r cm and 10 cm respectively. PR is the tangent to the circle STP at the point P . Given that $\angle POR = \frac{\pi}{3}$ radians.

Rajah 9 menunjukkan sebuah bulatan STP dan satu lengkok QRU berpusat O dan berjajari r cm dan 10 cm masing-masing. PR adalah tangent kepada bulatan STP pada titik P .

Diberi $\angle POR = \frac{\pi}{3}$ radian.

Find

Cari

- (a) the perimeter, in cm, of triangle OPR , [3 marks]
 perimeter, dalam cm, bagi segi tiga OPR , [3 markah]
- (b) the length, in cm, of minor arc PT , [2 marks]
 panjang, dalam cm, bagi lengkok minor PT , [2 markah]
- (c) the area, in cm^2 , of the shaded region. [5 marks]
 luas, dalam cm^2 , bagi kawasan berlorek. [5 markah]

- 10 Solutions by scale drawing will **not** be accepted.
Penyelesaian secara lukisan berskala tidak akan diterima.

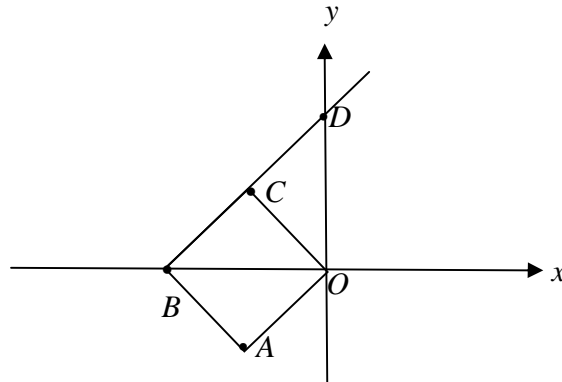


Diagram 10
 Rajah 10

Diagram 10 shows a parallelogram $OABC$ and a straight line $\frac{y}{8} - \frac{x}{4} = 1$ intersects the x -axis and the y -axis at point B and point D respectively. Given that point C divides line segment BD such that $2BC = 3CD$. Find

Rajah 10 menunjukkan segiempat selari $OABC$ dan satu garis lurus $\frac{y}{8} - \frac{x}{4} = 1$ yang bersilang dengan paksi- x dan paksi- y pada titik B dan titik D masing-masing. Diberi titik C membahagikan tembereng garis BD dengan keadaan $2BC = 3CD$. Cari

- (a) the coordinates of C and of A , [4 marks]
 koordinat C dan A , [4 markah]
- (b) the area of parallelogram $OABC$, [2 marks]
 luas bagi segi empat selari $OABC$, [2 markah]
- (c) the equation of straight line AB , [2 marks]
 persamaan bagi garis lurus AB , [2 marks]
- (d) the equation of the locus of point R which moves in such a way that its distance from point B is always $\frac{1}{2}$ the distance of OD . [2 marks]
 persamaan bagi lokus titik R yang bergerak dengan keadaan jaraknya dari titik B adalah sentiasa $\frac{1}{2}$ daripada jarak OD . [2 marks]

- 11** (a) There are fish of type *A* and type *B* in a pond. The ratio of the number of fish of type *A* to type *B* is 2 : 3. If 8 fish are caught at random from the pond, find the probability that

Terdapat ikan jenis A dan B di dalam sebuah kolam. Nisbah bilangan ikan jenis A kepada ikan jenis B ialah 2 : 3. Jika 8 ekor ikan ditangkap secara rawak dari kolam itu, cari kebarangkalian bahawa

- (i) exactly 3 fish are of type *A*,
tepat 3 ekor ikan adalah jenis A,
- (ii) not less than 3 fish are of type *B*.
tidak kurang daripada 3 ekor ikan adalah jenis B.

[5 marks]
[5 markah]

- (b) The heights of a group of students have a normal distribution with a mean of 163 cm and a standard deviation of 16 cm.

Calculate

Tinggi sekumpulan pelajar mempunyai taburan normal dengan min 163 cm dan sisihan piawai 16 cm.

Hitung

- (i) the standard score when the height is 175 cm,
skor piawai apabila ketinggian ialah 175 cm,
- (ii) the height, in cm, of a student whose standard score is -0.6 ,
ketinggian, dalam cm, seorang pelajar yang mempunyai skor piawai -0.6 ,
- (iii) the probability that the height of a student chosen at random is between 147 cm and 175 cm.
kebarangkalian bahawa ketinggian seorang pelajar yang dipilih secara rawak adalah antara 147 cm dan 175 cm.

