SPM

BEST SELLER

KOLEKSI SOALAN TRIAL SPM 2019

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iLMU STUDIO

GUDANG KEiAYAN

TOKOH MAALHiJRAH 2010

GURU INSPIRASI UMMAH 2019

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ILMU STUDIO TUITION CENTRE

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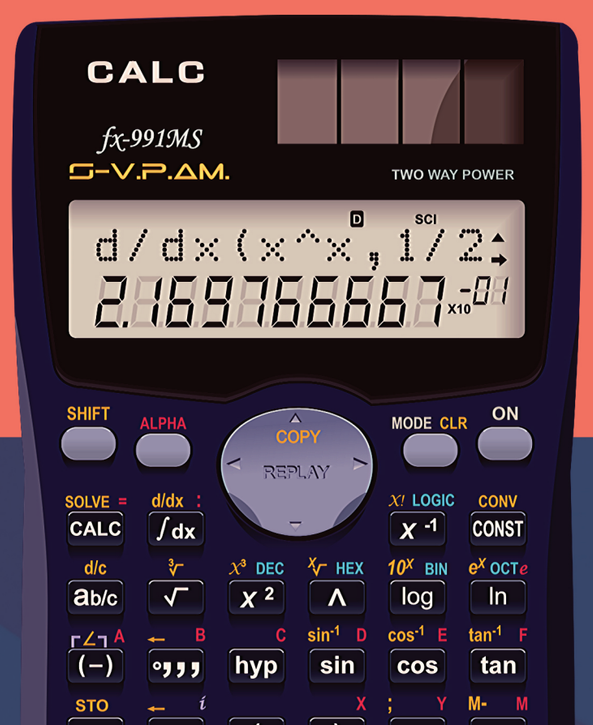
ADDMATHS 2019

ANJURAN MAJLIS PENGETUA-
PENGETUA WILAYAH PERSEKUTUAN

- STATISTIC
- COORDINATE GEOMETRY
- QUADRATIC FUNCTION
- SIMULTANEOUS EQUATIONS
- QUADRATIC EQUATION
- LOG AND INDICES
- INTEGRATION
- TRIGONOMETRY FUNCTION
- VECTOR
- PROBABILITY DISTRIBUTION
- LINEAR LAW
- LINEAR PROGRAMMING
- INDEX NUMBER
- SOLUTION OF TRIANGLE



SPM 2019

ADDMATHS
2019

STATISTICS/STATISTIK

(10 MARKS/10 MARKAH)

QUESTION 1/ SOALAN 1

Table 2 shows the masses of a group of students.
Jadual 2 menunjukkan jisim-jisim satu kumpulan pelajar.

Mass *(kg)* *Jisim (kg)*	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44
Number of students *Bilangan pelajar*	10	22	29	*p*	15

Table 2

Jadual 2

Given the mean mass of the students is 32.6 kg,

Diberi min jisim pelajar itu ialah 32.6 kg,

Find

Cari

(*a*) the value of *p*, [3 marks]

nilai p, [3 *markah*]

(*b*) the variance, of the distribution. [3 marks]

varians , bagi taburan itu. [3 *markah*]

(*c*) interquartile range, without using an ogive. [4 marks]

julat antara kuartil, tanpa menggunakan ogif, [4 *markah*]

QUESTION 2/ SOALAN 2

The first set of data $x, \ldots, 14$, is arranged in ascending order, so does the second data $16, \ldots, y$. Each set of data has 6 values. When the sets of data are combined, $x, \ldots, 14, 16, \ldots, y$, the new median is m and the new standard deviation is q.
Set data yang pertama $x, \ldots, 14$, *disusun mengikut tertib menaik, begitu juga susunan set kedua* $16, \ldots, y$. *Setiap set data mempunyai 6 nilai. Apabila set data itu digabungkan,* $x, \ldots, 14, 16, \ldots, y$, *median baharunya ialah m dan sisihan piawai baharunya ialah q.*

(a) State the value of m.
Nyatakan nilai m.

[1 *mark*]
[1 *markah*]

(b) If x and y are removed, state
Jika x dan y dikeluarkan, nyatakan

(i) the new value of m,
nilai m yang baharu,

(ii) the changes of the value of q.
perubahan nilai q.

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

(c) If 3 is multiply and 2 is added to the whole data, find
Jika 3 didarab dan 2 ditambah kepada keseluruhan data, cari

(i) the new median,
median baharu,

(ii) the new range.
julat baharu.

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

QUESTION 3/ SOALAN 3

The table 1 below shows a dispersion measure data for saving money by Zainal and Halimah for several months.

Jadual 1 di bawah menunjukkan suatu data sukatan serakan bagi simpanan wang Zainal dan Halimah selama beberapa bulan.

Name *Nama*	Mean *Min*	$\sum fx^2$	σ	Number of months *Bilangan bulanan*
Zainal	3	1360	5	p
Halimah	10	680	6	q

Table 1
Jadual 1

Find

Cari

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

(a) $\sum fx$ for Zainal and Halimah. [4 *marks*]
$\sum fx$ *bagi Zainal dan Halimah.* [4 *markah*]

QUESTION 4/ SOALAN 4

Table 1 shows the score of 7 students in a quiz arranged in increasing order.
Jadual 1 menunjukkan skor yang diperolehi oleh 7 orang pelajar dalam satu kuiz yang disusun secara menaik.

Student *Pelajar*	Shara	Zahidah	Masitah	Naliza	Wafi	Lutfi	Ben
Score *Skor*	6	?	8	?	13	15	18

Table 1
Jadual 1

(a) Given the interquartile range of the score is 7 and the mean score is 11, find the score of Zahidah and Naliza.
Diberi bahawa julat antara kuartil skor ialah 7 dan min skor ialah 11, cari skor yang diperolehi oleh Zahidah dan Naliza.

[2 marks]
[2 *markah*]

(b) Find the standard deviation of the score.
Cari sisihan piawai bagi skor tersebut.

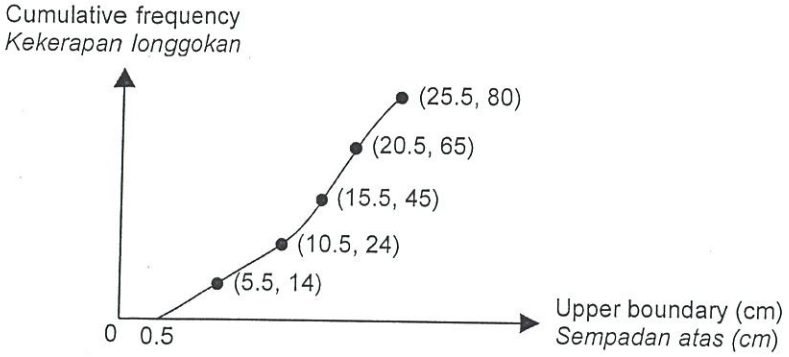
[2 marks]
[2 *markah*]

(c) The students sat for another written quiz and each of them managed to double their score. State the new mean and the new variance.
Pelajar-pelajar itu menduduki satu lagi kuiz bertulis dan setiap orang berjaya meningkatkan skor masing-masing sebanyak dua kali ganda. Nyatakan min baru dan varians baru bagi skor itu.

[2 marks]
[2 *markah*]

QUESTION 5/ SOALAN 5

Diagram 1 shows the distributions of length of 80 grouper fish in a pond.
Rajah 1 menunjukkan taburan panjang 80 ekor ikan kerapu dalam sebuah kolam.



Diagram/ *Rajah 1*

(a) Construct a frequency table by using the class interval based on the above ogive.
Bina jadual kekerapan dengan menggunakan selang kelas berdasarkan ogif di atas,
[2 marks/ *markah*]

(b) Based on the table constructed, calculate the interquartile range.
Berdasarkan jadual yang dibina, hitungkan julat antara kuartil.

[4 marks/ *markah*]

QUESTION 6/ SOALAN 6

Table 5 shows times recorded, t minutes, for a group of 200 students to complete a Mathematics Quiz.

Jadual 5 menunjukkan masa yang dicatatkan, t minit, bagi sekumpulan 200 murid untuk menyiapkan suatu Kuiz Matematik.

Times / *Masa* (minute/*minit*) t	16 – 20	21 – 25	26 – 30	31 – 35	36 – 40	41 – 45
Number of student / *Bilangan murid*	62	88	16	13	11	10

Table 5
Jadual 5

(*a*) Find the mean and the standard deviation of these data. [6 *marks*]
Cari min dan sisihan piawai bagi data tersebut. [6 *markah*]

(*b*) Due to the technical error, all students took 5 minutes less than the times recorded in Table 5. Explain the effect this would have on each of the value found in **5**(*a*). [1 *mark*]

Oleh sebab masalah teknikal, semua murid mengambil masa 5 minit kurang daripada masa dicatatkan di dalam Jadual 5.
Terangkan kesan yang akan berlaku kepada setiap nilai di **5**(*a*). [1 *markah*]

QUESTION 7/ SOALAN 7

Table 5 shows the frequency distribution of the pH values of soil samples taken from two orchards.
Jadual 5 menunjukkan taburan kekerapan nilai pH bagi sampel tanah diambil dari dua buah kebun.

pH value *nilai pH*	**Orchard *A*** *Kebun A*	**Orchard *B*** *Kebun B*
4·4 – 4·8	3	2
4·9 – 5·3	5	7
5·4 – 5·8	5	5
5·9 – 6·3	10	12
6·4 – 6·8	12	8
6·9 – 7·3	5	6

Table 5
Jadual 5

Find the mean and standard deviation of the distribution in each orchards. Based on the values obtained, compare the better soil orchard. [7 *marks*]
Cari min dan sisihan piawai bagi taburan itu dalam setiap kebun. Berdasarkan nilai-nilai yang diperoleh, bandingkan kebun yang mempunyai tanah kebun yang lebih baik. [7 *markah*]

QUESTION 8/ SOALAN 8

Table 1 shows the distributions of time taken by pupils in a certain school in answering twenty mental arithmetic questions.
Jadual 1 menunjukkan *taburan masa yang diambil oleh murid-murid di sebuah sekolah tertentu untuk menjawab dua puluh soalan mental aritmetik.*

Time (s) *Masa* (s)	Number of pupils *Bilangan murid*	
	Boys *Lelaki*	Girls *Perempuan*
25 – 29	22	0
30 – 34	30	34
35 – 39	31	40
40 – 44	25	36
45 – 49	24	26
50 – 54	8	0

Table 1
Jadual 1

(*a*) "The range of boys' times is greater than the range of the girls' times".
"*Julat masa murid lelaki adalah lebih besar daripada julat masa murid perempuan.*"

Determine whether the statement is correct or not.
Show calculation to support your answer.
Tentukan samada pernyataan tersebut adalah benar atau tidak.
Tunjukkan kiraan untuk menyokong jawapan anda.

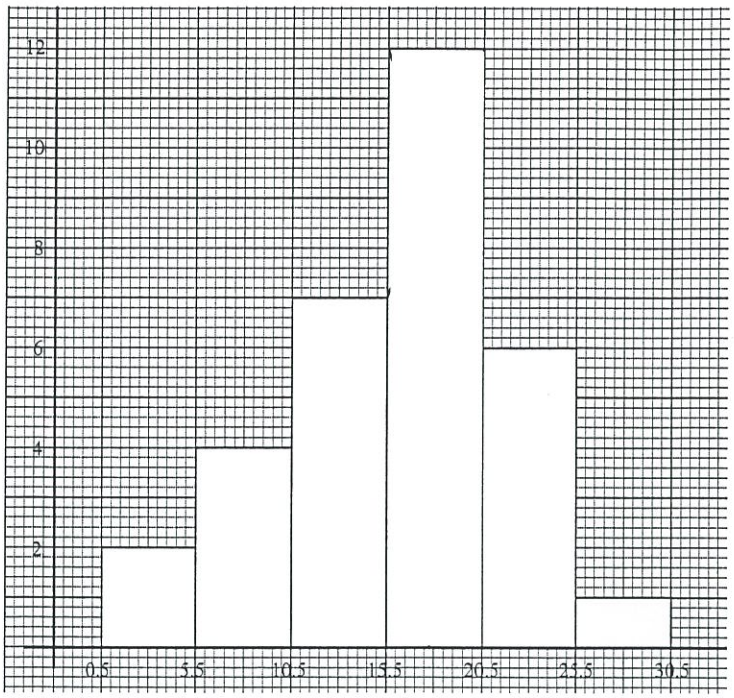
[3 *marks*]
[3 *markah*]

(*b*) Find the variance of the whole data.
Cari varians untuk keseluruhan data.

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

QUESTION 9/ SOALAN 9

The graph below shows the frequency distribution of the scores of a group of students in a quiz.
Graf di bawah menunjukkan taburan kekerapan bagi skor sekumpulan pelajar dalam kuiz.



Calculate
Cari

(a) the mode of the distribution

[1 mark]

nilai mod taburan tersebut

[1 markah]

(b) The Interquartile range of the distribution

[4 marks]

Julat antara kuartil taburan tersebut

[4 markah]

(c) Calculate the variance of the distribution

[3 marks]

Hitungkan varians taburan tersebut

[3 markah]

QUESTION 10/ SOALAN 10

10. Table 1 shows the frequency distribution of the ages of teachers in SMK Kay.
Jadual 1 menunjukkan taburan kekerapan umur guru-guru di SMK Kay.

Age (years) *Umur (tahun)*	Number of teachers *Bilangan guru*
25 – 29	6
30 – 34	13
35 – 39	40
40 – 44	*m*
45 – 49	8
50 – 54	8

Table 1
Jadual 1

(a) If the median age of the distribution is 37.5 years, calculate the value of *m*. [3 marks]
Jika umur median taburan itu ialah 37.5 tahun, hitung nilai m. [3 *markah*]

(b) Calculate the standard deviation of the ages of the teachers. [4 marks]
Hitung sisihan piawai bagi umur guru. [4 *markah*]

QUESTION 11/ SOALAN 11

Table 4 shows a frequency distributions of the outcome of a power consumption study of 100 houses in a residential park.

Jadual 4 menunjukkan taburan kekerapan bagi hasil daripada satu kajian penggunaan kuasa bagi 100 buah rumah di suatu taman perumahan.

Power Consumption *Penggunaan kuasa* (kWh)	80 - 89	90 - 99	100 - 109	110 - 119	120 - 129	130 - 139	140 - 149
Number of houses *Bilangan rumah*	7	14	17	19	21	13	9

Diagram 4
Jadual 4

(a) Find the interquartile range. [4 marks]
Cari julat antara kuartil. [4 *markah*]

(b) During the festive season, the power consumption per household increased by 2 times the original use. Does the interquartile range will change?
Give your reasons. [2 marks]
Pada musim perayaan, penggunaan kuasa bagi setiap rumah didapati meningkat sebanyak 2 kali ganda daripada penggunaan asal. Adakah nilai julat antara kuartil akan berubah? Berikan alasan anda .

[2 *markah*]

ANSWER / JAWAPAN

SIR VEN : 012 – 351 6764
INSTA : @VENSUCIVENSUCI
TWITTER : @VENSUCI

QUESTION 1

(a) 22, 27, 32, 37, 42

$$32.6 = \frac{22(10)+27(22)+32(29)+37(p)+42(15)}{10+22+29+p+15}$$

$$p = 24$$

(b) $\left(\frac{22^2(10)+27^2(22)+32^2(29)+37^2(24)+42^2(15)}{10+22+29+24+15}\right)-(32.6)^2$

36.14

(c) $L_{K1} = 24.5$ or $L_{K3} = 34.5$

$$K_1 = 24.5+\left(\frac{\frac{1}{4}(100)-10}{22}\right)(5) \text{ or } K_3 = 34.5+\left(\frac{\frac{3}{4}(100)-61}{24}\right)(5)$$

$K_1 = 27.909$ $K_3 = 37.417$

Interquartile range $= 37.417 - 27.909$

$= 9.508$

QUESTION 2

(a) 15

(b) (i) $m = 15$,

(ii) q makin kecil

(c) (i) $3(15)+2 = 47$

(ii) Julat $= y - x$

Julat baharu $= 3y - 3x$

QUESTION 3

(a) $\frac{1360}{p}-3^2 = 5^2$ or $\frac{680}{q}-10^2 = 6^2$

$p = 40$

$q = 5$

(b) $\frac{\sum fx_{Zainal}}{40} = 3$ $\frac{\sum fx_{Halimah}}{50} = 10$

$\sum fx_{Zainal} = 120$

$\sum fx_{Halimah} = 50$

QUESTION 4

(a) 15 – Zahidah's mark = 7 or $\frac{68+h}{7} = 11$, h = Naliza's mark

Zahidah's mark = 8 and Naliza's mark = 9

(b) $\sigma = \sqrt{\frac{6^2+8^2+8^2+9^2+13^2+15^2+18^2}{7}-11^2}$

4.071

(c) New mean = 22

New variance = 66.29

QUESTION 5

(a)

Length (cm)	f
1 – 5	14
6 – 10	10
11 – 15	21
16 – 20	20
21 – 25	15

QUESTION 5

ANSWER / JAWAPAN

SIR VEN : 012 – 351 6764
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TWITTER : @VENSUCI

QUESTION 6

(a) $(62 \times 18) + (88 \times 23) + (16 \times 28) + (13 \times 33) + (11 \times 38) + (10 \times 43)$

$$\frac{(62 \times 18) + (88 \times 23) + (16 \times 28) + (13 \times 33) + (11 \times 38) + (10 \times 43)}{200}$$

24. 33

$$(62 \times 18^2) + (88 \times 23^2) + (16 \times 28^2) + (13 \times 33) + (11 \times 38^2) + (10 \times 43^2)$$

$$\sqrt{\frac{(62 \times 18^2) + (88 \times 23^2) + (16 \times 28^2) + (13 \times 33^2) + (11 \times 38^2) + (10 \times 43^2)}{200} - (24.33)^2}$$

6.828

(b) Mean will reduce 5 and standard deviation unchanged

QUESTION 7

$(4.6 \times 3) + (5.1 \times 5) + (5.6 \times 5) + (6.1 \times 10) + (6.6 \times 12) + (7.1 \times 5)$ or
$(4.6 \times 2) + (5.1 \times 7) + (5.6 \times 5) + (6.1 \times 12) + (6.6 \times 8) + (7.1 \times 6)$

$\frac{(4.6\times3)+(5.1\times5)+(5.6\times5)+(6.1\times10)+(6.6\times12)+(7.1\times5)}{40}$ or
$\frac{(4.6\times2)+(5.1\times7)+(5.6\times5)+(6.1\times12)+(6.6\times8)+(7.1\times6)}{40}$

6.075 or 6.0375

$(3 \times 4.6^2) + (5 \times 5.1^2) + (5 \times 5.6^2) + (10 \times 6.1^2) + (12 \times 6.6^2) + (7.1^2 \times 5)$ or
$(2 \times 4.6^2) + (7 \times 5.1^2) + (5 \times 5.6^2) + (12 \times 6.1^2) + (8 \times 6.6^2) + (7.1^2 \times 6)$

$\sqrt{\frac{(3\times4.6^2)+(5\times5.1^2)+(5\times5.6^2)+(10\times6.1^2)+(12\times6.6^2)+(7.1^2\times5)}{40}-(6.075)^2}$ or
$\sqrt{\frac{(2\times4.6^2)+(7\times5.1^2)+(5\times5.6^2)+(12\times6.1^2)+(8\times6.6^2)+(7.1^2\times6)}{40}-(6.0375)^2}$

0.7242 or 0.7175

ORCHARD B

QUESTION 8

(a)

Range for boys = 52 – 27 or Range for girls = 47 – 32

= 25 = 15

Yes, the range of boys' times is greater than the range of girls' times

b)

$\sum fx = 10\,597$

$\sum fx^2 = 418\,459$

$\sigma^2 = \frac{418459}{276} - \left(\frac{10597}{276}\right)^2$

= 41.99

QUESTION 9

(a) 17.5

(b) $L = 10.5$, $F = 6$ $f_m = 7$

$$10.5 + \left(\frac{\frac{1}{4}(32) - 6}{7}\right)(5) = 11.93$$

$$15.5 + \left(\frac{\frac{3}{4}(32) - 13}{7}\right)(5) = 20.08$$

20.08 - 11.93
8.15

(c)

$$\text{Min} = \frac{511}{32} = 15.9688 \text{ // } 15.97$$

$$\text{Varians} = \frac{9303}{32} - \left(\frac{511}{32}\right)^2$$

$$= 35.7178 \text{ // } 35.72$$

ANSWER / JAWAPAN

SIR VEN : 012 – 351 6764
INSTA : @VENSUCIVENSUCI
TWITTER : @VENSUCI

QUESTION 10

(a) L=34.5 or F=19 or c=5

$$37.5 = 34.5 + \left(\frac{\frac{1}{2}(75+m)-19}{8}\right)(5)$$

m = 11

(b) x= 27, 32, 37, 42, 47, 52

$$\bar{x} = \frac{(27\times6)+(32\times13)+(37\times40)+(42\times11)+(47\times8)+(52\times8)}{6+13+40+11+8+8}$$

$= 38.51$

$$\sigma = \sqrt{\frac{131154}{86} - 38.51^2}$$

$= 6.483$

QUESTION 11

(a) $L_1 = 99.5$ *or* $L_3 = 119.5$ *or* $f_{Q1} = 17$ *or* $f_{Q3} = 21$
or $F_{Q1} = 21$ *or* $F_{Q3} = 57$ *or* $C = 10$

$$Q_1 = 99.5 + \left(\frac{25-21}{17}\right)10 \quad or \quad Q_3 = 119.5 + \left(\frac{75-57}{21}\right)10$$

$$Q_3 - Q_1 = 119.5 + \left(\frac{75-57}{21}\right)10 - 99.5 + \left(\frac{25-21}{17}\right)10$$

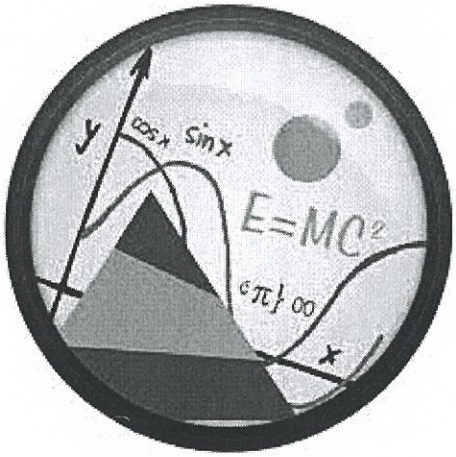
Julat Antara Kuartil = 26.22

(b) Ya

Kerana jika setiap data diganda dua secara seragam julat antara kuartil adalah 2 kali julat antara kuartil yang asal.

ADDMATHS
2019

COORDINATE GEOMTERY/KOORDINAT GEOMETRI
(10 MARKS/10 MARKAH)



QUESTION 1/ SOALAN 1

Diagram 5 shows the triangle POQ. Point R lies on the straight line PQ.
Rajah 5 menunjukkan segitiga POQ. Titik R terletak di atas garis lurus PQ.

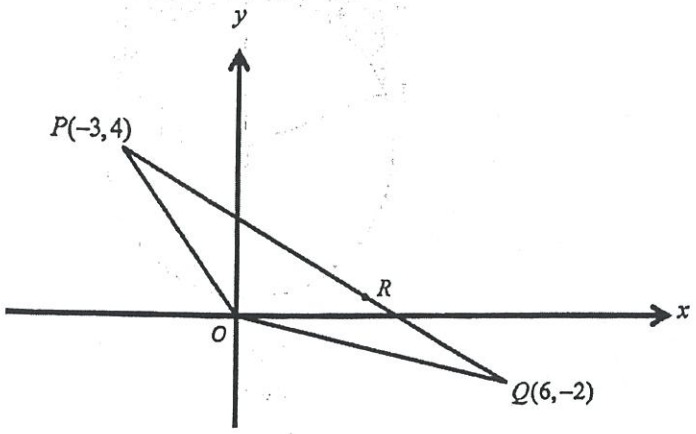


Diagram 5
Rajah 5

(*a*) Calculate the area, in unit^2, of triangle POQ. [2 marks]
Kira luas, dalam unit^2, segitiga POQ. [*2 markah*]

(*b*) Given that $PR : RQ = 3 : 2$, find the coordinates of R. [2 marks]
Diberi $PR : RQ = 3 : 2$, cari koordinat bagi R. [*2 markah*]

(*c*) A point T moves such that its distance from point P is always twice its distance from point Q.
Titik T bergerak dengan keadaan jaraknya dari P sentiasa dua kali jaraknya dari titik Q.

(i) Find the equation of the locus T.
Cari persamaan lokus T.

(ii) Hence, determine whether this locus intersects the y-axis. Shows your calculation.
Seterusnya, tentukan sama ada lokus ini memotong paksi-y. Tunjukkan pengiraan anda.

[6 marks]
[6 *markah*]

QUESTION 2/ SOALAN 2

Jeslina found a map as shown in Diagram 3 underneath her brother's pillow.
The map shows a direction of the wind with the bamboo tree as the origin.
The straight line AB, $y - x - 2 = 0$ intersect with the second line at point Z.
She has a feeling that there is something hidden at point Z.
Jeslina terjumpa sebuah peta seperti yang ditunjukkan dalam Rajah 3 di bawah bantal abangnya. Peta itu menunjukkan arah mata angin dengan pokok buluh sebagai asalan. Persamaan garis lurus AB, $y - x - 2 = 0$ bersilang dengan garis lurus kedua pada titik Z. *Dia merasakan bahawa terdapat sesuatu yang tersembunyi pada titik Z.*

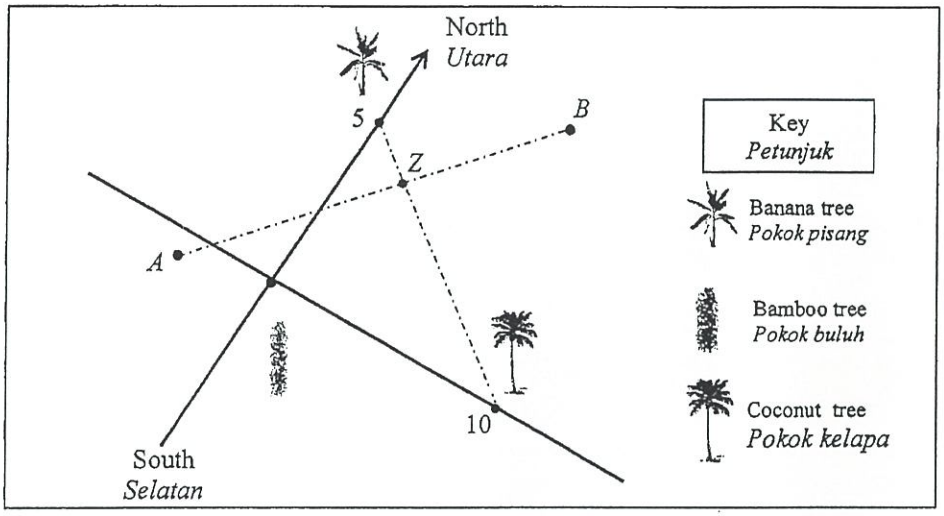


Diagram 3 / Rajah 3

(a) Find the coordinates of Z [4 *marks*]
Cari koordinat Z. [4 *markah*]

(b) Determine whether the straight line from the coconut tree to the banana tree is perpendicular to the straight line *AB*. Give a reason for your answer.
Tentukan sama ada garis lurus dari pokok kelapa kepada pokok pisang berserenjang dengan garis lurus AB atau tidak. Berikan sebab bagi jawapan anda.

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

QUESTION 3/ SOALAN 3

Diagram 6 shows a triangle ABC.

Rajah 6 menunjukkan segi tiga ABC.

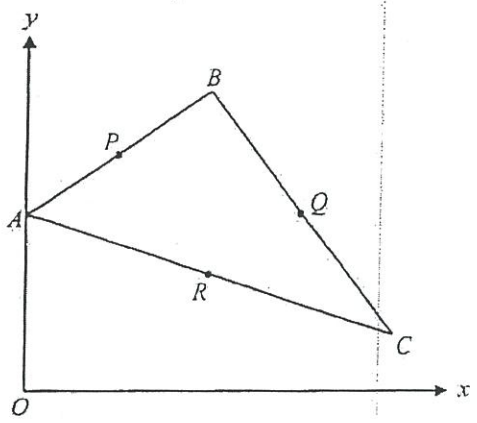


Diagram 6
Rajah 6

The points $P(3, 8)$, $Q(9, 6)$ and $R(6, 4)$ are midpoints of straight lines AB, BC and AC respectively, such that $APQR$ forms a parallelogram. The straight line AB intersects the y-axis at point A and the equation of straight line AB is $3y = 2x + 18$.

Titik-titik $P(3, 8)$, $Q(9, 6)$ dan $R(6, 4)$ masing-masing adalah titik tengah garis lurus AB, BC dan AC, di mana $APQR$ membentuk sebuah segi empat selari. Garis lurus AB menyilang paksi-y di titik A dan persamaan garis lurus AB ialah $3y = 2x + 18$.

(*a*) Straight line AB is extended until it intersects with the perpendicular bisector of straight line AC at point M.

Garis lurus AB dipanjangkan sehingga bersilang dengan pembahagi dua sama serenjang garis lurus AC pada titik M.

Find

Cari

(i) the equation of the perpendicular bisector of straight line AC,

persamaan pembahagi dua sama serenjang garis lurus AC.

(ii) the coordinates of M.

koordinat M.

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

(*b*) If the straight line AQ is extended to a point G such that $AQ : QG = 2 : 3$, find the coordinates of G. [2 *marks*]

Jika garis lurus AQ dipanjangkan ke titik G dengan keadaan $AQ : QG = 2 : 3$, cari koordinat G. [2 *markah*]

(*c*) Calculate the area of the triangle AGC. [3 *marks*]

Hitung luas segi tiga AGC. [3 *markah*]

QUESTION 4/ SOALAN 4

Diagram 2 shows a straight line AB.

Rajah 2 menunjukkan satu garis lurus AB.

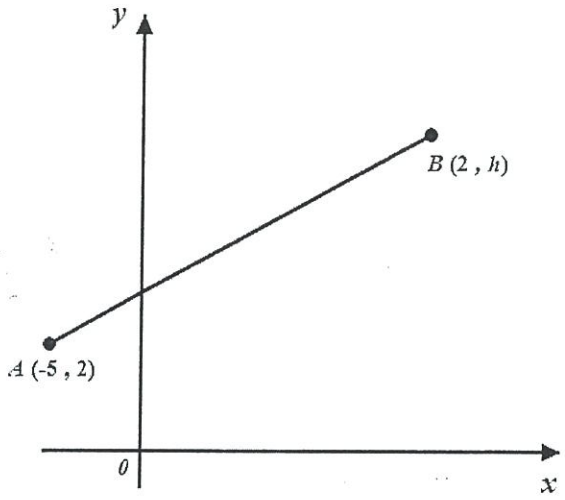


Diagram 2
Rajah 2

(a) Given the distance $AB = \sqrt{74}$ units. Find the value of h. [2 *marks*]

Diberi jarak $AB = \sqrt{74}$ *unit. Cari nilai h.* [2 *markah*]

(b) Determine the gradient of the straight line that is perpendicular to the straight line AB. [2 *marks*]

Tentukan kecerunan bagi garis lurus yang berserenjang dengan garis lurus AB. [2 *markah*]

(c) Point C divides the straight line AB internally in the ratio $AC : CB = 3 : 1$.

Find the coordinates of C. [2 *marks*]

Titik C membahagi dalam garis lurus AB dengan nisbah $AC : CB = 3 : 1$.

Cari koordinat titik C. [2 *markah*]

(d) A point P moves such that its distance from point B is always 9 units.

Find the equation of the locus P. [2 *marks*]

Satu titik P bergerak dengan keadaan jaraknya dari titik B adalah sentiasa 9 unit.

Cari persamaan lokus P. [2 *markah*]

QUESTION 5/ SOALAN 5

Diagram 2 shows a trapezium *OEFG*. The line *OE* is perpendicular to the line *EF*, which intersects the *y*-axis at point *H*.
Rajah 2 menunjukkan sebuah trapezium OEFG. Garis OE berserenjang dengan garis EF yang bersilang dengan paksi-y pada titik H.

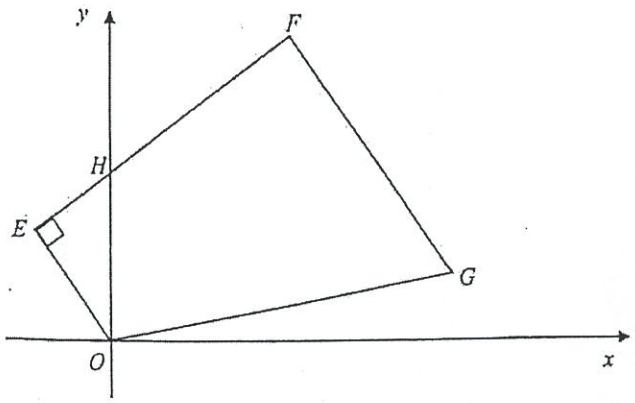


Diagram 2
Rajah 2

It is given that the equation of *OE* is $y = -2x$ and the equation of *EF* is $4y - px - 60 = 0$.
Diberi bahawa persamaan OE ialah $y = -2x$ *dan persamaan EF ialah* $4y - px - 60 = 0$.

(a) Find
Cari
(i) the value of *p*,.
nilai p,
(ii) the coordinates of *H*.
koordinat H.

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

(b) Given $2EH = HF$, find the coordinates of *F*. [3 *marks*]
Diberi $2EH = HF$, *cari koordinat F.* [3 *markah*]

(c) *P* is a moving point such that $\angle PFE$ is 90°. Find the equation of locus P. [2 *marks*]
P ialah suatu titik bergerak supaya $\angle PFE$ *ialah* 90°. *Cari persamaan lokus P.* [2 *markah*]

QUESTION 6/ SOALAN 6

Diagram 8 shows a triangle *ABC*.
Rajah 8 menunjukkan segi tiga ABC.

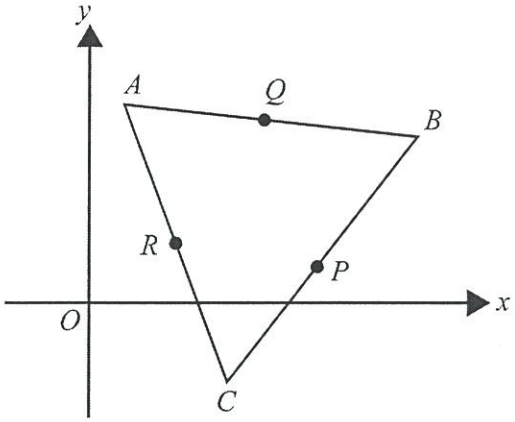


Diagram 8
Rajah 8

Given point $A(1,8)$, $B(7, k)$ and $C(3, -2)$ are vertices of triangle *ABC*. *P*, *Q* and *R* are midpoint to *BC*, *AB* and *AC* respectively. Gradient of *QR* is $\frac{3}{2}$.

Diberi $A(1,8)$, $B(7, k)$ *dan* $C(3, -2)$ *adalah bucu bagi segi tiga ABC. P, Q dan R masing-masing titik tengah bagi BC, AB dan AC. Kecerunan garis QR ialah* $\frac{3}{2}$.

Find
Cari

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

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

(*c*) ratio of area $\Delta ABC : \Delta PQR$. [4 *marks*]
nisbah luas $\Delta ABC : \Delta PQR$. [4 *markah*]

QUESTION 7 / SOALAN 7

Diagram 2 shows the triangle ABC.
Rajah 2 menunjukkan segitiga ABC.

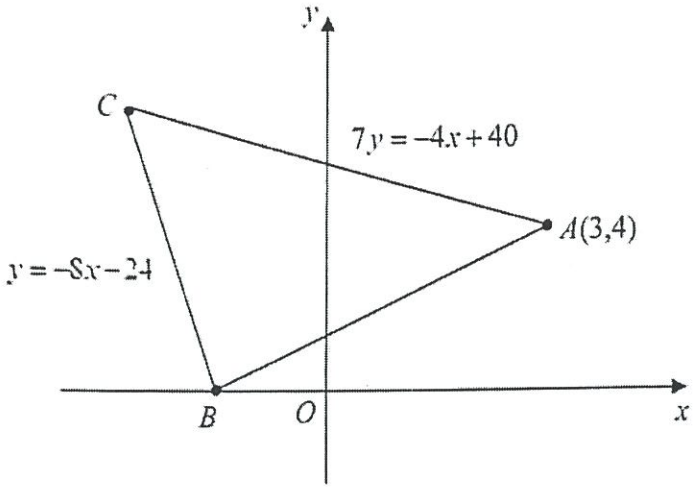


Diagram 2
Rajah 2

(a) Calculate
Hitung

(i) the coordinates C,
koordinat C,

(ii) the area, in unit^2, of triangle ABC.
luas, dalam unit^2, *bagi segitiga ABC.*

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

(b) The straight line AB is extended to a point D such that $AB : BD = 2 : 3$. Find the coordinates D.
Garis lurus AB dipanjangkan ke suatu titik D dengan keadaan $AB : BD = 2 : 3$. *Cari koordinat D.*

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

(c) Given point $E(-8,1)$ is midpoint of straight line CD. Point $P(x, y)$ moves such that $\angle CPD = 90^\circ$. Find the equation of the locus P.

Diberi titik $E(-8,1)$ *ialah titik tengah bagi garis lurus CD. Titik* $P(x, y)$ *bergerak dengan keadaan* $\angle CPD = 90^\circ$. *Cari persamaan lokus P.*

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

QUESTION 8/ SOALAN 8

Diagram 7 shows a triangle *PQR*
Rajah 7 menunjukkan sebuah segi tiga PQR

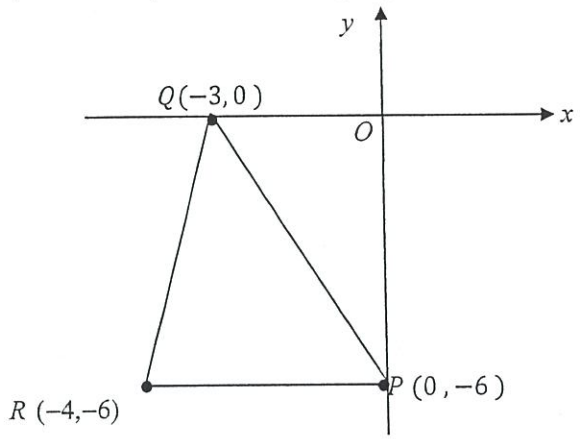


Diagram 7/ *Rajah 7*

Find/ *Cari*

(a) The equation of the straight lines passes through *R* and perpendicular to *PQ*
[3 marks]

Cari persamaan garis lurus yang melalui titik R dan berserenjang dengan PQ
[3 markah]

(b) Find the ratio of the area in unit^2, of triangle *PQR* to the area of triangle *OPQ*
[4 marks]

Cari nisbah luas dalam unit^2, segi tiga PQR kepada luas segi tiga OPQ
[4 markah]

(c) Point S moves such that its distance from *P* and its distance from *Q* are in the ratio **1 : 2**
Find the equation of the locus of *S*
[3 marks]

Titik S bergerak dengan keadaan jaraknya dari P dan jaraknya dari Q ialah dalam nisbah **1 : 2**
Cari persamaan lokus bagi S
[3 markah]

QUESTION 9/ SOALAN 9

The diagram 3 shows a triangle PQR. The gradients of the lines PQ, PR and QR are – 3*h*, 3*h* and *h* respectively.