[5 marks]
[5 markah]

Section C
Bahagian C

[20 marks]
[20 markah]

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

- 12** A particle starting from a fixed point O is moving along a straight line. The velocity of the particle, $v \text{ m s}^{-1}$, is given by $v = 16 - 6t$ where t is the time, in seconds, after passing through O .
Sebutir zarah bermula dari titik tetap O dan bergerak dalam satu garis lurus. Halaju zarah itu, $v \text{ m s}^{-1}$, diberi oleh $v = 16 - 6t$ dengan keadaan t ialah masa, dalam saat, selepas melalui O .

Find
Carikan

- (a) the displacement of the particle from O when it is instantaneously at rest, [5 marks]
sesaran zarah itu dari O apabila ia berhenti seketika, [5 markah]
- (b) the time when the particle passes through O again, [2 marks]
masa apabila zarah itu melalui O semula, [2 markah]
- (c) the total distance travelled by the particle in the first 4 seconds. [3 marks]
jumlah jarak yang dilalui oleh zarah itu dalam 4 saat yang pertama. [3 markah]

- 13 Table 13 shows the prices and the price indices of four Ingredients, P , Q , R and S , used to make a particular kind of pudding.
Jadual 13 menunjukkan harga dan indeks harga bagi empat bahan, P , Q , R dan S , yang digunakan untuk membuat sejenis puding.

Ingredient Bahan	Price (RM) per kg in the year <i>Harga (RM) se kg pada tahun</i>		Price index in the year 2010 based on the year 2008 <i>Indeks harga pada tahun 2010 berdasarkan tahun 2008</i>	Weightages <i>Pemberat</i>
	2008	2010		
P	2.20	2.97	x	5
Q	4.50	5.40	120	n
R	5.00	y	144	1
S	3.00	4.50	150	$2n$

Table 13
Jadual 13

- (a) Find the value of
Cari nilai

- (i) x ,
(ii) y .

[2 marks]
[2 markah]

- (b) Given that the composite index for the cost of making the pudding in the year 2010 based on the year 2008 is 138.25, find the value of n . [3 marks]
Diberi indeks gubahan bagi kos membuat puding itu pada tahun 2010 berdasarkan tahun 2008 ialah 138.25, cari nilai n . [3 markah]

- (c) Calculate the price of the pudding in the year 2008 if its corresponding price in the year 2010 is RM 8.80. [2 marks]
Hitung harga puding pada tahun 2008 jika harganya yang sepadan pada tahun 2010 ialah RM 8.80. [2 markah]

- (d) The cost of making the pudding is expected to increase by 55% from the year 2008 to the year 2011. Calculate the expected composite index for the year 2011 based on the year 2010. [3 marks]
Kos membuat puding itu dijangka meningkat sebanyak 55% dari tahun 2008 ke tahun 2011. Hitung indeks gubahan dalam tahun 2011 berdasarkan tahun 2010. [3 markah]

- 14 In Diagram 14, ABC and CDE are two triangles. E is the midpoint of AC , $AC = DC$, $AB = 9.7$ cm and $\angle ABC = 60^\circ$.

Dalam Rajah 14, ABC dan CDE adalah dua buah segitiga. E adalah titik tengah AC , $AC = DC$, $AB = 9.7$ cm dan $\angle ABC = 60^\circ$.