Rajah 3 di bawah menunjukkan segi tiga PQR. Kecerunan garis PQ, PR dan QR masing – masing ialah – 3h, 3h dan h.

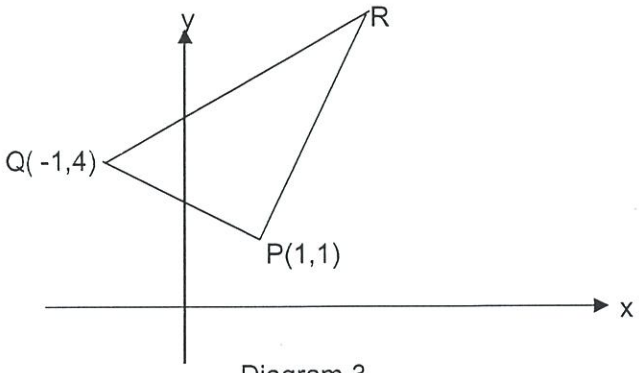


Diagram 3
Rajah 3

Find/ *Cari*

(a) the value of *h*. [1 marks]
nilai *h*. [1 *markah*]

(b) the coordinates of point R. [3 marks]
koordinat titik R [3 *markah*]

(c) the area of triangle PQR. [2 marks]
luas segitiga PQR [2 *markah*]

QUESTION 10/ SOALAN 10

Diagram 11 shows a quadrilateral *ABCD*. Points *B* lies on the *y*-axis. The equation of the straight line *CD* is $7y + 3x + 23 = 0$ and *AD* is $x = 4$.

Rajah 11 menunjukkan sisi empat ABCD. Titik B terletak pada paksi-y. Persamaan garis lurus CD ialah $7y + 3x + 23 = 0$ *dan AD ialah* $x = 4$.

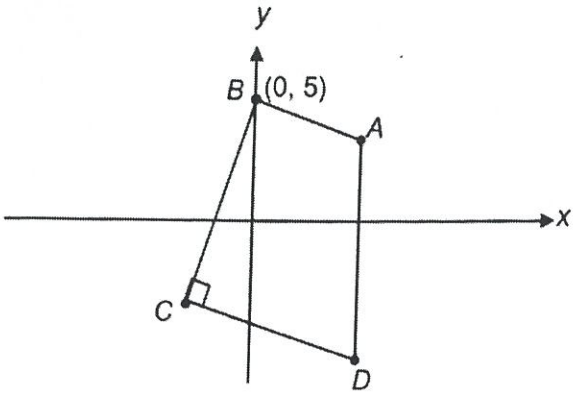


Diagram 11
Rajah 11

Find
Cari

(a) (i) the equation of straight line *BC*,
persamaan garis lurus BC,

(ii) the coordinates of *C*.
koordinat C.

[6 marks]
[6 *markah*]

(b) A point *P* moves such that its distance is always 6 units from point *D*. Find the equation of the locus of *P*.
Titik P bergerak dengan keadaan jaraknya adalah sentiasa 6 unit *dari titik D. Cari persamaan lokus P.*

[4 marks]
[4 *markah*]

ANSWER / JAWAPAN

SIR VEN : 012 – 351 6764
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QUESTION 1

(a) Area of $OPQ = \frac{1}{2}\begin{vmatrix} 0 & -3 & 6 & 0 \\ 0 & 4 & -2 & 0 \end{vmatrix}$ or equivalent

$= \frac{1}{2}\left|(0)(4)+(-3)(-2)+(6)(0)-(0)(-2)-(6)(4)-(-3)(0)\right|$

$= \frac{1}{2}\left|-18\right|$

$= 9 \text{ unit}^2$

QUESTION 1

(b) $x = \frac{(-3)(2)+(6)(3)}{3+2}$ or $y = \frac{(4)(2)+(-2)(3)}{3+2}$

$R\left(\frac{12}{5}, \frac{2}{5}\right)$

c (i) $TP = 2TQ$

$\sqrt{(x+3)^2+(y-4)^2} = 2\sqrt{(x-6)^2+(y+2)^2}$

$3x^2+3y^2-54x+24y+135=0$

$x^2+y^2-18x+8y+45=0$

(ii) $x=0, \quad y^2+8y+45=0$

$(8)^2-4(1)(45)$ *[use b^2-4ac]

-116, no root → not intersect.

QUESTION 2

(a) $y=-\frac{1}{2}x+5$ P1

$x+2=-\frac{1}{2}x+5$ K1 try to solve equation

$x=2, y=4$ N1

$Z(2,4)$ N1

(b) $\left(-\frac{1}{2}\right)(1)$ use $m_1 \times m_2$ K1

$-\frac{1}{2}$ N1

Not perpendicular because $m_1 \times m_2 \neq -1$ N1

QUESTION 3

(a) (i) $-\frac{1}{3} \times m_2 = -1$

$y-4=3(x-6)$

$y=3x-14$

(ii) $\frac{2}{3}x+6=3x-14$

$\left(\frac{60}{7}, \frac{82}{7}\right)$

(b) $\frac{0(3)+2x}{5}=9$ or $\frac{6(3)+2y}{5}=6$

$\left(\frac{45}{2}, 6\right)$

(c) $C(12, 2)$

$\frac{1}{2}\begin{vmatrix} 0 & \frac{45}{2} & 12 & 0 \\ 6 & 6 & 2 & 6 \end{vmatrix}$

$\frac{1}{2}\left|(45+72)-(135+72)\right|$

45

QUESTION 4

(a) $\sqrt{74} = \sqrt{(2-(-5))+(h-2)}$

$h=7$

(b) $\frac{5}{7}$

$-\frac{7}{5}$

(c) $\left(\frac{1(-5)+3(2)}{1+3}, \frac{1(2)+3(7)}{1+3}\right)$

$\left(\frac{1}{4}, \frac{23}{4}\right)$

(d) $\sqrt{(x-2)^2+(y-7)^2} = 9$

$x^2+y^2-4x-14y-28=0$

QUESTION 5

(a) $p=2$

(ii) $H(0,15)$

(b) $-2x=\frac{1}{2}x+15$ or $E(-6, 12)$

$0=\frac{2(-6)+1(x)}{3}$ and $15=\frac{2(12)+1(y)}{3}$

$F(12, 21)$

(c) $\left(\frac{y-21}{x-12}\right)\left(\frac{1}{2}\right)=-1$

$y+2x+45=0$ or equivalent

ANSWER / JAWAPAN

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QUESTION 6

(a) $\left(\frac{k-(-2)}{7-3}\right)=\frac{3}{2}$

$k=4$

(b) $\left(\frac{7+3}{2},\frac{4+(-2)}{2}\right)$

$m=\frac{8-1}{1-5}$

$y-8=-\frac{7}{4}(x-1)$

$y=-\frac{7}{4}x+\frac{39}{4}$

(c) $\frac{1}{2}|1(8)+7(-2)+3(8)-8(7)-4(3)-(-2)(1)|$

$\frac{1}{2}|5(6)+4(3)+2(1)-1(4)-6(2)-3(5)|$

26 *or* 6.5

$\frac{26}{6.5}$

4 : 1

QUESTION 7

(a)(i)

$-8x-24=-\frac{4}{5}x+\frac{40}{7}$

$C(-4,8)$

(ii)

$B(-3,0)$

$A=\frac{1}{2}|-4(4)+3(0)+(-3)-18(3)+4(-3)+0(-4)|$

$=26\ unit^2$

(b)

$\frac{3(3)+2x}{3+2}=-3$ or $\frac{3(4)+2y}{3+2}=0$

$D(-12,-6)$

(c)

$\sqrt{65}$

$\sqrt{(x-(-8))^2+(y-1)^2}=\sqrt{65}$

$x^2+y^2+16x-2y=0$

OR

$\left(\frac{y-(-6)}{x-(-12)}\right)$ or $\left(\frac{y-8}{x-(-4)}\right)$

$\left(\frac{y-(-6)}{x-(-12)}\right)\left(\frac{y-8}{x-(-4)}\right)=-1$

$x^2+y^2+16x-2y=0$

QUESTION 8

(a) $m=\frac{1}{2}$

$y-(-6)=\frac{1}{2}(x-(-4))$

$y=\frac{1}{2}x-4$ // $2y-x+8=0$

(b) $=\frac{1}{2}|(24+18)-(18)|$

$=12$

$\frac{1}{2}\times 3\times 6=9$

12 : 9 OR 4 : 3

(c) $2SP=SQ$ or

$\sqrt{(x-0)^2+(y-(-6))^2}$ or

$\sqrt{(x-(-3))^2+(y-0)^2}$

$2\sqrt{(x-0)^2+(y-(-6))^2}=\sqrt{(x-(-3))^2+(y-0)^2}$

$3x^2+3y^2+48y-6x+135=0$

QUESTION 9

(a) $h=\frac{1}{2}$

(b) Eq QR: $y=\frac{1}{2}x+\frac{9}{2}$ OR Eq PR: $y=\frac{3}{2}x-\frac{1}{2}$

Solve simultaneous eq $\frac{1}{2}x+\frac{9}{2}=\frac{3}{2}x-\frac{1}{2}$

R(5,7)

(c) $\frac{1}{2}|4-7+5+1-20-7|$

12 unit²

ANSWER / JAWAPAN

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QUESTION 10

(a) (i) $m_1 = -\frac{3}{7}$

$m_2 = \frac{7}{3}$

$y = \frac{7}{3}x + 5$

(ii) $7\left(\frac{7}{3}x + 5\right) + 3x + 23 = 0$

$x = -3 \quad or \quad y = -2$

$C(-3, -2)$

(b) Sub $x = 4$ into $7y + 3x + 23 = 0$

$y = -2x$

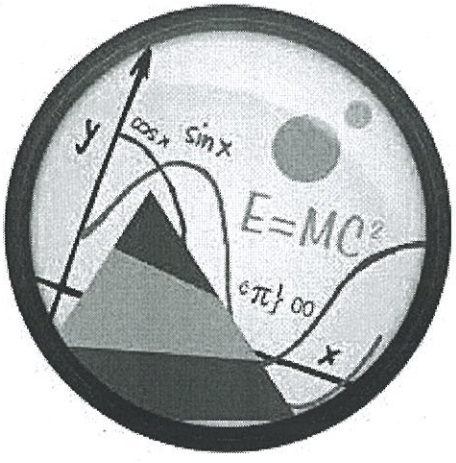
$D(4, -5)$

$\sqrt{(x-4)^2 + (y-(-5))^2} = 6$

$x^2 + y^2 - 8x + 10y + 5 = 0$

ADDMATHS
2019

QUADRATIC FUNCTION/FUNGSI KUADRATIK
(6 MARKS/6 MARKAH)



QUESTION 1/ SOALAN 1

Diagram 2 shows the graph of $y=(p+1)x^2-2px+p-3$, where p is a constant.
Rajah 2 menunjukkan graf bagi $y=(p+1)x^2-2px+p-3$, *dengan keadaan p ialah pemalar.*

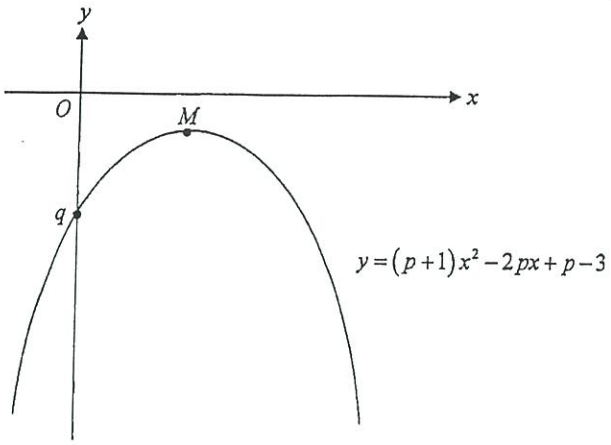


Diagram 2 / *Rajah* 2

The graph have a maximum point M and intersects the y-axis at q.
Graf itu mempunyai titik maksimum M dan bersilang pada paksi-y di q.

(*a*) Find the range of values of p.
Cari julat nilai p.
[2 *marks*]
[2 *markah*]

(*b*) If $(-1,-10)$ is a point on the graph, find
Jika $(-1,-10)$ *ialah titik pada graf, cari*

(i) the value of q,
nilai q,

(ii) the coordinates of M.
koordinat M.
[5 *marks*]
[5 *markah*]

QUESTION 2/ SOALAN 2

Diagram 3 shows a suspension with two vertical pole. The poles with height of 180 cm is separated by 300 cm from each other. The rope used as the suspension has been slack and in parabolic form. The height of the rope in the middle between the two poles is 130 cm from the ground.

Rajah 3 *menunjukkan sebuah ampaian dengan dua batang tiang. Tiang dengan ketinggian* 180 cm *itu terpisah sejauh* 300 cm *antara satu sama lain. Tali yang digunakan sebagai ampaian tersebut telah kendur dan berbentuk parabola. Ketinggian tali di tengah-tengah antara tiang-tiang tersebut adalah* 130 cm *dari tanah.*

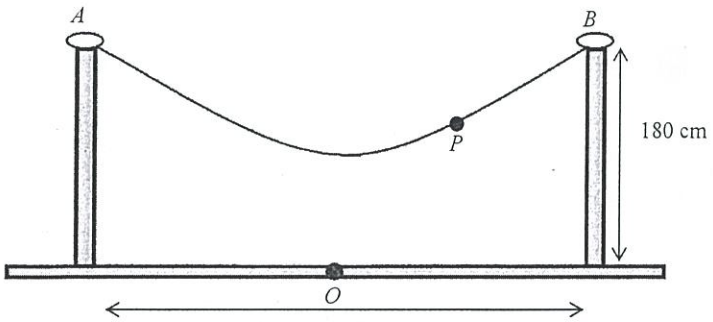


Diagram 3
Rajah 3

(a) Assuming the point O is the origin of the axes, find the equation of the parabolic suspension rope, $f(x)$. [3 *marks*]

Dengan andaian titik O ialah asalan bagi paksi, cari persamaan tali ampaian yang berbentuk parabola, $f(x)$ [3 *markah*]

(b) A shirt hanged on the suspension rope at point P. The overall height of the shirt is 1.25 meter and its distance from pole is one meter. Is the shirt touches the ground? [3 *marks*]

Sehelai baju digantung pada tali ampaian itu di titik P. Ketinggian keseluruhan baju itu ialah 1.25 *meter dan jaraknya dari tiang B adalah satu meter. Adakah baju tersebut mencecah lantai ?* [3 *markah*]

ANSWER / JAWAPAN

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QUESTION 1

(a) $(-2p)^2 - 4(p+1)(p-3) < 0$

$$p < -\frac{3}{2}$$

(b) (i) $-10 = (p+1)(-1)^2 - 2p(-1) + p - 3$

$$p = -2$$

$$q = -5$$

(ii) $$y = -\left[x^2 - 4x + \left(\frac{-4}{2}\right)^2 - \left(\frac{-4}{2}\right)^2 + 5\right]$$

$$A(2, -1)$$

QUESTION 2

(a) $f(x) = a(x-0)^2 + 130$

$180 = a(150)^2 + 130$

$\therefore \quad f(x) = \frac{1}{450}x^2 + 130$

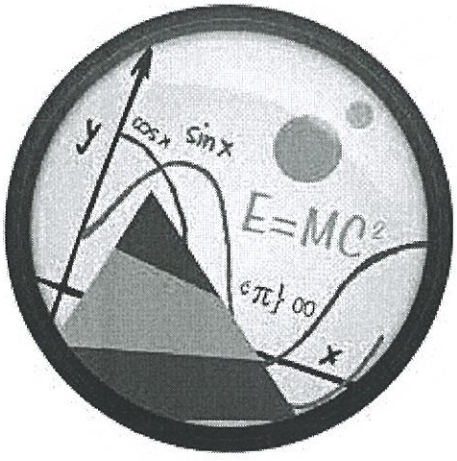
(b) $(50, y)$ $\qquad f(x) = \frac{1}{450}(50)^2 + 130$

$$= 135\frac{5}{9}\text{ cm} = 1.36\text{ m}$$

$\therefore$ Baju tidak mencecah tanah kerana tinggi baju < tinggi titik P

ADDMATHS
2019

SIMULTANEOUS EQUATION/PERSAMAAN SERENTAK
(6 MARKS/6 MARKAH)



QUESTION 1/ SOALAN 1

Solve the following simultaneous equations :

Selesaikan persamaan serentak berikut :

$$mn + 4m = 3 - 2n^2$$
$$m - 2n + 1 = 0$$

Give your answers correct to four significant sigure.

Berikan jawapan anda betul kepada empat angka bererti.

[5 marks]

[5 *markah*]

QUESTION 2/ SOALAN 2

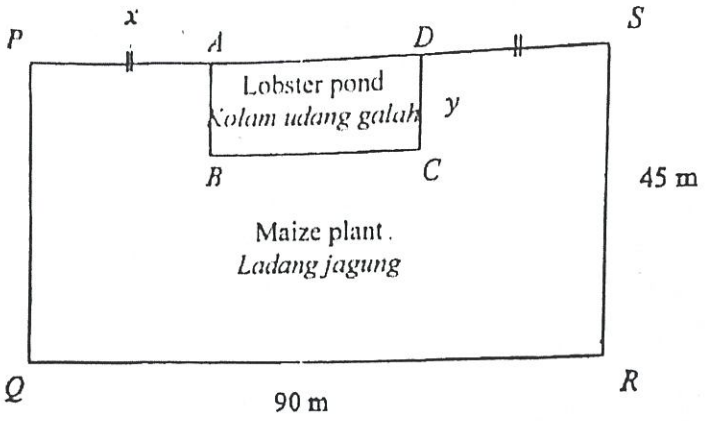


Diagram 1
Rajah 1

Diagram 1 shows a piece of rectangular lands PQRS. En Harun rears lobster in a rectangular pond ABCD. Perimeter of the pond is 130 m. The remain land with area of 3300 m^2 is used to plant maize. Find, in meter, the length of each side of the pond.

[7 marks]

Rajah 1 menunjukkan sebidang tanah berbentuk segiempat tepat PQRS. En Harun menternak udang galah di dalam kolam segiempat tepat ABCD. Perimeter tanah kolam tersebut ialah 130 m. Tanah yang selebihnya digunakan untuk menanam jagung dengan keluasan 3300 m^2. *Cari panjang , dalam meter, bagi setiap sisi kolam udang itu.*

[7 *markah*]

QUESTION 3/ SOALAN 3

Solve the simultaneous equations.

Selesaikan persamaan serentak berikut.

$$2x - 3y = 1$$

$$\frac{3}{x} + \frac{2}{y} = 1$$

Give your answers correct to four significant figures.

Berikan jawapan anda, betul kepada empat angka bererti.

QUESTION 4/ SOALAN 4

Diagram 1 shows a plan of 5 terraced houses to be built on Encik Azman's land.