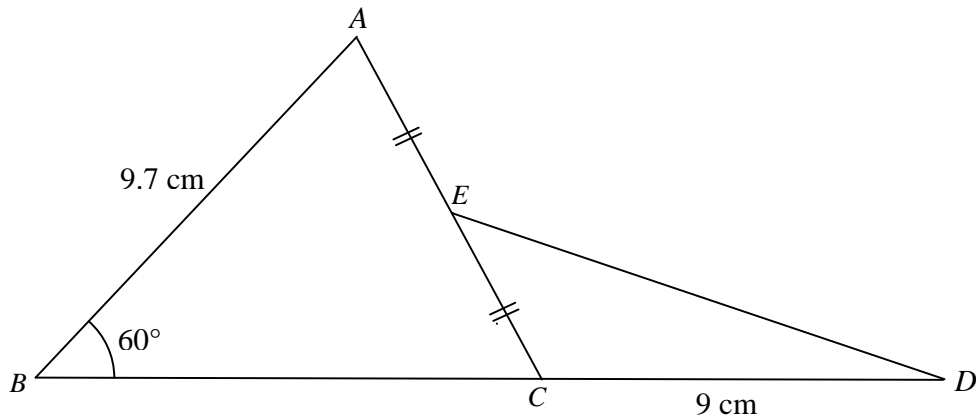


Diagram 14
Rajah 14

Calculate
Hitung

- (a) $\angle ACB$, [2 marks]
[2 markah]
- (b) the length of ED , [3 marks]
panjang ED , [3 markah]
- (c) the area of quadrilateral $ABDE$. [5 marks]
luas sisi empat $ABDE$. [5 markah]
- 15 A bakery shop produces two types of bread, L and M. The production of the bread involves two processes, mixing the ingredients and baking the bread. Table 15 shows the time taken to make a loaf of bread L and bread M respectively.
Sebuah kedai roti mengeluarkan dua jenis roti, L dan M. Penghasilan roti-roti tersebut melibatkan dua proses iaitu pencampuran bahan dan pembakaran roti. Jadual 15 menunjukkan masa yang diambil oleh sebuku roti L dan roti M masing-masing.

Type of bread/ Jenis roti	Time taken (minutes) / Masa yang diambil (minit)	
	Mixing the ingredients Pencampuran bahan	Baking the bread Pembakaran roti
L	30	40
M	30	30

Table 15

Jadual 15

The shop produces x loaves of bread type L and y loaves of bread type M per day. The production of the loaves of bread per day are based on the following constraints:

Kedai ini mengeluarkan x buku roti jenis L dan y buku roti jenis M setiap hari. Penghasilan roti setiap hari berdasarkan kekangan-kekangan berikut:

I : The maximum total time used for mixing ingredients for both types of bread is not more than 540 minutes.

Jumlah masa maksimum yang digunakan untuk pencampuran bahan bagi kedua-dua roti tersebut adalah tidak melebihi 540 minit.

II : The total time for baking both types of bread is at least 240 minutes.

Jumlah masa untuk pembakaran bagi kedua-dua roti tersebut adalah sekurang-kurangnya 240 minit.

III : The ratio of the number of loaves of bread type L to the number of loaves of bread type M is not less than 1 : 2.

Nisbah bilangan buku roti jenis L kepada bilangan buku roti jenis M adalah tidak kurang daripada 1 : 2.

(a) Write down 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 memuaskan semua kekangan yang dinyatakan di atas. [3 markah]

(b) Using a scale of 2 cm to represent 2 loaves of bread on both axes, construct and shade the region R that satisfies all the above constraints. [3 marks]

Dengan menggunakan skala 2 cm untuk mewakili 2 buku roti bagi kedua-dua paksi, binakan dan lorekkan kawasan R yang memuaskan semua kekangan yang dinyatakan di atas. [3 markah]

(c) By using your graph from **15(b)**, find
*Berdasarkan graf anda dari **15(b)**, cari*

(i) the maximum number of loaves of bread type L if 10 loaves of bread type M are produced per day.

bilangan maksimum buku roti jenis L jika 10 buku roti jenis M dihasilkan setiap hari.

(ii) the maximum total profit per day if the profit from one loaf of bread type L and type M are RM1.50 and RM2.00 respectively.

jumlah keuntungan maksimum sehari jika keuntungan yang diperolehi daripada sebuku roti jenis L dan jenis M ialah RM1.50 dan RM2.00 masing-masing.

[4 marks]

[4 markah]