Rajah 1 menunjukkan pelan bagi 5 buah rumah teres yang akan dibina di atas tanah Encik Azman.

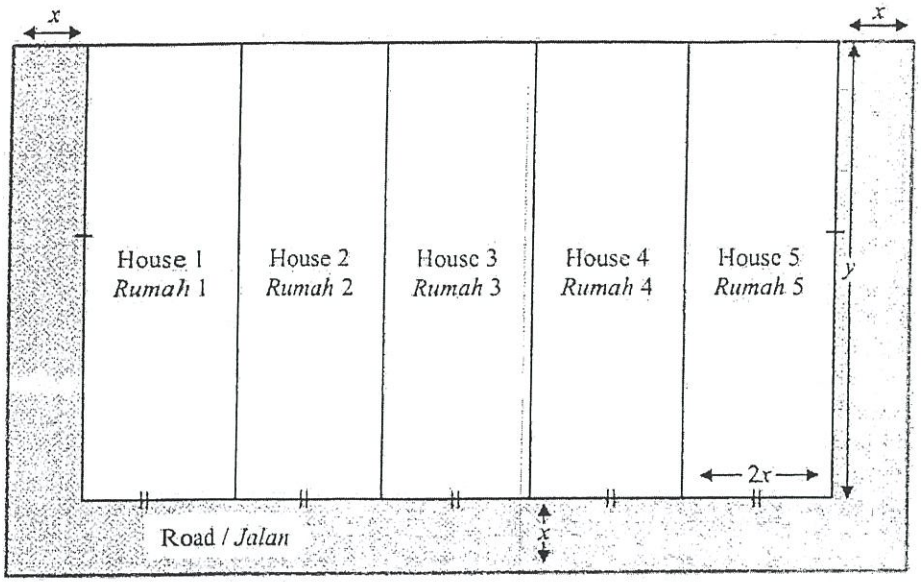


Diagram 1
Rajah 1

The perimeter of the whole 5 houses is 160 metre. He allocated an area of 600 metre^2 to construct a road in front of the houses and on both sides of the end lot as in Diagram 1. The width of the road is x metre.

Find the length and width, in metre, of each house. [6 *marks*]

Perimeter kesemua 5 buah rumah ialah 160 meter. Dia memperuntukkan luas sebanyak 600 meter^2 untuk membina jalan di hadapan dan kedua-dua sisi rumah lot hujung seperti Rajah 1. Lebar jalan ialah x meter.

Cari panjang dan lebar, dalam meter, setiap rumah. [6 *markah*]

QUESTION 5/ SOALAN 5

Solve the following simultaneous equations:

Selesaikan persamaan serentak berikut:

$$x + 2y = 6$$
$$2y^2 - xy = 10$$

[5 marks]
[5 *markah*]

QUESTION 6/ SOALAN 6

Given $(-k, 2m)$ is the solution of the simultaneous equation of $8x+4y=32$ and $2x^2+4xy=40$. Find the value of k and m if k and m are integers.

Diberi $(-k, 2m)$ *ialah penyelesaian bagi persamaan serentak* $8x+4y=32$ *dan* $2x^2+4xy=40$. *Cari nilai* k *dan* m *jika* k *dan* m *adalah integer.*

[5 *marks*]

[5 *markah*]

QUESTION 7/ SOALAN 7

Diagram 4 shows a grazing field with length 30·2 m and width 20·4 m. The unshaded area which had been grazed is a rectangular in shape. The perimeter of the grazed area is 43·2 m and the area that has not been grazed is 500 m^2.

Rajah 4 menunjukkan sebuah padang ragut dengan panjang 30·2 m *dan lebar* 20·4 m. *Kawasan yang tidak berlorek adalah kawasan yang sudah diragut berbentuk segi empat tepat. Perimeter kawasan yang diragut ialah* 43·2 m *dan luas kawasan yang belum diragut ialah* 500 m^2.

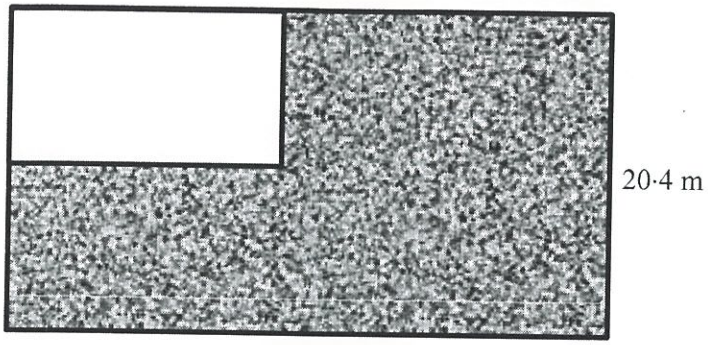


Diagram 4
Rajah 4

Find the area of the grazed field in metre.

Cari luas kawasan yang sudah diragut dalam meter.

[7 *marks*]
[7 *markah*]

QUESTION 8/ SOALAN 8

Diagram 5 shows a trapezium *ABCD*.
Rajah 5 menunjukkan sebuah trapezium ABCD.

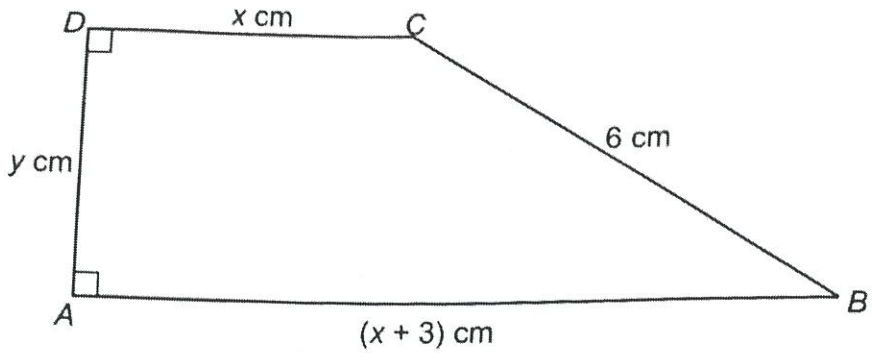


Diagram 5
Rajah 5

The trapezium *ABCD* has a perimeter of 23 cm and the length of the diagonal *AC* is $\sqrt{41}$ cm. Find the possible values of *x* and y.

Trapezium ABCD mempunyai perimeter 23 cm *dan panjang pepenjuru AC ialah* $\sqrt{41}$ cm. *Cari nilai-nilai yang mungkin bagi x dan y.*

[6 marks]
[6 *markah*]

ANSWER / JAWAPAN

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QUESTION 1

$m = 2n - 1$ or $n = \frac{m+1}{2}$

$n(2n-1) + 4(2n-1) = 3 - 2n^2$

$m\left(\frac{m+1}{2}\right) + 4m = 3 - 2\left(\frac{m+1}{2}\right)^2$

$n = \frac{-7 \pm \sqrt{7^2 - 4(4)(-7)}}{2(4)}$

$n = \frac{-11 \pm \sqrt{11^2 - 4(2)(-5)}}{2(2)}$

$n = 0.7111, -2.461$

$m = 0.4221, m = -5.922$

$m = 0.4222, -5.922$

$n = 0.7111, n = -2.461$

QUESTION 2

$(90 - 2x + y)2 = 130$ atau setara

$y = 2x - 25$

$(90 \times 45) - (90 - 2x)y = 3300$ atau $750 = 90y - 25$

$750 = 90(2x - 25) - 2x(2x - 25)$

$4x^2 - 230x + 3000 = 0$

$x = \frac{-(-230) \pm \sqrt{(-230)^2 - 4(4)(3000)}}{2(4)}$

$x = 20$ dan $x = 37.5$

$y = 15$ dan $y = 50$(abaikan)

AD = 50 dan AB = 15 kedua-dua betul

QUESTION 3

$x = \frac{1+3y}{2}$ **P1**

$\frac{3}{\left(\frac{1+3y}{2}\right)} + \frac{2}{y} = 1$ atau $3y + 2\left(\frac{1+3y}{2}\right) = \left(\frac{1+3y}{2}\right)y$

$6y + 2 + 6y = y + 3y^2$

$3y^2 - 11y - 2 = 0$

$\frac{-(-11) \pm \sqrt{(-11)^2 - 4(3)(-2)}}{2(3)}$

$y = 3.840$; $y = -0.1736$

$x = 6.261$; $x = 0.2396$

QUESTION 4

$2y + 20x = 160$ or $12x^2 + 2xy = 600$

$y = 80 - 10x$ or $x = 8 - \frac{y}{10}$ or

$y = \frac{300}{x} - 6x$

$12x^2 + 2x(80 - 10x) = 600$ or

$12\left(8 - \frac{y}{10}\right)^2 + 2\left(8 - \frac{y}{10}\right)y = 600$ or

$2\left(\frac{300}{x} - 6x\right) + 20x = 160$

Factorization

$(x-5)(x-15) = 0$ or $(y+10)(y-30) = 0$

OR
Formula

$x = \frac{-(-20) \pm \sqrt{(-20)^2 - 4(1)(75)}}{2(1)}$ or

$y = \frac{-(40) \pm \sqrt{(40)^2 - 4(1)(2100)}}{2(1)}$

ANSWER / JAWAPAN

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QUESTION 4

OR
Completing the square

$8\left[(x-10)^2-(-10)^2-75\right]=0$ or
$2\left[(y+20)^2-(20)^2-2100\right]=0$

$x=5, \quad (x=15)$
$y=30, \quad (y=-10)$

Length = 30 meter
Width =10 meter

QUESTION 5

$x=6-2y \quad or \quad y=\frac{6-x}{2}$

$2y^2-(6-2y)y=10 \quad or \quad 2\left(\frac{6-x}{2}\right)^2-x\left(\frac{6-x}{2}\right)=10$

$(2y-5)(y+1)=0 \quad or \quad (x-1)(x-8)=0$

$y_1=\frac{5}{2} \qquad y_2=-1$

$x_1=1 \qquad x_2=8$

QUESTION 6

$y=8-2x$ OR $x=\frac{8-y}{2}$

$2x^2+4x(8-2x)=40 \qquad 2\left(\frac{8-y}{2}\right)^2+4y\left(\frac{8-y}{2}\right)=40$

$(3x-10)(x-2)=0 \qquad (3y-4)(y-4)=10$

$y=4 \quad y=\frac{4}{3}$

$x=2 \quad x=\frac{10}{3}$

$m=2$ and $k=-2$

QUESTION 7

$(30.2 \times 20.4)-xy=500$

$2x+2y=43.2$

$x=21.6-y$

$(21.6-y)(y)=116.08$

$y^2-21.6y+116.08=0$

$y=\frac{-(-21.6)\pm\sqrt{(-21.6)^2-4(1)(116.08)}}{2(1)}$

$y=11.55, x=10.05 \quad or \quad y=10.05, x=11.55$

Perimeter of the ungrazed field =101.2

ANSWER / JAWAPAN

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QUESTION 8

$$x + x + 3 + y + 6 = 23$$
$$2x + y = 23$$
$$y = 14 - 2x$$

$$y^2 + x^2 = (\sqrt{41})^2$$
$$y^2 + x^2 = 41$$

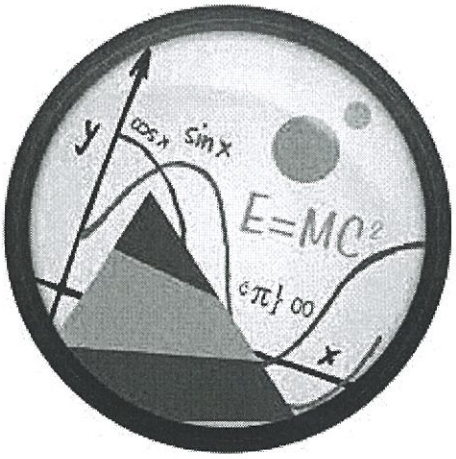
$$x^2 + (14 - 2x)^2 = 41$$
$$5x^2 - 56x + 155 = 0$$
$$(5x - 31)(x - 5) = 0$$

$$x = \frac{31}{5} \text{ or } x = 5$$

$$y = \frac{8}{5} \text{ or } y = 4$$

ADDMATHS
2019

QUADRATIC EQUATION/PERSAMAAN KUADRATIK
(7 MARKS/7 MARKAH)



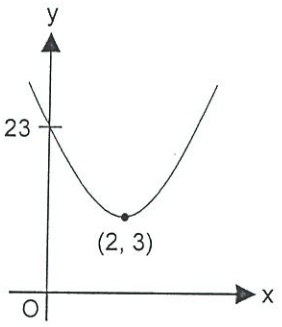
QUESTION 1/ SOALAN 1

(a) If α and β are the roots of the quadratic equation $2x^2 - 3x - 6 = 0$. Form a quadratic equation which has roots $\frac{\alpha}{3}$ and $\frac{\beta}{3}$.

Jika α dan β ialah punca-punca persamaan kuadratik $2x^2 - 3x - 6 = 0$. Bentukkan persamaan kuadratik yang mempunyai punca-punca $\frac{\alpha}{3}$ dan $\frac{\beta}{3}$.

[4 marks/ *markah*]

(b)



Diagram/ *Rajah* 5

In Diagram 5, the point (2, 3) is the turning point on the graph having an equation shaped $y = p(x + h)^2 + k$. Find the values for p, h and k.

Dalam Rajah 5, titik (2, 3) ialah titik pusingan pada graf yang mempunyai persamaan berbentuk $y = p(x + h)^2 + k$. Cari nilai p, h dan k.

[3 marks/ *markah*]

QUESTION 2/ SOALAN 2

Diagram 4 shows a piece of plywood in a rectangular shape with length $5x$ cm and width y cm. A carpenter wants to cut the plywood into two equal pieces of right angled triangle. The perimeter of each triangle is 24 cm and the longest side of the triangle is $(x + y)$ cm.

Rajah 4 *menunjukkan sekeping papan lapis berbentuk segi empat tepat dengan panjang* $5x$ cm *dan lebar* y cm. *Seorang tukang kayu ingin memotong papan lapis itu kepada dua keping papan berbentuk segi tiga tegak yang sama saiz. Perimeter setiap segi tiga ialah* 24 cm *dan sisi terpanjang segi tiga itu ialah* $(x + y)$ cm.

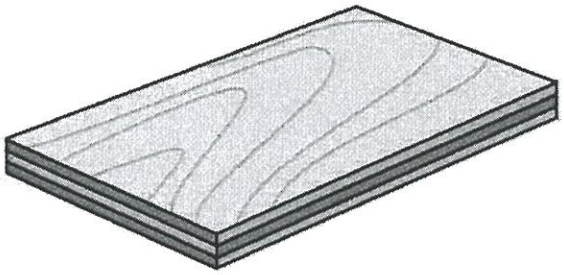


Diagram 4
Rajah 4

Calculate the area, in cm^2, of the board. [7 *marks*]
Hitung luas, dalam cm^2, *papan itu.* [7 *markah*]

QUESTION 3/ SOALAN 3

Diagram 3 shows a rectangular plank.
Rajah 3 menunjukkan sekeping papan berbentuk segi empat tepat

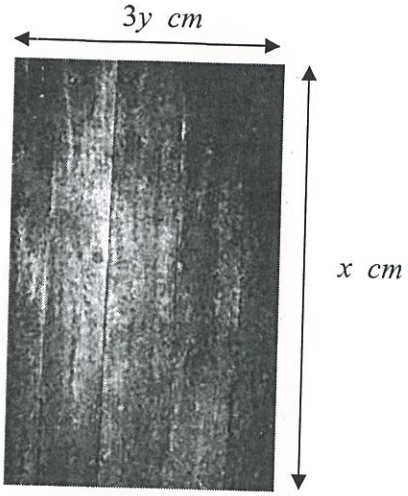


Diagram 3 / *Rajah 3*

Pak Ali wants to cut the plank into two triangular planks. The perimeter of each triangular plank is 24 cm and the measurement of the longest side of the triangle is $(x + y)$ cm. Calculate the area, in cm^2, of the plank

[6 marks]

Pak Ali ingin memotong papan itu kepada dua keping papan berbentuk segi tiga. Perimeter setiap segi tiga ialah 24 cm dan ukuran sisi terpanjang segi tiga itu ialah $(x + y)$ cm. Hitung luas, dalam cm^2, papan itu

[6 markah]

QUESTION 4/ SOALAN 4

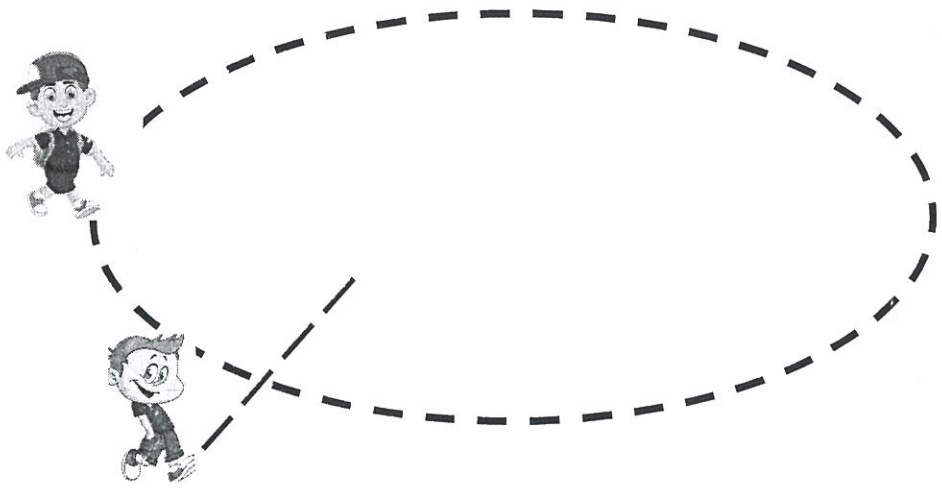


Diagram 1
Rajah 1

Ali walks such that his equation of locus is given by $2x^2+11y^2+2x+2y=0$. While, Abu moves in a straight line with the equation $x-3y+1=0$ and intersect the locus. Find the intersection points. [6 marks]

Ali berjalan dengan keadaan persamaan lokusnya diberi sebagai $2x^2+11y^2+2x+2y=0$. *Sementara Abu pula bergerak secara garis lurus dengan persamaan* $x-3y+1=0$ *dan bersilang dengan lokus tersebut. Cari titik-titik persilangan itu.*

[6 *markah*]

ANSWER / JAWAPAN

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QUESTION 1

QUESTION 2

$(30.2 \times 20.4) - xy = 500$

$2x + 2y = 43.2$

$x = 21.6 - y$

$(21.6 - y)(y) = 116.08$

$y^2 - 21.6y + 116.08 = 0$

$y = \frac{-(-21.6) \pm \sqrt{(-21.6)^2 - 4(1)(116.08)}}{2(1)}$

$y = 11.55, x = 10.05 \quad or \quad y = 10.05, x = 11.55$

Perimeter of the ungrazed field =101.2

QUESTION 3

$2x + 4y = 24$

$x = 12 - 2y$

$[(12 - 2y) + y]^2 = (12 - 2y)^2 + (3y)^2$

$y(y - 2) = 0 \quad or \quad (x - 8)(x - 12) = 0$

$y = 0, \ y = 2$

$x = 12, \ x = 8$

Area $= 48 \text{ cm}^2$

QUESTION 4

$x = 3y - 1$

$2(3y - 1)^2 + 11y^2 + (3y - 1) + 2y = 0$

$y(29y - 4) = 0 \quad \text{or} \quad y = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(29)(0)}}{2(29)}$

$y = 0, \ \frac{4}{29}$ @ 0.1379

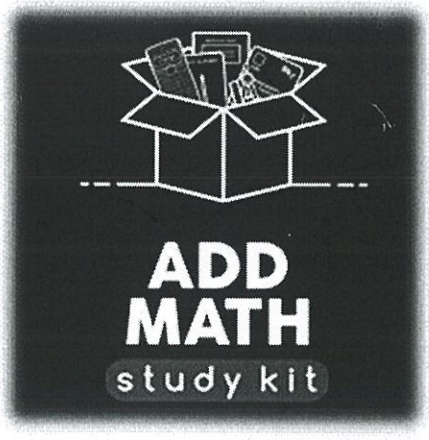
$x = -1, \ \frac{-17}{29}$ @ - 0.5862

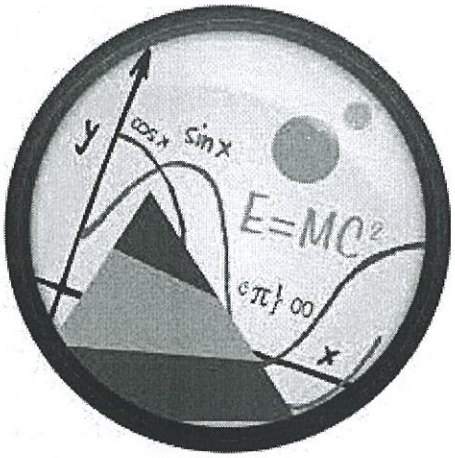
Intersection points (--1,0), $\left(\frac{-17}{29}, \frac{4}{29}\right)$

ILMU STUDIO TUITION CENTRE is.