END OF QUESTION PAPER

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

SEKOLAH-SEKOLAH MENENGAH ZON A KUCHING

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2012

MATEMATIK TAMBAHAN

Kertas 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

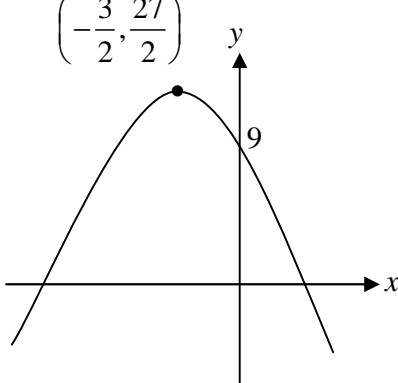
MARKING SCHEME

Skema Pemarkahan ini mengandungi 13 halaman bercetak

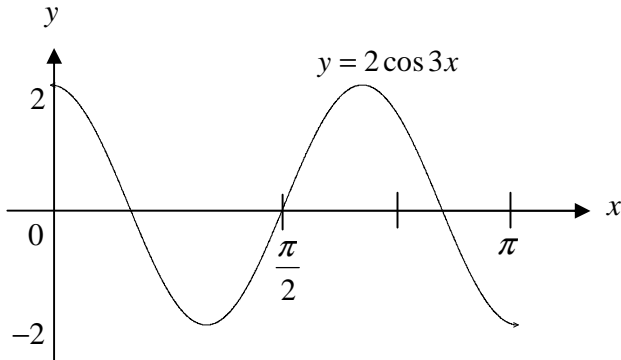
<http://tutormansor.wordpress.com/>

ADDITIONAL MATHEMATICS MARKING SCHEME

TRIAL SPM exam Zon A Kuching 2012 – PAPER 2

QUESTION NO.	SOLUTION	MARKS
1	$x = 1 + 2y$ <div style="text-align: right; border: 1px solid black; padding: 2px; display: inline-block;">P1</div> $(1+2y)^2 - 5y^2 + (1+2y)y - 6 = 0$ <div style="text-align: right; border: 1px solid black; border-radius: 50%; padding: 2px; display: inline-block;">K1</div> <p style="text-align: right;">Eliminate x or y</p> $y = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(-5)}}{2(1)}$ <div style="text-align: right; border: 1px solid black; border-radius: 50%; padding: 2px; display: inline-block;">K1</div> <p style="text-align: right;">Solve the quadratic equation by quadratic formula @ completing the square must be shown</p> $y = 0.854, -5.854$ <div style="text-align: right; border: 1px solid black; padding: 2px; display: inline-block;">N1</div> <p style="text-align: right;">or</p> $x = 2.708, -10.708$ <div style="text-align: right; border: 1px solid black; border-radius: 50%; padding: 2px; display: inline-block;">N1</div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Note : OW-1 if the working of solving quadratic equation is not shown.</p> </div>	5
2 (a) (b)	$f(x) = b - ax^2 - 2apx - ap^2$ <div style="text-align: right; border: 1px solid black; border-radius: 50%; padding: 2px; display: inline-block;">K1</div> $a = 2$ <div style="text-align: right; border: 1px solid black; padding: 2px; display: inline-block;">N1</div> $-2ap = -6 \text{ or } b - ap^2 = 9$ <div style="text-align: right; border: 1px solid black; border-radius: 50%; padding: 2px; display: inline-block;">K1</div> $b = 27/2$ <div style="text-align: right; border: 1px solid black; padding: 2px; display: inline-block;">N1</div> <div style="text-align: right; border: 1px solid black; padding: 2px; display: inline-block;">N1</div> $p = \frac{3}{2}$ <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> $\left(-\frac{3}{2}, \frac{27}{2}\right)$ </div>  </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px; display: inline-block; margin-right: 5px;">N1</div> <div> $\left(-\frac{3}{2}, \frac{27}{2}\right)_{\max}$ and $(0, 9)$ </div> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px; display: inline-block; margin-right: 5px;">N1</div> <div>The shape of the function.</div> </div> </div> </div>	5 2

7

QUESTION NO.	SOLUTION	MARKS
3 (a)	$a = 5, d = 8$ (K1) $77 = 5 + (n-1)(8)$ (K1) $n = 10$ (N1)	3
(b)	$a = 5\pi, d = 8\pi$ (K1) $S_{10} = \frac{10}{2} [2(5\pi) + (10-1)(8\pi)]$ (K1) $= 410\pi$ (N1) \therefore the total cost = RM90.20 (N1)	4 7
4 (a)	$\frac{\sin 2x}{\frac{\cos 2x}{\frac{1}{\cos 2x}} - 1}$ (K1) $= \frac{2 \sin x \cos x}{1 - (1 - 2 \sin^2 x)}$ (K1) $= \cot x$ (N1)	3
(b)(i)		5

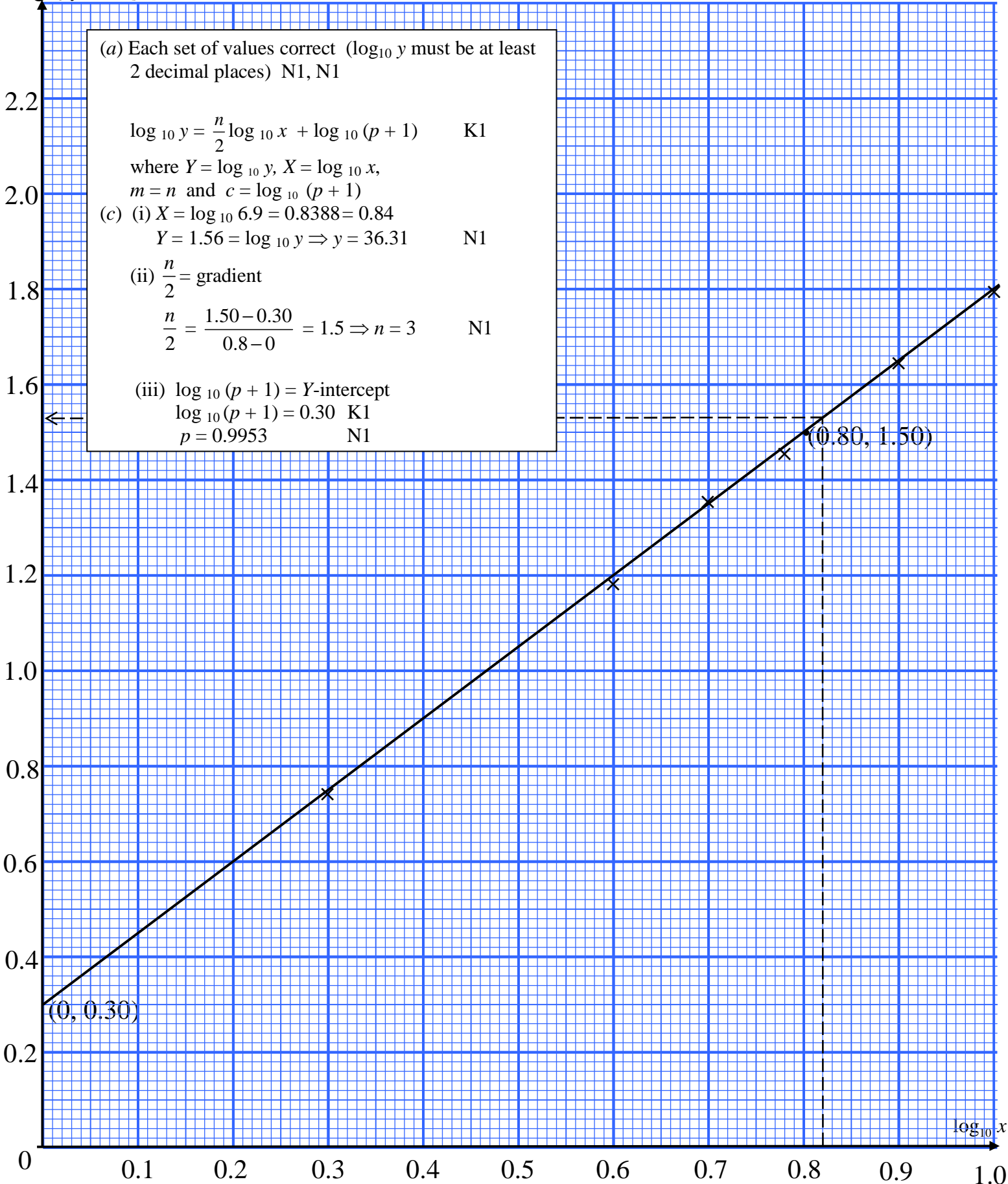
QUESTION NO.	SOLUTION	MARKS
(ii)	Shape of cosine curve P1 Amplitude P1 Period P1 $2\cos 3x = -2k$ K1 $k = -1, 1$ N1	8
5 (a)	$\sum fx = 30.5(3) + 50.5(7) + 70.5(6) + 90.5(2) + 110.5(2) = 1270$ $\bar{x} = \frac{1270}{20} = 63.5$ K1 K1 N1	3
(b)	$\sigma^2 = \frac{(30.5)^2(3) + (50.5)^2(7) + (70.5)^2(6) + (90.5)^2(2) + (110.5)^2(2)}{3+7+6+2+2} - (63.50)^2$ $= \frac{91265}{20} - 4032.25 = 531$ K1 K1 N1	6
6 (a)	$\overline{OP} = \overline{OK} + \overline{KP}$ $= \underline{a} + h(-\underline{a} + \underline{b})$ $\overline{OP} = (1-h)\underline{a} + h\underline{b}$ K1 K1 N1	3

QUESTION NO.	SOLUTION	MARKS
(b)	$\frac{3}{4h+8} = \frac{h}{1-h} \quad \text{K1}$ $(4h-1)(h+3) = 0 \quad \text{K1}$ $h = \frac{1}{4} \quad \text{N1}$ $PL : KL = 3 : 4 \quad \text{N1}$	<div style="text-align: center; font-size: 24px; font-weight: bold;">4</div> <div style="border: 1px solid black; width: 30px; height: 30px; margin: 0 auto; text-align: center; line-height: 30px; font-weight: bold;">7</div>