ADDMATHS 2019

- INTEGRATION
- PENGAMIRAN

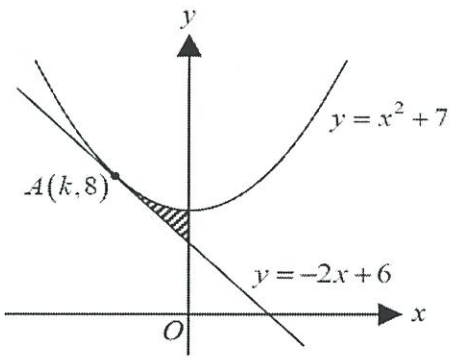




QUESTION 1/ SOALAN 1

(b) Diagram 10(b) shows the curve $y = x^2 + 7$ and the tangent $y = -2x + 6$ to the curve at the point A(k, 8).

Rajah 10(b) menunjukkan lengkung $y = x^2 + 7$ dan tangen $y = -2x + 6$ kepada lengkung itu pada titik A(k, 8).



Diagram/ *Rajah* 10(b)

Calculate/ Hitung

(i) the value of k.
nilai k. [1 mark/ *markah*]

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

QUESTION 2/ SOALAN 2

Diagram 5 shows a straight line $y = x - 1$ intersecting the curve $y = 11 - x^2$ at the point $A(3,2)$.
Rajah 5 menunjukkan garis lurus $y = x - 1$ *menyilang lengkung* $y = 11 - x^2$ *pada titik* $A(3,2)$.

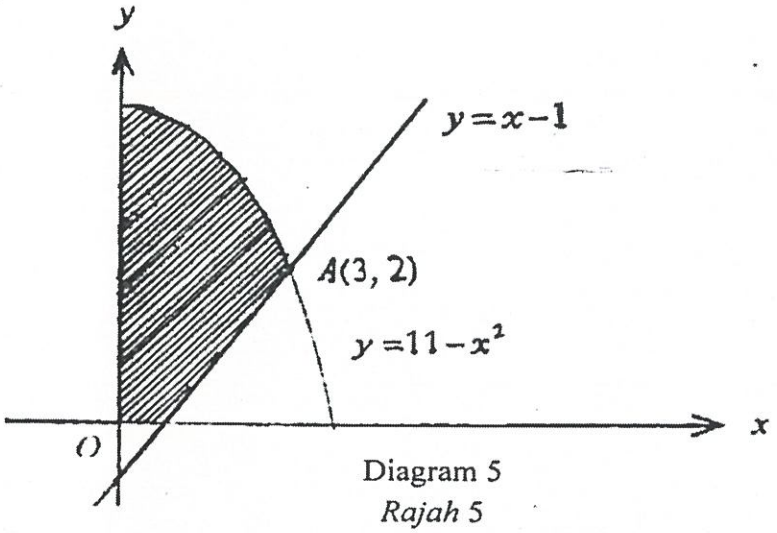


Diagram 5
Rajah 5

Find
Cari

(a) the area of the shaded region,
luas kawasan berlorek itu,

[4 marks]
[4 *markah*]

(b) the volume generated, in terms of π, when region enclosed by the curve, the y –axis and the straight line $y = 2$ is revolved through 360^0 about the y -axis.
isipadu yang dijanakan, dalam sebutan π, *apabila rantau yang dibatasi oleh lengkung, paksi* $-y$ *dan garis lurus* $y = 2$ dikisarkan 360^0 pada paksi – y.

[3 marks]
[3 *markah*]

QUESTION 3/ SOALAN 3

(a) Given the curve $y = ax^3 + bx^2$, where a and b are constants. One of the turning point of the curve is (1,2). Find the value of a and of b. [3 marks]

Diberi lengkung $y = ax^3 + bx^2$, *dengan keadaan a dan b adalah pemalar . Salah satu daripada titik pusingan bagi lengkung itu ialah* (1,2).
Cari nilai a dan nilai b. [3 *markah*]

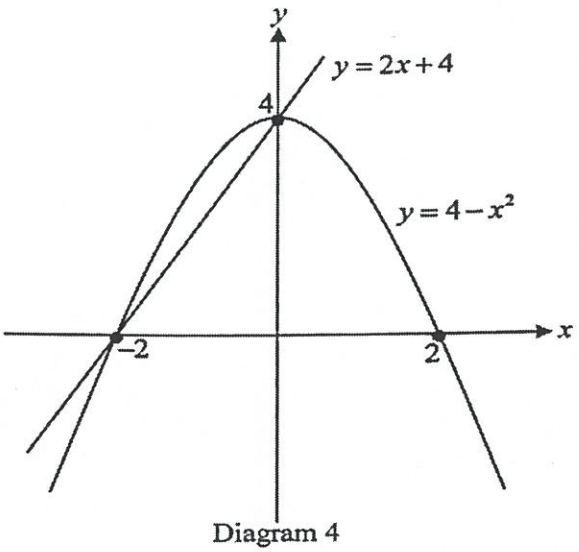


Diagram 4
Rajah 4

(b) Diagram 4 shows the straight line $y = 2x + 4$ and the curve $y = 4 - x^2$.
Rajah 4 *menunjukkan garis lurus* $y = 2x + 4$ *dan lengkung* $y = 4 - x^2$.
Find
Cari

(i) the area bounded the curve and x-axis, [3 marks]
luas yang dibatasi oleh lengkung itu dan paksi-x, [3 *markah*]

(ii) the volume revolution, in terms of π, when the region bounded the straight line and the curve are rotated through 360^0 about the y-axis.
isipadu yang dijanakan, dalam sebutan π, *apabila rantau yang dibatasi oleh lengkung dan garis lurus itu dikisar melalui* 360^0 *pada paksi-y.*

[4 marks]
[4 *markah*]

QUESTION 4/ SOALAN 4

Diagram 5 shows a straight line DP which is normal to the curve at point $P(4, 12)$.

Rajah 5 menunjukkan garis lurus DP yang merupakan normal kepada lengkung pada titik $P(4, 12)$.

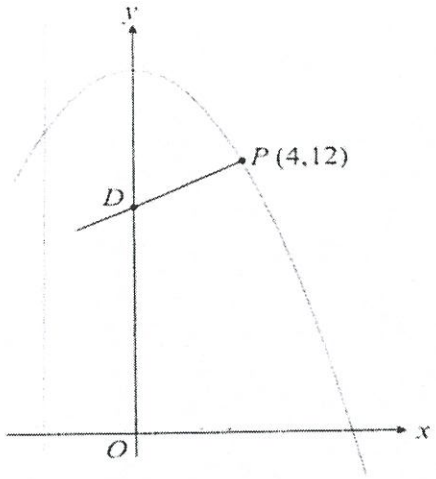


Diagram 5
Rajah 5

The gradient function of the curve is $-\frac{1}{2}x$.

Fungsi kecerunan bagi lengkung tersebut ialah $-\frac{1}{2}x$.

(*a*) Find

Cari

(i) the y-coordinate of point D,

koordinat y bagi titik D,

(ii) the equation of the curve.

persamaan lengkung tersebut.

[6 *marks*]
[6 *markah*]

(*b*) The volume generated when the region bounded by the curve, the y-axis and the straight line $y = k$ is revolved through $360°$ about the y-axis is 50π unit^3.
Find the value of k. [4 *marks*]

Isipadu yang dijanakan apabila rantau yang dibatasi oleh lengkung, paksi-y dan garis lurus $y = k$ dikisarkan melalui $360°$ pada paksi-y ialah 50π unit^3.
Cari nilai k [4 *markah*]

QUESTION 5/ SOALAN 5

Diagram 6 shows the straight line $y = x - 9$ intersecting the curve $x = (y - 3)^2$ at points P and Q.
Rajah 6 menunjukkan garis lurus $y = x - 9$ *menyilang lengkung* $x = (y - 3)^2$ *pada titik P dan titik Q.*

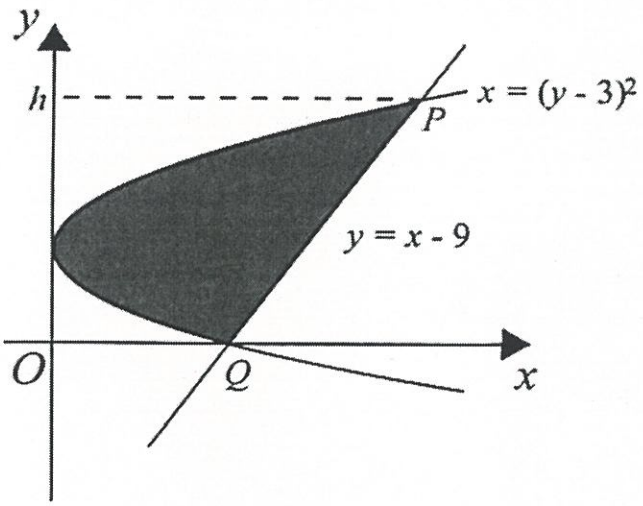


Diagram 6
Rajah 6

Find
Cari

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

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

c) the volume of revolution, in terms of π, when the region bounded by the curve, the x-axis and the y-axis is revolved through 360° about the y-axis. [4 *marks*]
isi padu kisaran, dalam sebutan π, *apabila rantau yang dibatasi oleh lengkung, paksi-x dan paksi-y diputarkan melalui* 360° *pada paksi-y.* [4 *markah*]

QUESTION 6/ SOALAN 6

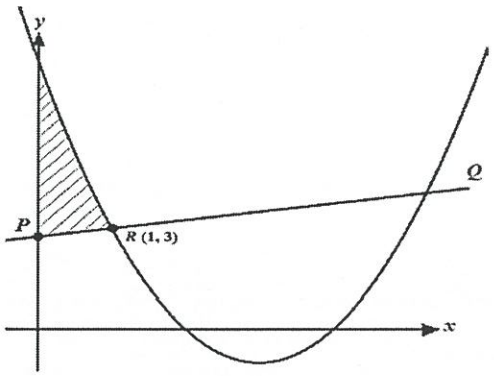


Diagram 4
Rajah 4

Diagram 4 shows the straight line PQ is normal to the curve $y = f(x)$ at point $R(1,3)$. Given that gradient of function of the curve is $2x-6$ and straight line PQ intercept y-axis at point P.

Rajah 4 menunjukkan garis lurus PQ yang normal pada lengkung $y = f(x)$ *di titik* $R(1,3)$. *Diberi bahawa fungsi kecerunan bagi lengkung tersebut ialah* $2x-6$ *dan garis lurus PQ memotong paksi-y di titik P.*

Find
Cari

(a) the equation of the curve, [3 *marks*]
persamaan lengkung tersebut, [3 *markah*]

(b) the coordinat of P, [3 *marks*]
koordinat P, [3 *markah*]

(c) the area of the shaded region. [4 *marks*]
luas kawasan berlorek. [4 *markah*]

QUESTION 7/ SOALAN 7

Diagram 1 shows the curve $y=\frac{x^2}{4}$ intersects the straight line $x=4y-2$ at point a and point b.

Rajah 1 menunjukkan lengkung $y=\frac{x^2}{4}$ *bersilang dengan garis lurus* $x=4y-2$ *pada titik a dan titik b.*

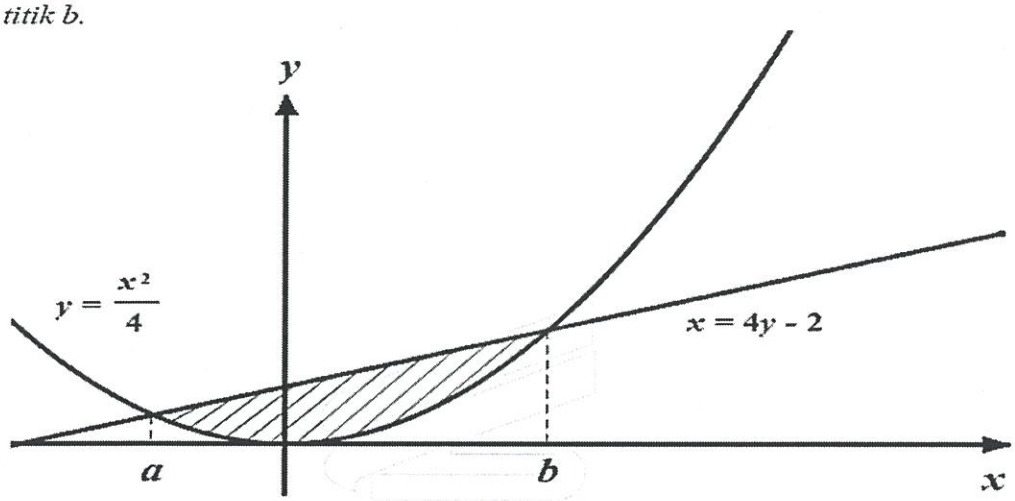


Diagram 1
Rajah 1

Find
Cari

(b) the value of a and b [3 *marks*]
nilai a dan b [3 *markah*]

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

QUESTION 8/ SOALAN 8

Diagram 5 shows the straight line $y = 2 - x$ intersects the curve $y^2 = x$ at point A.
Rajah 5 menunjukkan garis lurus $y = 2 - x$ *menyilang lengkung* $y^2 = x$ *pada titik* A .

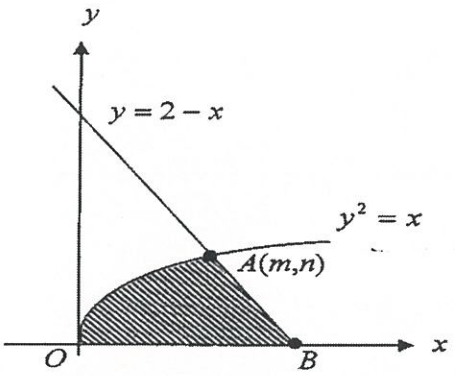


Diagram 5 / *Rajah 5*

(*a*) Find
Cari

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

(ii) the coordinates of B.
koordinat B.

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

(*b*) Calculate
Hitungkan

(i) the area of the region bounded by the curve and the straight line $x = m$.
luas rantau yang dibatasi oleh lengkung dan garis lurus $x = m$.

(ii) the volume generated, in terms of π , when the shaded region is revolved through 360° about the x-axis.
isipadu janaan, dalam sebutan π, *apabila rantau berlorek diputarkan melalui* 360° *pada paksi-x.*

[7 marks]
[7 *markah*]

QUESTION 9/ SOALAN 9

Diagram 7 shows the straight line $y = -x + k$ touching the curve $y = 3x - x^2$ at point A.
Rajah 7 menunjukkan garis lurus $y = -x + k$ *menyentuh lengkung* $y = 3x - x^2$ *pada titik* A.

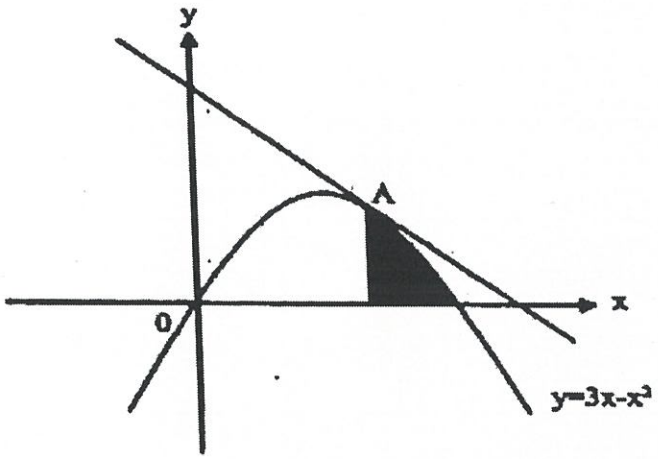


Diagram 7/ *Rajah 7*

Find,
Cari,

(a) the coordinates of point A,
titik koordinat A,

[2 marks/2 *markah*]

(b) the value of k,
nilai k,

[2 marks/2 *markah*]

(c) the area of the shaded region,
luas rantau berlorek,

[3 marks/3 *markah*]

(d) the volume generated, in terms of π, when the region bounded by the curve $y = 3x - x^2$ and the x-axis is revolved through 360° about the x-axis.
isipadu janaan dalam sebutan π, *apabila rantau yang dibatasi oleh lengkung* $y = 3x - x^2$ *dan paksi - x dikisarkan* 360° *pada paksi - x.*

[3 marks/3 *markah*]

QUESTION 10/ SOALAN 10

Diagram 4 shows the straight line $5y+4x=25$ intersects the curve $3y^2=x-2$ at point Q.
Rajah 4 menunjukkan garis lurus $5y+4x=25$ *menyilang lengkung* $3y^2=x-2$ *pada titik* Q.

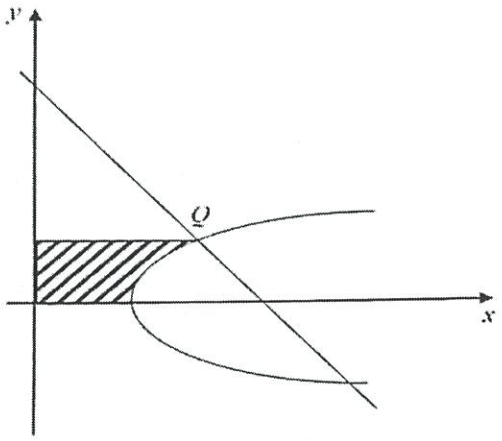


Diagram 4
Rajah 4

Find
Cari

(a) the coordinates of point Q, [3 *marks*]
koordinat titik Q, [3 *marks*]

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

(c) the volume of revolution, in terms of π when the shaded region is rotated through 360^0 about the x –axis. [4 *marks*]

isi padu janaan ,dalam sebutan π *apabila rantau berlorek dikisarkan melalui* 360^0 *pada paksi–x.*

[4 *markah*]

QUESTION 11/ SOALAN 11

Diagram 1 shows the curve $y = x^2 - 9$. Given coordinates of P is (3, 0). The straight line AQ is parallel to the y-axis.