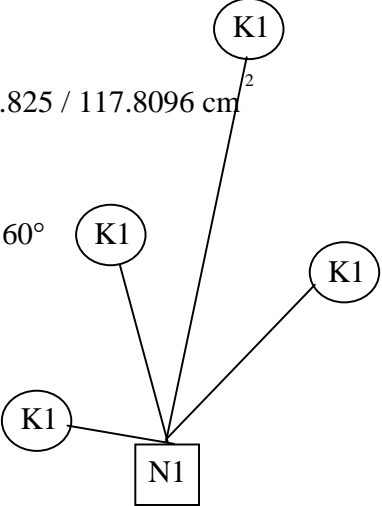
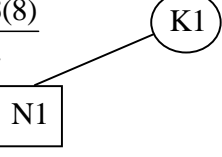
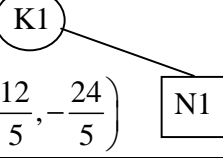

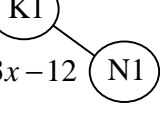
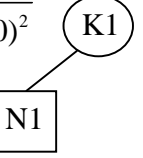
$\log_{10} x$	0.30	0.60	0.70	0.78	0.90	1.00	N1
$\log_{10} y$	0.75	1.19	1.36	1.46	1.65	1.80	N1

Correct both axes (Uniform scale)	K1
All points are plotted correctly	N1
Line of best fit	N1

$\log_{10} y$ Q7



QUESTION NO.	SOLUTION	MARKS
8 (a)	$\frac{dy}{dx} = 3x^2 \text{ or } \frac{dy}{dx} = 3(1) = 3 \text{ or } m_{normal} = -\frac{1}{3} \quad \text{K1}$ $1 = -\frac{1}{3}(1)+c \quad \text{K1}$ $y = -\frac{1}{3}x + \frac{4}{3} \quad \text{N1}$	3
(b)	$B(4, 0) \quad \text{K1}$ $\int_0^1 x^3 dx + \frac{1}{2}(4-1)(1) \quad \text{K1}$ $= \frac{1}{4} + \frac{3}{2}$ $= 1\frac{3}{4} \text{ unit}^2 \quad \text{N1}$	3
(c)	<p>volume of revolution</p> $= \int_0^1 \pi(x^3)^2 + \frac{1}{3}\pi(1)^3(4-1) \quad \text{K1}$ $= \pi\left[\frac{x^7}{7}\right]_0^1 + \pi \quad \text{K1}$ $= 1\frac{1}{7}\pi \text{ unit}^3 \quad \text{N1}$	4
		10
QUESTION NO.	SOLUTION	MARKS
9 (a)	$PR = 8.660 \quad \text{K1}$ $r = 5 \quad \text{K1}$ $23.66 \text{ cm} \quad \text{N1}$	3
(b)	$s = 5\left(\pi - \frac{\pi}{3}\right) \quad \text{K1}$ $= 10.47 \quad \text{N1}$	2

(c)	<p>Area of shaded region of semi circle</p> $= \frac{1}{2}(10)^2(\pi) - \frac{1}{2}(5)^2(\pi)$ $= 117.825 / 117.8096 \text{ cm}^2$ <p>Area of shaded region PQR</p> $= \frac{1}{2}(10)^2 \left(\frac{\pi}{3} \right) - \frac{1}{2}(5)(10) \sin 60^\circ$ $= 30.716 / 30.7093 \text{ cm}^2$ <p>Total area of shaded region</p> $= 117.825 + 30.716$ $= 148.541 / 148.5192 \text{ cm}^2$ 	<p>5</p> <hr/> <p>10</p>
QUESTION NO.	SOLUTION	MARKS
10 (a)(i)	$\frac{2(-4) + 3(0)}{3+2} \quad \text{or} \quad \frac{2(0) + 3(8)}{3+2}$ $C = \left(\frac{-8}{5}, \frac{24}{5} \right)$ 	4
(ii)	$\frac{-\frac{8}{5} + x}{\frac{5}{2}} = -2 \quad \text{or} \quad \frac{24}{5} + y}{2} \quad \text{or} \quad (-2, 0)$ $A \left(-\frac{12}{5}, -\frac{24}{5} \right)$ 	2
(b)	$= \frac{1}{2} \left 0 \left(-\frac{24}{5} \right) + \left(-\frac{12}{5} \right) (0) + (-4) \left(\frac{24}{5} \right) + \left(-\frac{8}{5} \right) (0) - 0 \left(-\frac{12}{5} \right) - \left(-\frac{24}{5} \right) (-4) - (0) \left(-\frac{8}{5} \right) - \left(\frac{24}{5} \right) (0) \right $ $= 19.2$ 	2
(c)	$m_{AB} = -3$ $y = -3x - 12$ 	
(d)	$\sqrt{(x - (-4))^2 + (y - 0)^2}$ $x^2 + y^2 + 8x = 0$ 	10