Rajah 1 menunjukkan lengkung $y = x^2 - 9$. *Diberi titik koordinat P ialah* (3, 0). *Garis lurus AQ adalah selari dengan paksi-y.*

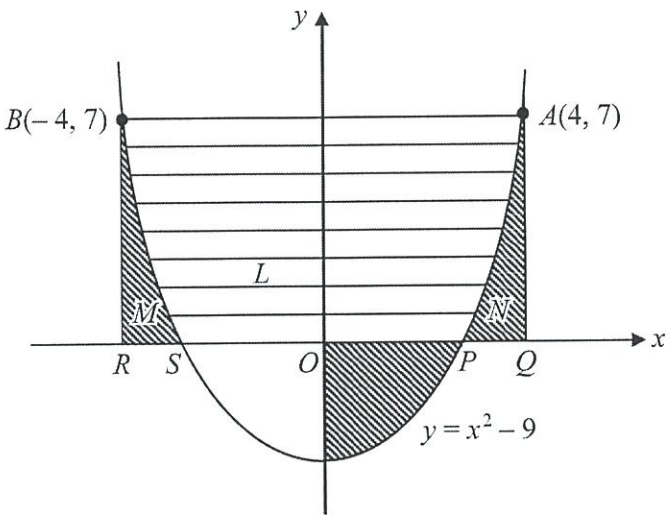


Diagram 1
Rajah 1

Calculate

Hitung

(*a*) the volume of revolution, in terms of π, when the region bounded by the curve and the x-axis is rotated through 180° about the y-axis. [4 *marks*]

isi padu kisaran, dalam sebutan π, *apabila rantau yang dibatasi oleh lengkung itu dan paksi-x dikisarkan melalui* 180° *pada paksi-y.* [4 *markah*]

(*b*) the area of the shaded region M and N, given $ABRQ$ is a rectangle and the area of the unshaded region L *is* $21\frac{1}{3}$ *unit*^{2}. [2 *marks*]

luas rantau berlorek M dan N, ABRQ ialah segi empat tepat dan diberi luas kawasan tidak berlorek L ialah $21\frac{1}{3}$ *unit*^{2}. [2 *markah*]

QUESTION 12/ SOALAN 12

Diagram 1 shows the curve $y = 4x - x^2$ cutting the x-axis at O and b.

Rajah 1 menunjukkan lengkung $y = 4x - x^2$ *yang memotong paksi-x di O dan b.*

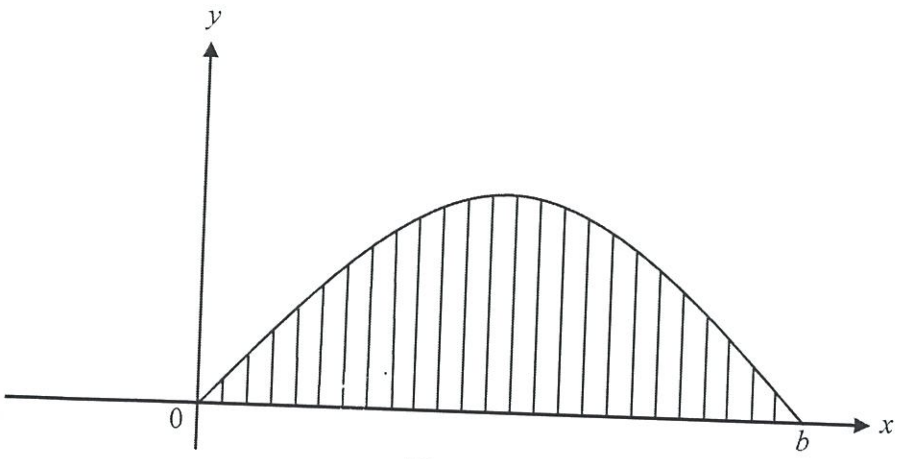


Diagram 1

Rajah 1

Find

Cari

(*a*) The region is revolved through 360 ° about the x-axis. Find the volume generated, in terms of π.

[4 *marks*]

Rantau berlorek dikisarkan melalui 360 ° *pada paksi-x. Cari isi padu yang dijanakan dalam sebutan* π.

[4 *markah*]

(*b*) Given area of the shaded region is $\frac{32}{3}$ unit^2, find the value of $\int_b^0 2f(x)dx$. [2 *marks*]

Diberi luas kawasan rantau berlorek ialah $\frac{32}{3}$ *unit*^{2}, *cari nilai* $\int_b^0 2f(x)dx$. [2 *markah*]

QUESTION 13/ SOALAN 13

. Diagram below shows a curve y = f(x). The straight line AB is a normal to the curve at point B(2,2).
Rajah menunjukkan lengkung y = f(x). Garis lurus AB adalah normal kepada lengkung pada titik B(2,2).

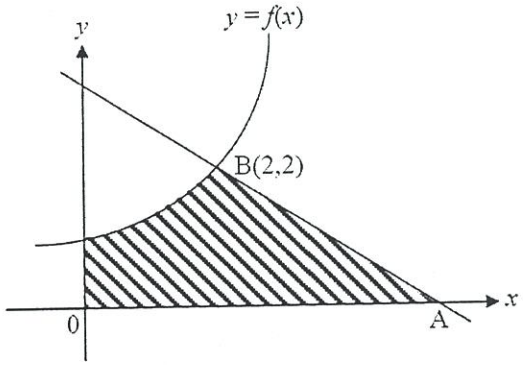


Diagram 6/ *Rajah 6*

Given that the gradient function of the curve is $\frac{x}{2}$.

Diberi fungsi kecerunan bagi lengkung ialah $\frac{x}{2}$.

Find
Cari

(a) (i) the equation of the straight line AB.
Persamaan garis lurus AB.

(ii) the equation of the curve. [3 marks]
persamaan lengkung itu. [3 *markah*]

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

(c) the volume of revolution, in terms of π, when the region bounded by the curve, y – axis and straight line y = 2 and is rotated through 360° about the y – axis.
[3 marks]

isipadu kisaran, dalam sebutan π, apabila rantau yang dibatasi oleh lengkung, paksi –y dan garis lurus y = 2 dan diputarkan melalui 360° pada paksi – y. [3 *markah*]

QUESTION 14/ SOALAN 14

(a) Diagram 9.1 shows the curve $y = x^2$, curve $y = \frac{16}{x^2}$ and the straight line PQ. The straight line PQ is a tangent to the curve $y = x^2$ at $P(2, 4)$.

Rajah 9.1 menunjukkan lengkung $y = x^2$, *lengkung* $y = \frac{16}{x^2}$ *dan garis lurus PQ. Garis lurus PQ adalah tangen kepada lengkung* $y = x^2$ *pada* $P(2, 4)$.

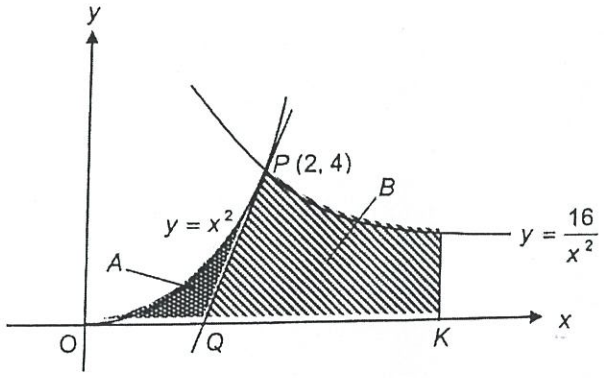


Diagram 9.1
Rajah 9.1

(i) Calculate the coordinate of Q. [3 marks]
Hitung coordinate of Q. [3 *markah*]

(ii) Find the value of k if the total area of region A and B is $\frac{20}{3}$ units^2. [4 marks]

Cari nilai k jika jumlah luas rantau A dan B ialah $\frac{20}{3}$ unit^2. [4 *markah*]

(b) Diagram 9.2 shows part of the curve $y = x^2 + 3$ and straight line $y = 5$.

Rajah 9.2 menunjukkan sebahagian daripada lengkung $y = x^2 + 3$ *dan garis lurus* $y = 5$.

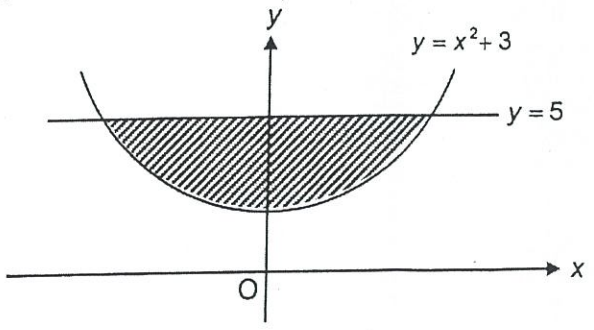


Diagram 9.2
Rajah 9.2

Calculate the volume generated, in terms of π, when the shaded region is rotated through 180° about the y-axis. [3 marks]

Hitung isipadu yang dijanakan dalam sebutan π, *apabila berlorek diputarkan melalui* 180° *pada paksi-y.* [3 *markah*]

QUESTION 15/ SOALAN 15

In Diagram 8, shows the graph of a function $y = f(x)$ which has a minimum point at Q and intersects the straight line $y + x = 9$ at point P. Given that $f'(x) = 2x$.

Rajah 8 menunjukkan sebahagian daripada graf fungsi $y = f(x)$ yang mempunyai titik minimum pada Q dan bersilang dengan garis lurus $y + x = 9$ pada titik P. Diberi bahawa $f'(x) = 2x$

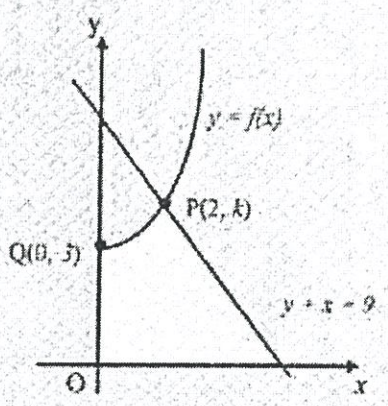


Diagram 8 / *Rajah 8*

(a) Find

Cari

(i) $f(x)$ [2 marks/*markah*]

(ii) the value of k, and hence the area of the shaded region.

nilai k dan seterusnya luas rantau berlorek. [3 marks/*markah*]

(b) Find the volume generated, in terms of π, when the region bounded by the y-axis, the curve $f(x)$ and the straight line $y + x = 9$ is revolved through 360° about the y-axis.

Cari isipadu yang dijanakan, dalam sebutan π, apabila rantau yang dibatasi oleh paksi-y, lengkung $f(x)$ dan garis lurus $y + x = 9$, diputarkan melalui 360° pada paksi-y.

[3 marks/*markah*]

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QUESTION 1

QUESTION 2

(a) $y = x - 1$ pada $(x, 0)$

$x = 1$ P1

Luas kawasan berlorek

$\int_0^3 11 - x^2 dx = \left[11x - \frac{x^3}{3}\right]_0^3$ atau $\frac{1}{2}(2)(2)$

$\left[11x - \frac{x^3}{3}\right]_0^3 - \frac{1}{2}(2)(2)$

22 unit^2 N1

(b) **Isipadu janaan**

$\pi\int_2^{11}(11 - y)dy = \pi\left[11y - \frac{y^2}{2}\right]_2^{11}$ K1

$\pi\left[11(11) - \frac{11^2}{2}\right] - \left[11(2) - \frac{2^2}{2}\right]$ K1

40.5 π

QUESTION 3

8(a) $\frac{dy}{dx} = 3ax^2 + 2bx$

$0 = 3a(1)^2 + 2b$

$2 = a(1)^3 + b(1)^2$

$a = -4,\ b = 6$ (both)

(b)(i) $\int_{-2}^{2}(4 - x^2)dx$

$\left[4x - \frac{x^3}{3}\right]_{-2}^{2}$

$\left(4(2) - \frac{2^3}{3}\right) - \left(4(-2) - \frac{(-2)^3}{3}\right)$

$10\frac{2}{3}$

(ii) $\pi\left[4y - \frac{y^2}{2}\right]_0^4$ or $\frac{1}{3}\pi(2)^2(4)$

$\pi\left[(4(4) - \frac{4^2}{2}) - 0\right]$

$\pi\left[(4(4) - \frac{4^2}{2}) - 0\right] - \frac{16}{3}\pi$

$\frac{8}{3}\pi$

QUESTION 4

(a) (i) $-2 \times m_2 = -1$

$\frac{y - 12}{0 - 4} = \frac{1}{2}$

$y = 10$

(ii) $y = -\frac{1}{2}\left(\frac{x^2}{2}\right) + c$

$12 = -\frac{1}{2}\left(\frac{4^2}{2}\right) + c$

$y = -\frac{x^2}{4} + 16$

(b) $\pi\int_{12}^{k}(64y - 4y)\,dy = 50\pi$

$\left[64y - \frac{4y^2}{2}\right]_k^{16} = 50$

$\left[64(16) - 2(16)^2\right] - \left[64k - 2k^2\right] = 50$

$k^2 - 32k + 231 = 0$

$(k - 21)(k - 11) = 0$

$k = 11$

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QUESTION 5

(a)
$(y-3)^2 = y+9$
$y(y-7) = 0$
$h = 7$

(b)
$\int_0^7 (y+9)\,dy - \int_0^7 (y-3)^2\,dy$
$= \left[\frac{y^2}{2} + 9y\right]_0^7 - \left[\frac{(y-3)^3}{3}\right]_0^7$
$= \frac{7^2}{2} + 9(7) - 0 - \left[\frac{(7-3)^3}{3} - \frac{(0-3)^3}{3}\right]$
$= 57\frac{1}{6}$ or 57.17

(c)
$(0, 3)$
$\pi \int_0^3 (y-3)^4\,dy$
$= \pi \left[\frac{(y-3)^5}{5}\right]_0^3$
$= \pi \left[\frac{(3-3)^5}{5} - \frac{(0-3)^5}{5}\right]$
$= \frac{243\pi}{5}$

QUESTION 6

(a) $y = \frac{2x^2}{2} - 6x + c$

$3 = \frac{2(1)^2}{2} - 6(1) + c$

$y = x^2 - 6x + 8$

(b) $m_T = -4, \quad m_N = \frac{1}{4}$

$y - 3 = \frac{1}{4}(x-1)$

$P\left(0, \frac{11}{4}\right)$

(c) Luas $A = \left[\frac{x^3}{3} - \frac{6x^2}{2} + 8x\right]_0^1$

Luas $B = \frac{1}{2}\left(\frac{11}{4} + 3\right)(1)$

$= \left[\frac{x^3}{3} - \frac{6x^2}{2} + 8x\right]_0^1 - \frac{1}{2}\left(\frac{11}{4} + 3\right)(1)$

$\frac{59}{24}$

QUESTION 7

(a) $x = 4\left(\frac{x^2}{4}\right) - 2$

$(x-2)(x+1) = 0$

$\therefore a = -1, \quad b = 2$

(b) $Luas = \int_{-1}^{2} \frac{x^2}{4}\,dx = \left[\frac{x^3}{12}\right]_{-1}^{2}$

$Luas = \frac{1}{2}\left(\frac{1}{4} + 1\right)(3)$

$\frac{1}{2}\left(\frac{1}{4} + 1\right)(3) - \left[\frac{x^3}{12}\right]_{-1}^{2}$

$\frac{9}{8}$

QUESTION 8

(a) (i) m = 1 ; n = 1

(ii) B (2 , 0)

(b) (i) $\left[\frac{x^{\frac{3}{2}}}{\frac{3}{2}}\right]_0^1$ 1

K1 (gu

$\frac{2}{3}$ unit² or setara N1

(ii) $\pi \int_0^1 x\,dx + \pi \int_1^2 (2-x)^2\,dx$ 1

$\pi \left[\frac{x^2}{2}\right]_0^1 + \pi \left[4x - 2x^2 + \frac{x^3}{3}\right]_1^2$

$\frac{5}{6}\pi$ unit³

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QUESTION 9

(a) Differentiate $y = 3x - x^2$ and equate to -1 K1

$3 - 2x = -1$

A(2,2) N1

(b) Use gradient formula K1

$\frac{k-2}{0-2} = -1$

$k = 4$ N1

(c) Integrate $\int 3x - x^2\,dx$ K1

$\frac{3x^2}{2} - \frac{x^3}{3}$ K1 Use limit $\int_2^3$ into $\left[\frac{3x^2}{2} - \frac{x^3}{3}\right]$

$\frac{7}{6}\,unit^2$ N1

(d) Integrate $\pi \int (3x - x^2)^2\,dx$ K1

$\pi\left[\frac{9x^3}{3} - \frac{6x^4}{4} + \frac{x^5}{5}\right]$

K1 Use limit $\pi \int_0^3$ into $\pi\left[\frac{9x^3}{3} - \frac{6x^4}{4} + \frac{x^5}{5}\right]$

N1 $8.1\pi\,unit^3$

QUESTION 10

(a)

$3y^2 + 2 = \frac{25 - 5y}{4}$

$12y^2 + 8 = 25 - 5y$

$(y - 1)(12y + 17) = 0$

$y = 1, y = -\frac{17}{12}$

$Q(5,1)$

(b)

$Area = \int_0^1 3y^2 + 2dy$

$= \left[\frac{3y^3}{3} + 2y\right]_0^1$

$= [y^3 + 2y]_0^1$

$= [1^3 + 2(1)] - 0$

$= 3unit^2$

OR

$Area = \int_2^5 \left(\frac{x-2}{3}\right)^{\frac{1}{2}} dx$

$= \left[\left(\frac{x-2}{3}\right)^{\frac{3}{2}} \times 2\right]_2^5$

$= 5(1) - \left[\left(\frac{5-2}{3}\right)^{\frac{3}{2}} \times 2 - \left[\left(\frac{2-2}{3}\right)^{\frac{3}{2}} \times 2\right]\right]$

$= 3unit^2$

(c)

$\pi \int_2^5 y^2\,dx = \int_2^5 \frac{x}{3} - \frac{2}{3}\,dx$

$\pi(1)^2(5)$ or $\pi\left[\left(\frac{5^2}{6} - \frac{2(5)}{3}\right) - \left(\frac{2^2}{6} - \frac{2(2)}{3}\right)\right]$

$\pi(1)^2(5) - \pi\left[\left(\frac{5^2}{6} - \frac{2(5)}{3}\right) - \left(\frac{2^2}{6} - \frac{2(2)}{3}\right)\right]$

$\frac{7}{2}\pi$

QUESTION 11

(a) $\pi \int_{-9}^{0} (y+9)dy$

$\frac{y^2}{2} + 9y$

$\left[(0) - \left(\frac{81}{2} - 81\right)\right]$

$\frac{81}{2}\pi$

(b) $(7 \times 8) - 21\frac{1}{3}$

$34\frac{2}{3}$

QUESTION 12

(a) $V = \pi \int_0^4 (4x - x^2)^2 dx$

$\pi\left[\frac{16x^3}{3} - 2x^4 + \frac{x^5}{5}\right]_0^4$

$\pi\left[\frac{16(4)^3}{3} - 2(4)^4 + \frac{(4)^5}{5}\right] - 0$

$\frac{512}{15}\pi$

(b)

$2 \times \frac{32}{3}$

$-\frac{64}{3}$

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QUESTION 13

(a) (i) $2 = -1(2) + c$ or $y - 2 = -1(x - 2)$

$y = -x + 4$

(ii) $y = \frac{x^2}{4} + c$

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

(b) $\left[\frac{x^3}{12} + x\right]_0^2$ OR $\frac{1}{2} \times 2 \times 2$ or 2

$\frac{8}{3} + 2$

$\frac{14}{3}$

(c) $\pi\left[\frac{4y^2}{2} - 4y\right]_1^2$

$\pi\left[\left[2(2)^2 - 4(2)\right] - \left[2(1)^2 - 4(1)\right]\right]$

2π

QUESTION 14

(a) (i) $\frac{dy}{dx} = 2x$

Gradient of $PQ = 4$

Q (1, 0)

(ii) $\left[\frac{x^3}{3}\right]_0^2 + \left[\frac{16x^{-2+1}}{-2+1}\right]_2^k = \frac{20}{3}$ or $\left[\frac{x^3}{3}\right]_0^2 + \left[-\frac{16}{x}\right]_2^k = \frac{20}{3}$

$\frac{8}{3} + \left[-\frac{16}{k} - (-8)\right] = \frac{20}{3}$

$k = 4$

(b) $\int_3^5 \pi (y - 3)dy$

$\pi\left[\frac{y^2}{2} - 3y\right]_3^5$

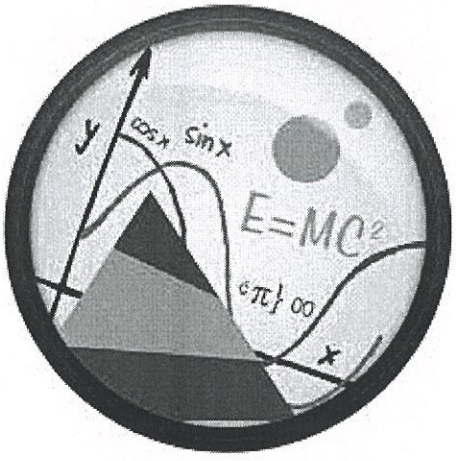
$\pi\left[\left(\frac{5^2}{2} - 3(5)\right) - \left(\frac{3^2}{2} - 3(3)\right)\right]$

2π

QUESTION 15

ADDMATHS
2019

TRIGONOMETRY FUNCTION/FUNGSI TRIGONOMETRI
(10 MARKS/10 MARKAH)



QUESTION 1/ SOALAN 1

(a) Solve the equation $\cos 2x - \cos x = 0$ for $0° \leq x \leq 360°$.