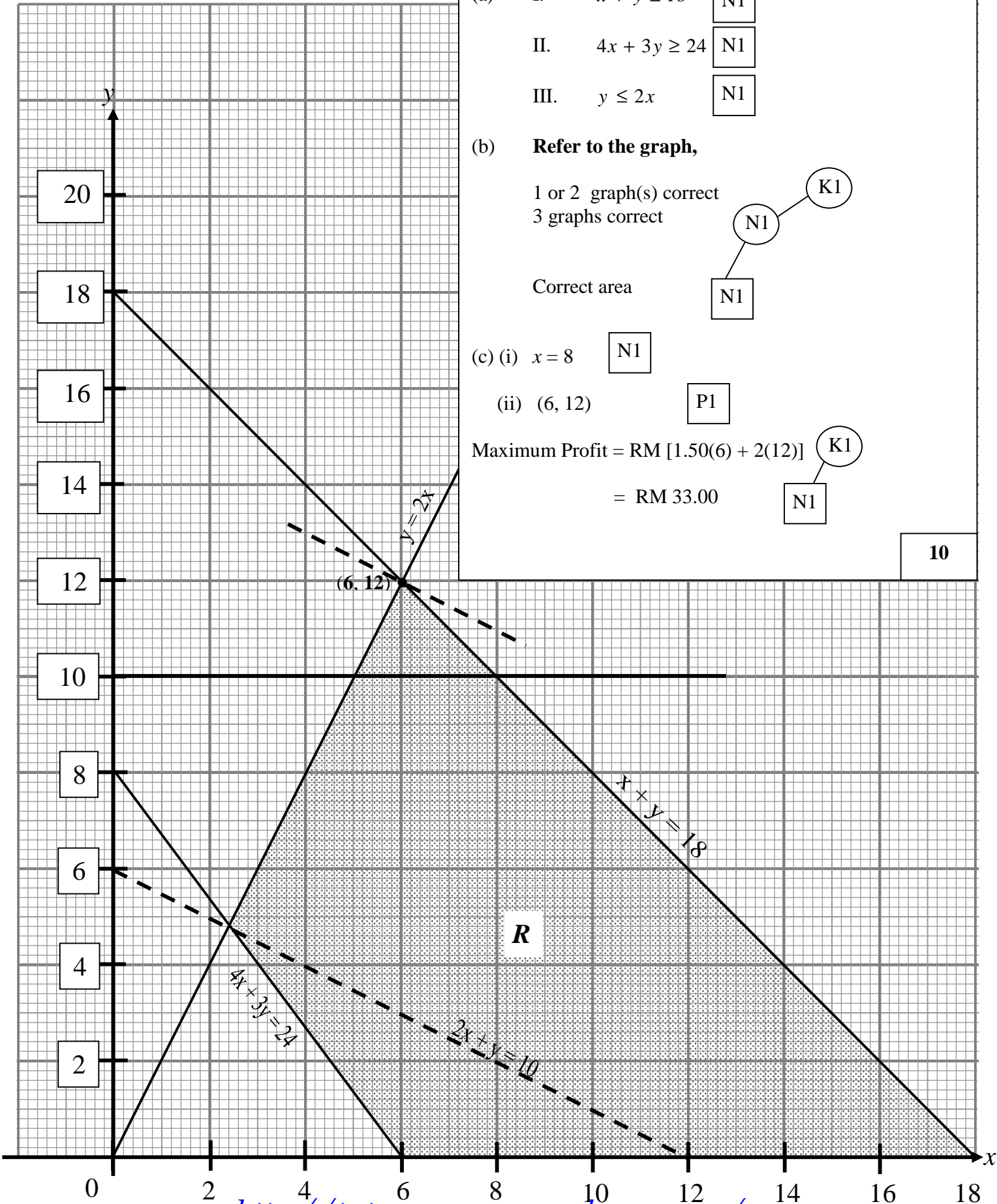
QUESTION NO.	SOLUTION	MARKS
11(a) (i) (ii)	${}^8C_3\left(\frac{2}{5}\right)^3\left(\frac{3}{5}\right)^5$ $= 0.2787$ <div style="text-align: right;"> K1 N1 </div> $1 - {}^8C_6\left(\frac{2}{5}\right)^6\left(\frac{3}{5}\right)^2 - {}^8C_7\left(\frac{2}{5}\right)^7\left(\frac{3}{5}\right) - \left(\frac{2}{5}\right)^8$ 0.9052 <div style="text-align: right;"> K1 K1 N1 </div>	5
(b) (i) (ii) (iii)	0.75 <div style="text-align: right;">P1</div> $\frac{h-163}{16} = -0.6$ <div style="text-align: right;">K1</div> $h = 153.4$ <div style="text-align: right;">N1</div> $P(-1 \leq z \leq 0.75) \text{ or } 1 - P(Z > 1) - P(Z > 0.75) \text{ or } R(-1) - R(0.75)$ 0.6147 <div style="text-align: right;"> K1 N1 </div>	5
		10