Selesaikan persamaan $\cos 2x - \cos x = 0$ *untuk* $0° \leq x \leq 360°$.

[3 marks/3 *markah*]

(b) (i) Sketch the graph of $y = |\cos 2x|$ for $0 \leq x \leq \pi$.

Lakarkan graf $y = |\cos 2x|$ *untuk* $0 \leq x \leq \pi$.

(ii) Hence, using the same axes, sketch a suitable graph to find the number of solution for the equation $|\cos 2x| = \sin x$ for $0 \leq x \leq \pi$.

State the number of solutions.

Seterusnya, gunakan paksi yang sama, lukis satu graf yang sesuai untuk mencari bilangan penyelesaian bagi persamaan $|\cos 2x| = \sin x$ *untuk* $0 \leq x \leq \pi$. *Nyatakan bilangan penyelesaian itu.*

[7 marks/7 *markah*]

QUESTION 2/ SOALAN 2

(*a*) Prove that $\frac{\sin 2x}{1-\cos 2x} = \cot x$ [2 marks]

Buktikan bahawa $\frac{\sin 2x}{1-\cos 2x} = \cot x$ [2 *markah*]

(*b*) (i) Sketch the graph of $y = 2\sin\frac{3}{2}x + 1$ for $0 \le x \le 2\pi$.

Lakarkan graf $y = 2\sin\frac{3}{2}x + 1$ *untuk* $0 \le x \le 2\pi$.

(ii) Determine the equation of a suitable straight line to find the number of solutions to equation $2\sin\frac{3}{2}x = \frac{3}{4\pi}x - 2$ for $0 \le x \le 2\pi$.

Tentukan persamaan garis lurus yang berssuaian untuk mencari bilangan penyelesaian bagi persamaan $2\sin\frac{3}{2}x = \frac{3}{4\pi}x - 2$ *untuk* $0 \le x \le 2\pi$.

[6 marks]

[6 *markah*]

QUESTION 3/ SOALAN 3

(a) Prove $\sin 2x = \dfrac{2-2\sin^2 x}{\cot x}$ [2 *marks*]

Buktikan $\sin 2x = \dfrac{2-2\sin^2 x}{kot\, x}$ [2 *markah*]

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

Lakar graf bagi $y = 1+\sin 2x$ untuk $0 \le x \le 2\pi$.

(ii) Hence, find the values of p if $p - \left(\dfrac{2-2\sin^2 x}{\cot x}\right) = 5$ have two solutions only.

Seterusnya cari nilai- nilai p *jika* $p - \left(\dfrac{2-2\sin^2 x}{kot\, x}\right) = 5$ *mempunyai dua penyelesaian sahaja.*

[8 *marks*]
[8 *markah*]

QUESTION 4/ SOALAN 4

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

Lakarkan graf bagi $y = 1 - 2\tan x$ *untuk* $0 \le x \le 2\pi$. [3 *markah*]

(b) Hence, using the same axes, sketch a suitable straight line to find the number of solutions for the equation $2\pi \tan x = -x$.

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

Seterusnya, dengan menggunakan paksi yang sama, lakar satu garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan $2\pi \tan x = -x$.

Nyatakan bilangan penyelesaian itu. [3 *markah*]

QUESTION 5/ SOALAN 5

(a) Prove that $\frac{\cos x+\sin x}{1+\sin 2x+\cos 2x}=\frac{1}{2}\sec x$. [3 *marks*]

Buktikan $\frac{kos\ x+\sin x}{1+\sin 2x+kos\ 2x}=\frac{1}{2}sek\ x$ [3 *markah*]

(b) Hence, solve the equation

$$\frac{\cos x+\sin x}{1+\sin 2x+\cos 2x}=\frac{1}{\sqrt{3}}$$ [3 *marks*]

Seterusnya, selesaikan persamaan

$$\frac{kos\ x+\sin x}{1+\sin 2x+kos\ 2x}=\frac{1}{\sqrt{3}}$$ [3 *markah*]

QUESTION 6/ SOALAN 6

(a) Sketch the graph of $y = \left|4\cos\frac{3}{2}x\right|$ for $0 \leq x \leq 2\pi$. [4 *marks*]

Lakar graf bagi $y = \left|4\text{kos}\frac{3}{2}x\right|$ *untuk* $0 \leq x \leq 2\pi$. [4 *markah*]

(b) Hence, using the same axes, sketch a suitable graph to find the number of solutions for the equation $\left|4\pi\cos\frac{3}{2}x\right| - x = 0$ for $0 \leq x \leq 2\pi$. State the number of solutions. [3 *marks*]

Seterusnya, dengan menggunakan paksi yang sama, lakar satu graf yang sesuai untuk mencari bilangan penyelesaian bagi persamaan $\left|4\pi\text{kos}\frac{3}{2}x\right| - x = 0$ *untuk* $0 \leq x \leq 2\pi$. *Nyatakan bilangan penyelesaian itu.* [3 *markah*]

QUESTION 7/ SOALAN 7

a) Prove $\frac{2\tan x}{1+\tan^2 x} = \sin 2x$. [2 *marks*]

Buktikan bahawa $\frac{2\tan x}{1+\tan^2 x} = \sin 2x$. [2 *markah*]

b) Hence,

Seterusnya,

i) solve the equation $\frac{2\tan x}{1+\tan^2 x} = \frac{1}{2}$ for $0 \le x \le 2\pi$ and give your answer in the simplest fraction form in terms of π rad,

selesaikan persamaan $\frac{2\tan x}{1+\tan^2 x} = \frac{1}{2}$ *untuk* $0 \le x \le 2\pi$ *dan berikan jawapan anda dalam bentuk pecahan termudah dalam sebutan* π rad,

ii) sketch the graph of $y = \frac{2\tan x}{1+\tan^2 x} - \frac{1}{2}$ for $0 \le x \le \pi$,

lakar graph $y = \frac{2\tan x}{1+\tan^2 x} - \frac{1}{2}$ *untuk* $0 \le x \le \pi$,

iii) find the value of k such that the equation $\frac{2\tan x}{1+\tan^2 x} - \frac{1}{2} = k$ has only three solutions for $0 \le x \le \pi$.

cari nilai k jika persamaan $\frac{2\tan x}{1+\tan^2 x} - \frac{1}{2} = k$ *mempunyai hanya tiga penyelesaian sahaja untuk* $0 \le x \le \pi$.

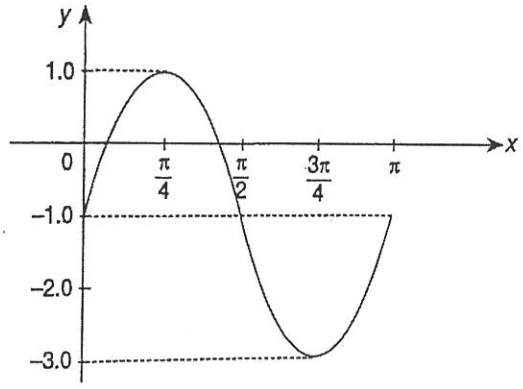
[8 marks]
[8 *markah*]

QUESTION 8/ SOALAN 8

(a) Prove that $(\sin x - \cos x)(\tan x + \cot x) = \sec x - \operatorname{cosec} x$.
Buktikan $(\sin x - \cos x)(\tan x + \cot x) = \sec x - \operatorname{cosec} x$.

[2 marks/ *markah*]

(b) Diagram 8 shows part of the graph of $y = h \sin (kx) + p$ for $0 \le x \le \pi$.
Rajah 8 menunjukkan sebahagian daripada graf $y = h \sin (kx) + p$ *untuk* $0 \le x \le \pi$.



Diagram/ *Rajah 8*

(i) State the values of h, k and p.
Nyatakan nilai-nilai h, k dan p.

[3 marks/ *markah*]

(ii) Find the range of values of q such that the equation $\sin (kx) = \frac{q}{h} - \frac{p}{h}$ does not have any real roots.
Cari julat nilai-nilai q dengan keadaan $\sin (kx) = \frac{q}{h} - \frac{p}{h}$ *tidak mempunyai punca-punca nyata.*

[2 marks/ *markah*]

(c) Solve the equation $3 \sin x \cos x + 2 \cos x = 0$ for $0° \le x \le 360°$.
Selesaikan persamaan $3 \sin x \cos x + 2 \cos x = 0$ *untuk* $0° \le x \le 360°$.

[3 marks/ *markah*]

QUESTION 9/ SOALAN 9

(a) (i) Prove that $2\cot x \sin^2 x = \sin 2x$.

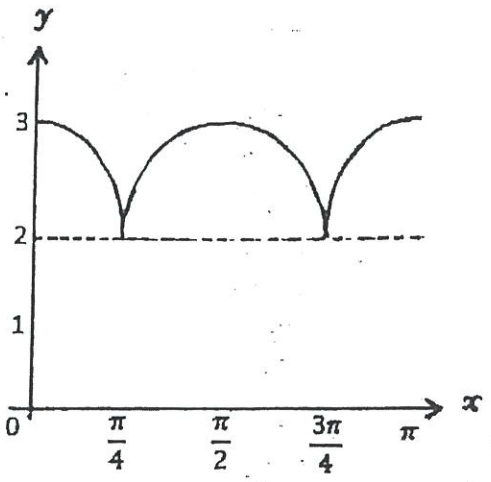
Buktikan bahawa $2\cot x \sin^2 x = \sin 2x$.

(ii) Solve the equation $\sin 2x = \frac{1}{2}$ for $0 \le x \le 2\pi$.

Selesaikan persamaan $\sin 2x = \frac{1}{2}$ *untuk* $0 \le x \le 2\pi$.

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

(b)



From the graph, state the equation of the trigonometric function of y.

Daripada graf, nyatakan persamaan bagi fungsi trigonometri y.

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

(c) Hence, copy and sketch a straight line graph on the same axes to find the number of solution of the equation $\frac{x}{\pi} - |kos\ 2x| = 0$ for $0 \le x \le \pi$. State the number of solutions. [3 *marks*]

Seterusnya, salin dan lakar satu garis lurus pada paksi yang sama untuk mencari bilangan penyelesaian bagi persamaan $\frac{x}{\pi} - |kos\ 2x| = 0$ *bagi* $0 \le x \le \pi$. *Nyatakan bilangan penyelesaian.* [3 *markah*]

QUESTION 10/ SOALAN 10

A particle moves along a straight line so that its velocity, v m s^{-1} at time t seconds is given by

$$v(t) = \frac{\sin 2t + \cos 2t - 1}{\cos t - \sin t}$$

Satu zarah bergerak pada satu garis lurus dengan halaju, v m s^{-1} *pada masa* t *saat diberi oleh*

$$v(t) = \frac{\sin 2t + \text{kos } 2t - 1}{\text{kos } t - \sin t}$$

(*a*) Prove that $v(t) = 2 \sin t$, [3 *marks*]

Buktikan bahawa $v(t) = 2 \sin t$, [3 *markah*]

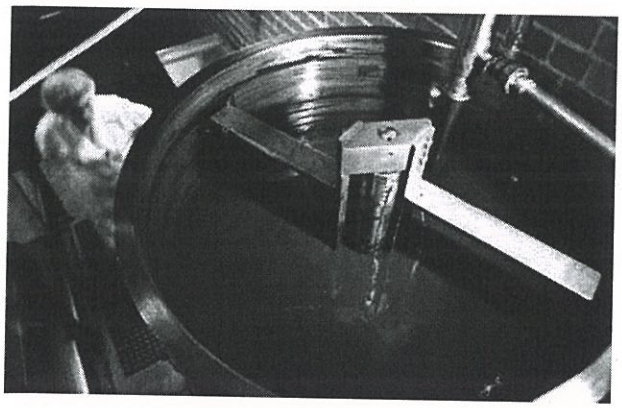
(*b*) Hence, sketch the graph of $y = v(t)$ for $0 \leq t \leq 2\pi$. [3 *marks*]

Seterusnya, lakarkan graf $y = v(t)$ *untuk* $0 \leq t \leq 2\pi$. [3 *markah*]

QUESTION 11/ SOALAN 11

The photograph shows the machine that stirs chocolate in the Shah Alam Chocolate Factory. A vat of milk chocolate is stirred by a stirrer blade that is driven by a wheel that pushes the blade back and forth.

Foto menunjukkan mesin pemutar coklat di Kilang Coklat Shah Alam. Tong susu coklat dikacau oleh bilah pemutar yang dikawal oleh roda secara bolak-balik.



The distance between the centre of the wheel and the stirrer blade can be modeled by the function

$$\cos 2\theta = \frac{\cot^2 \theta - 1}{\cot^2 \theta + 1}$$

Jarak di antara roda dengan bilah pemutar berdasarkan fungsi

$$\text{kos } 2\theta = \frac{\text{kot}^2 \theta - 1}{\text{kot}^2 \theta + 1}$$

(*a*) Prove the modeled function above,
Buktikan fungsi di atas,
[3 *marks*]
[3 *markah*]

(*b*) hence, find the angle of rotation for $\frac{\cot^2 \theta - 1}{\cot^2 \theta + 1} = \frac{1}{\text{cosec } \theta}$ for $0° \le \theta \le 360°$. [3 *marks*]

seterusnya, cari sudut putaran $\frac{\text{kot}^2 \theta - 1}{\text{kot}^2 \theta + 1} = \frac{1}{\text{kosek } \theta}$ *untuk* $0° \le \theta \le 360°$. [3 *markah*]

QUESTION 12/ SOALAN 12

(a) Prove that $\frac{2\sin x\cos x}{1-2\sin^2 x} = \tan 2x$.

Buktikan bahawa $\frac{2\sin x\cos x}{1-2\sin^2 x} = \tan 2x$.

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

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

Lakar graf $y = \tan 2x + 1$ *untuk* $0 \le x \le \pi$.

(ii) Hence, using the same axes, sketch a suitable straight line to find the number of solutions for the equation $\frac{6\sin x\cos x}{1-2\sin^2 x} - \frac{5x}{\pi} = 0$ for $0 \le x \le \pi$. State the number of solutions.

Seterusnya, dengan menggunakan paksi yang sama, lakar satu garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan $\frac{6\sin x\cos x}{1-2\sin^2 x} - \frac{5x}{\pi} = 0$ *untu* $0 \le x \le \pi$. *Nyatakan bilangan penyelesaian itu.*

[6 *marks*]
[6 *markah*]

QUESTION 13/ SOALAN 13

(a) Sketch the graph of $y = 2\sin\frac{3}{2}x \text{ for } 0 \leq x \leq 2\pi$

[2 marks]

Lakar graf bagi $y = 2\sin\frac{3}{2}x \text{ untuk } 0 \leq x \leq 2\pi$

[2 markah]

(b) Hence using the same axes, sketch the suitable straight line to find the number of solution to the equation $\sin\frac{3}{2}x + \frac{1}{2} = \frac{3}{8\pi}x \text{ for } 0 \leq x \leq 2\pi$.
State the number of solution.

[3 marks]

Seterusnya dengan menggunakan paksi yang sama, lakar satu garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan
$\sin\frac{3}{2}x + \frac{1}{2} = \frac{3}{8\pi}x \text{ untuk } 0 \leq x \leq 2\pi$.
Nyatakan bilangan penyelesaian itu.