QUESTION NO.	SOLUTION	MARKS
12 (a)	$-6t + 16 = 0 \quad \text{K1}$ $t = 2\frac{2}{3} \quad \text{N1}$ $s = -3t^2 + 16t \quad \text{K1}$ $s = -3\left(\frac{2}{3}\right)^2 + 16\left(\frac{2}{3}\right) \quad \text{K1}$ $= 21\frac{1}{3} \text{ m} \quad \text{N1}$	5
(b)	$t(-3t + 16) = 0 \quad \text{K1}$ $t = 5\frac{1}{3} \quad \text{N1}$	2
(c)	$ s_{\frac{2}{3}} - s_0 + s_4 - s_{\frac{2}{3}} \quad \text{K1}$ $= 21\frac{2}{3} - 0 + 16 - 21\frac{2}{3} \quad \text{K1}$ $= 26\frac{2}{3} \quad \text{N1}$	3

QUESTION NO.	SOLUTION	MARKS
13 (a)	$x = 135$ N1 $y = 7.20$ N1	2
(b)	$\frac{135(5)+120(n)+144(1)+150(2n)}{5+n+1+2n}$ $414.75n + 829.5 = 420n + 819$ $n = 2$	3
(c)	$P_{08} = \frac{100}{138.25} \times \text{RM } 8.80$ $= \text{RM } 6.37$	2
(d)	$\bar{I}_{\frac{11}{08}} = 155$ $\bar{I}_{\frac{11}{10}} = \frac{155}{138.25} \times 100$ 112.12	3
		10

QUESTION NO.	SOLUTION	MARKS
14 (a)	$\frac{9.7}{\sin \angle ACB} = \frac{9}{\sin 60^\circ}$ <div style="display: flex; align-items: center; margin-left: 100px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin-right: 10px;">K1</div> <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin-right: 10px;">N1</div> </div> $\angle ACB = 68.97^\circ / 68^\circ 58'$	2
(b)	$\angle ECD = 180^\circ - 68.97^\circ = 111.03^\circ / 111^\circ 2'$ <div style="display: flex; align-items: center; margin-left: 100px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin-right: 10px;">K1</div> </div> $ED^2 = 4.5^2 + 9^2 - 2(4.5)(9)\cos 111.03^\circ$ <div style="display: flex; align-items: center; margin-left: 100px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin-right: 10px;">K1</div> </div> $ED = 11.42 \text{ cm}$ <div style="display: flex; align-items: center; margin-left: 100px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin-right: 10px;">N1</div> </div>	3
(c)	$\angle BAC = 180^\circ - 60^\circ - 68.97^\circ = 51.03^\circ / 51^\circ 2'$ <div style="display: flex; align-items: center; margin-left: 100px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin-right: 10px;">P1</div> </div> $\text{Area of triangle } ABC = \frac{1}{2} \times 9.7 \times 9 \times \sin 51.03^\circ$ <div style="display: flex; align-items: center; margin-left: 100px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin-right: 10px;">K1</div> </div> $= 33.94$ $\text{Area of triangle } CDE = \frac{1}{2} \times 9 \times 4.5 \times \sin 111.03^\circ$ <div style="display: flex; align-items: center; margin-left: 100px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin-right: 10px;">K1</div> </div> $= 18.90$ $\text{Area of quadrilateral } ABCD = 33.94 + 18.90$ <div style="display: flex; align-items: center; margin-left: 100px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin-right: 10px;">K1</div> </div> 52.84 <div style="display: flex; align-items: center; margin-left: 100px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 2px 5px; margin-right: 10px;">N1</div> </div>	5
		10

Answer for question 15



- (a) I. $x + y \leq 18$ [N1]
 II. $4x + 3y \geq 24$ [N1]
 III. $y \leq 2x$ [N1]

(b) Refer to the graph,
 1 or 2 graph(s) correct [N1]
 3 graphs correct [K1]
 Correct area [N1]

(c) (i) $x = 8$ [N1]
 (ii) (6, 12) [P1]
 Maximum Profit = RM [1.50(6) + 2(12)] [K1]
 = RM 33.00 [N1]

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