[3 markah]

QUESTION 14/ SOALAN 14

(a) Solve the equation $5\tan y - \cot y = \sec y$ for $0° \le y \le 360°$. [4 marks]

Selesaikan persamaan $5\tan y - \text{kot}\, y = \text{sek}\, y$ *untuk* $0° \le y \le 360°$. [4 *markah*]

(b) Sketch the graph of $y = 1 - \cos\frac{3}{2}x$ for $0 \le x \le 2\pi$. [3 marks]

Lakar graf untuk $y = 1 - kos\frac{3}{2}x$ *untuk* $0 \le x \le 2\pi$. [4 *markah*]

QUESTION 15/ SOALAN 15

(a) Sketch the graph of $y = \left|4\cos\frac{3}{2}x\right|$ for $0 \le x \le 2\pi$. [4 marks]

Lakar graf bagi $y = \left|4kos\frac{3}{2}x\right|$ *untuk* $0 \le x \le 2\pi$. [4 *markah*]

(b) Hence, using the same axes, sketch a suitable straight line to find the number of solutions for the equation $2 + \frac{x}{\pi} = 2\left|4\cos\frac{3}{2}x\right|$ for $0 \le x \le 2\pi$. State the number of solutions. [3 marks]

Seterusnya, dengan menggunakan paksi yang sama, lakar satu garis lurus yang sesuai untuk mencari bilangan penyelesaian bagi persamaan $2 + \frac{x}{\pi} = 2\left|4kos\frac{3}{2}x\right|$ *for* $0 \le x \le 2\pi$. *Nyatakan bilangan penyelesaian itu.* [3 *markah*]

ANSWER / JAWAPAN

SIR VEN : 012 – 351 6764
INSTA : @VENSUCIVENSUCI
TWITTER : @VENSUCI

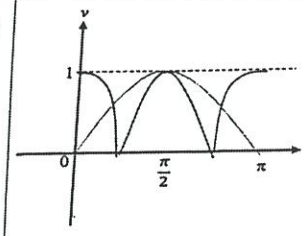
QUESTION 1

(a) Use $\cos 2x = 2\cos^2 - 1$ K1

$x = 120°, 0°$ N1

$x = 0°, 120°, 240°, 360°$ N1

10 (b)(i)



Shape of cosine graph

1 cycle $0 \le x \le \pi$

Modulus of cosine graph

(ii) $y = \sin x$ N1

Sketch the sine graph K1

$\frac{1}{2}$ cycle for $0 \le x \le \pi$ P1

Number of solutions = 3 N1

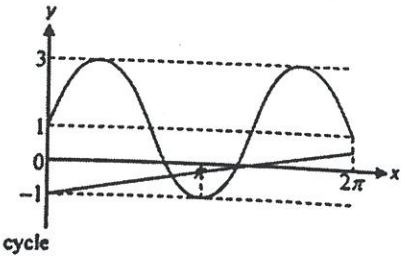
QUESTION 2

(a) $\frac{2\sin x \cos x}{1-(1-2\sin^2 x)}$

$= \frac{\cos x}{\sin x}$

$= \cot x$

(b)



Shape and cycle

Amplitude

Shipted

$y = \frac{3x}{4\pi} - 1$

Draw straight line $y = \frac{3x}{4\pi} - 1$

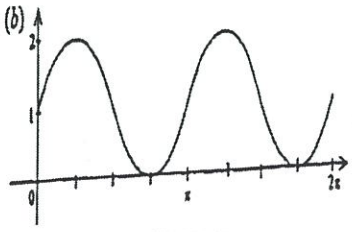
No of solutions: 2

QUESTION 3

(a) $\frac{2(1-\sin^2 x)}{\frac{\cos x}{\sin x}} = 2\cos^2 x \left(\frac{\sin x}{\cos x}\right)$ K1

$2\sin x \cos x = \sin 2x$ N

(b)



(ii) $p - \left(\frac{2-2\sin^2 x}{\cot x}\right) = 5$

$p - (\sin 2x) = 5$

$\sin 2x = p - 5$

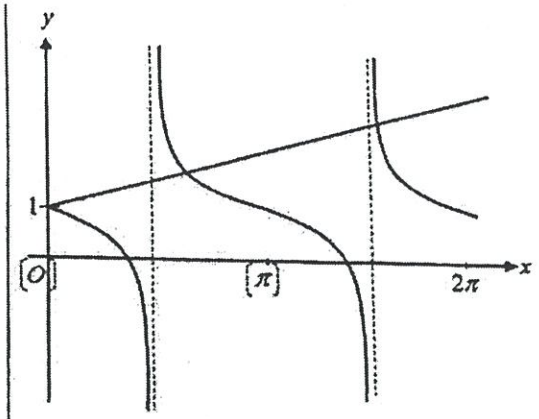
$1 + \sin 2x = p - 4$

$y = 0, p = 4$

$y = 2, p = 6$

QUESTION 4

(a)



(b) $y = \frac{x}{\pi} + 1$

Number of solutions = 3

ANSWER / JAWAPAN

SIR VEN : 012 – 351 6764
INSTA : @VENSUCIVENSUCI
TWITTER : @VENSUCI

QUESTION 5

a) $\dfrac{\cos x + \sin x}{1 + 2\sin x kos\ x + 2kos^2 x - 1}$

$\dfrac{(\cos x + \sin x)}{2\cos x(\sin x + \cos x)}$

$\dfrac{1}{2\cos x}$

$\dfrac{1}{2}\sec x$

b) $\dfrac{\cos x + \sin x}{1 + \sin 2x + \cos 2x} = \dfrac{1}{\sqrt{3}}$

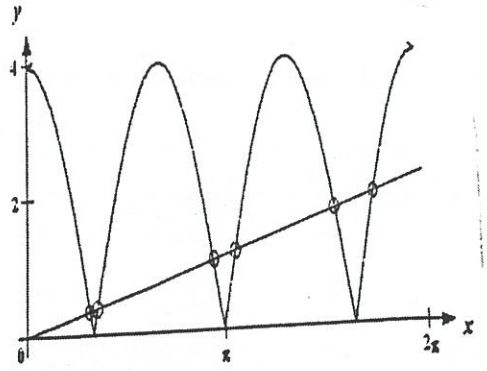
$\dfrac{1}{2\cos x} = \dfrac{1}{\sqrt{3}}$

$\cos x = \dfrac{\sqrt{3}}{2}$

$x = 30^o$

$x = 30^o, 60^o$

QUESTION 6



(a) Shape

Amplitude 4

Cycle 1.5

Modulus

(b) $y = \dfrac{x}{\pi}$

Draw a line

No of solution 6

QUESTION 7

$\dfrac{2\tan x}{1+\tan^2 x} = \dfrac{2\sin x}{\cos x} \times \dfrac{1}{\sec^2 x}$

$= \dfrac{2\sin x}{\cos x} \times \cos^2 x$

$= 2\sin x\ \cos x$

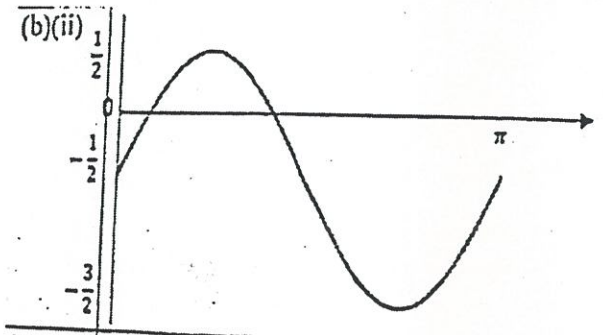
$= \sin 2x$

$\sin 2x = \dfrac{1}{2}$

$2x = \dfrac{\pi}{6}, \dfrac{5\pi}{6}, \dfrac{13\pi}{6}, \dfrac{17\pi}{6}$

$x = \dfrac{\pi}{12}, \dfrac{5\pi}{12}, \dfrac{13\pi}{12}, \dfrac{17\pi}{12}$

(b)(ii)



(b)(iii) $k = -\frac{1}{2}$

QUESTION 8

ANSWER / JAWAPAN

SIR VEN : 012 – 351 6764
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TWITTER : @VENSUCI

QUESTION 9

(a) (i)

$$2\cot x\sin^2 x = 2\left(\frac{\cos x}{\sin x}\right)(\sin^2 x)$$
$$= 2\sin x\cos x$$
$$= \sin 2x$$

(ii)

$$\sin 2x = 0.5$$
$$2x = 30^\circ, 150^\circ, 390^\circ, 510^\circ$$
$$x = 15^\circ, 75^\circ, 195^\circ, 255^\circ$$

(b)

$y = kos\ x$ **atau** $y = kos\ 2x$ **P1**

$y = |kos\ 2x|$ **P1**

$y = 2 + |kos\ 2x|$ **P1**

QUESTION 10

(a)

Use identity:

$\sin 2t = 2\sin t\cos t$

or $\cos 2t = 1 - 2\sin^2 t$

$$\frac{2\sin t(\cos t - \sin t)}{\cos t - \sin t}$$

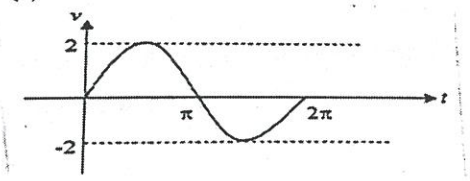
$2\sin t$

Shape: *sin t or cos t*

Amplitude=2

Cycle = 1 $0 \le t \le 2\pi$

(b)



QUESTION 11

(a) $\dfrac{\cot^2\theta - 1}{\cot^2\theta + 1}$

$$\frac{\left(\frac{\cos^2\theta}{\sin^2\theta}\right) - 1}{\left(\frac{\cos^2\theta}{\sin^2\theta}\right) + 1}$$

$$\frac{\left(\frac{\cos^2\theta - \sin^2\theta}{\sin^2\theta}\right)}{\left(\frac{\cos^2\theta + \sin^2\theta}{\sin^2\theta}\right)}$$

$\cos^2\theta - \sin^2\theta$

$\cos 2\theta$

(b) $\cos 2\theta = \dfrac{1}{\cos k\theta}$

$$\cos 2\theta = \frac{1}{\frac{1}{\sin\theta}}$$

$1 - 2\sin^2\theta = \sin\theta$

$2\sin^2\theta + \sin\theta - 1 = 0$

$(2\sin\theta - 1)(\sin\theta + 1) = 0$

$\sin\theta = \frac{1}{2}$, $\sin\theta = -1$

30° , 150° , 270°

QUESTION 12

(a)

$$y = \frac{5x}{3\pi} + 1$$

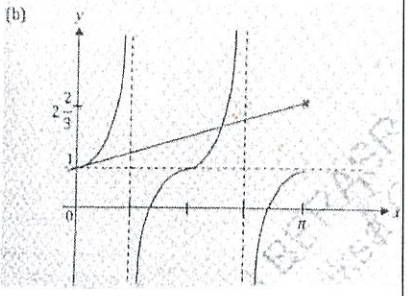
Straight line

$\dfrac{\sin 2x}{\cos 2x}$

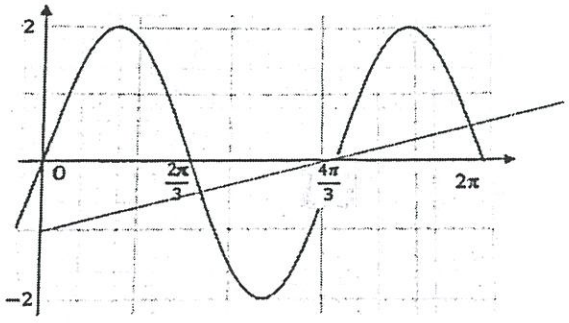
$\tan 2x$

Number of solutions = 2

(b)



QUESTION 13

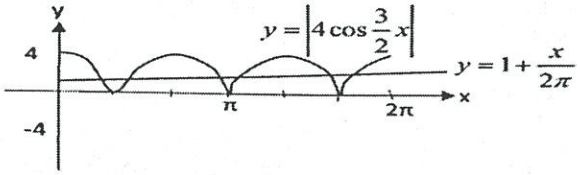


$y = \dfrac{3}{4\pi}x - 1$

No of solutions: 3

QUESTION 14

(a)



Shape (cosine)
Cycle (1.5 cycles)
Amplitude
Modulus

(b) $y = 1 + \dfrac{x}{2\pi}$

Draw line $y = 1 + \dfrac{x}{2\pi}$

No. of solutions = 6

ANSWER / JAWAPAN

SIR VEN : 012 – 351 6764
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QUESTION 15

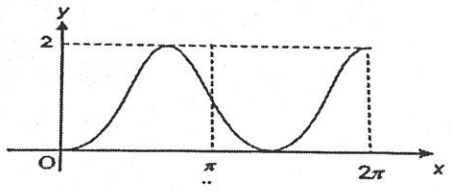
$$5\left[\frac{\sin y}{\cos y}\right]-\frac{\cos y}{\sin y}=\frac{1}{\cos y}$$

$6\sin^2 y-\sin y-1=0$
$(2\sin y-1)(3\sin y+1)=0$

$\sin y=\frac{1}{2}$ or $\sin y=-\frac{1}{3}$ $[y=19.47°]$

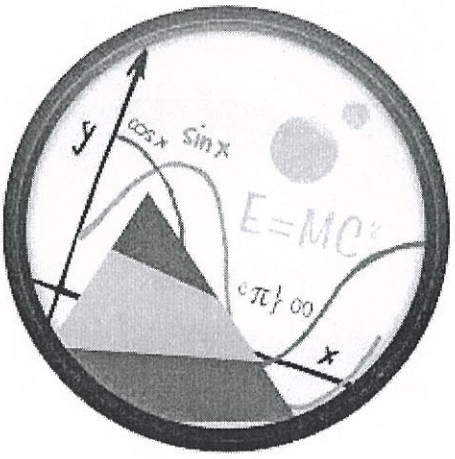
$y=30°, 150°$ $y=199.47°, 340.53°$

$y=30°, 150°, 199.47°, 340.53°$



ADDMATHS
2019

PROBABILITY DISTRIBUTION/TABURAN KEBARANGKALIAN
(10 MARKS/10 MARKAH)



QUESTION 1/ SOALAN 1

(a) The result of a survey in SMK Anakku Sayang shows that 68% of the form five students passed in an Additional Mathematics Monthly Test.
Keputusan satu kajian dalam SMK Anakku Sayang menunjukkan bahawa 68% pelajar tingkatan 5 lulus dalam satu Ujian Bulanan Matematik Tambahan.

(i) If 10 of the form five students from the school are chosen at random. Calculate the probability that at least 8 of the students passed in Additional Mathematics test.
Jika 10 orang pelajar tingkatan lima dari sekolah tersebut dipilih secara rawak, hitung kebarangkalian bahawa sekurang-kurangnya 8 orang murid lulus ujian Matematik Tambahan.

[3 marks/ *markah*]

(ii) If the total number of form five students who are taking Additional Mathematics test in the school is 85 students, find the variance number of students who failed Additional Mathematics test.
Jika seramai 85 orang pelajar tingkatan lima yang mengambil ujian Matematik Tambahan di sekolah tersebut, kirakan varians bilangan pelajar yang gagal ujian Matematik Tambahan.

[2 marks/ *markah*]

(b) The height of students in Form 5 Matahari is normally distributed with mean 155 cm and variance 225 cm^2.
Ketinggian murid-murid dalam Tingkatan 5 Matahari bertabur secara normal dengan min 155 cm dan varians 225 cm^2.

(i) If a student is chosen at random from the class, find the probability that the height of students is less than 148 cm.
Jika seorang pelajar dipilih secara rawak daripada kelas itu, cari kebarangkalian bahawa ketinggian pelajar itu kurang daripada148 cm.

[2 marks/ *markah*]

(ii) Find the number of students which is chosen randomly falls in the range of 140 cm and 150 cm, if the total number of students is 35 students.

Cari bilangan murid yang dipilih secara rawak mempunyai ketinggian di antara 140 cm dan 150 cm, sekiranya jumlah murid kelas tersebut ialah 35 orang.

[3 marks/ *markah*]

QUESTION 2/ SOALAN 2

(*a*) In a survey, it is found that 125 out of 500 students in SMK Sri Binjai got a scholarship. If 10 students from the school are chosen at random, calculate the probability at exactly 3 students got scholarship. [2 marks]

Dalam satu kaji selidik, 125 *daripada* 500 *orang pelajar SMK Sri Binjai memperolehi biasiswa. Jika* 10 *orang pelajar dipilih secara rawak, hitung kebarangkalian tepat* 3 *orang mendapat biasiswa.* [2 *markah*]

(*b*) The masses of teachers in SMK Sri Handalan has a normal distribution with a mean 54 kg and a variance 144 kg^2.
Jisim bagi guru-guru di SMK Sri Handalan adalah mengikut satu taburan normal dengan min 54 *kg dan varians* 144 kg^2.

(i) Calculate the probability that a teacher chosen at random will have a mass more than 60 kg. [2 marks]

Hitung kebarangkalian bahawa seorang pelajar yang dipilih secara rawak mempunyai jisim melebihi 60 *kg.* [2 *markah*]

(ii) Given that 70% of teachers in the school have mass more than *m* kg. Find the value of *m*. . [3 marks]
Diberi bahawa 70% *guru-guru di sekolah itu mempunyai jisim melebihi m* kg.
Cari nilai bagi m. . [3 *markah*]

QUESTION 3/ SOALAN 3

(a) The probability of a student walks to school is p. A sample of 6 students is selected at random.

Kebarangkalian seorang murid berjalan kaki ke sekolah ialah p. Suatu sampel 6 orang murid dipilih secara rawak.

(i) If the probability of all the students walk to school is 0.046656, find the value of p.

Jika kebarangkalian bagi 6 orang murid itu berjalan kaki ke sekolah ialah 0.046656, *cari nilai p.*

(ii) Find the probability that more than 4 students walk to school.

Cari kebarangkalian bahawa lebih daripada 4 orang murid berjalan kaki ke sekolah.

[5 marks]

[5 *markah*]

QUESTION 3/ SOALAN 3

(b) Diagram 7 shows a standard normal distribution graph representing the volume of chilli sauce in bottles produced by a factory.
Rajah 7 menunjukkan satu graf taburan normal piawai yang mewakili isipadu sos cili dalam botol yang dihasilkan oleh sebuah kilang.

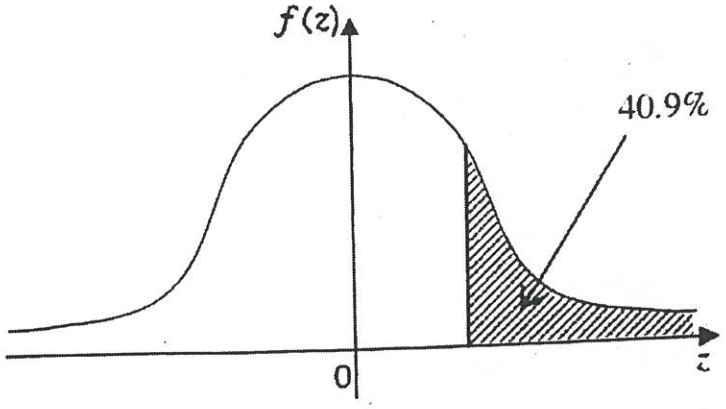


Diagram 7
Rajah 7

It is given the mean is 900 m^3 and variance is 289 m^6. If the percentage of the volume more than V is 40.9%, find
Diberi bahawa min ialah 900 m^3 *dan variansnya ialah* 289 m^6. *Jika peratus isipadu yang melebihi V ialah* 40.9%, *cari*

(i) the value of V,
nilai bagi V,

(ii) the probability that the volume between 866 m^3 and 951 m^3
kebarangkalian bahawa isi padu antara 866 m^3 dan 951 m^3

[5 marks]
[5 *markah*]

QUESTION 4/ SOALAN 4

(*a*) A box contains two types of oranges, M and N in the ratio of 3 : 4. If 7 oranges are picked at random from the box, find the probability that

Sebuah kotak mengandungi dua jenis oren, M dan N dengan nisbah 3 : 4. *Jika* 7 *biji oren dipilih secara rawak daripada kotak itu, cari kebarangkalian bahawa*

(i) 6 chosen oranges are type N,

6 *biji oren yang dipilih adalah jenis* N,

(ii) at least 2 oranges of type M are picked.

sekurang-kurangnya 2 *biji oren jenis* M *dipilih.*

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

(*b*) The time taken to answer the formative test of Additional Mathematics Form 5 follows a normal distribution with a mean of 90 minutes and a standard deviation of 12 minutes.

Masa yang diambil untuk menjawab ujian formatif Matematik Tambahan Tingkatan 5 *mengikut taburan normal dengan min* 90 *minit dan sisihan piawai* 12 *minit.*

(i) If a student is randomly selected, find the probability that he takes less than 81 minutes or more than 108 minutes to answer the test.

Jika seorang pelajar dipilih secara rawak, cari kebarangkalian bahawa pelajar tersebut mengambil masa kurang daripada 81 *minit atau lebih daripada* 108 *minit untuk menjawab ujian tersebut.*

(ii) It is found that 5% of students take less than t minutes to answer the test, find the value of t.

Didapati bahawa 5% *daripada pelajar itu mengambil masa kurang daripada t minit untuk menjawab ujian tersebut, cari nilai t.*

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

QUESTION 5/ SOALAN 5

a) In a game, a player has to guess the number of marbles in a container. Given the probability of making a correct guess is p.
Di dalam suatu permainan, seorang pemain mesti meneka bilangan guli di dalam suatu bekas. Diberi kebarangkalian membuat satu tekaan yang betul adalah p.

i) Find the value of p and the number of guesses required so that the mean and standard deviation for the number of correct guesses are 36 and $\frac{5\sqrt{5}}{2}$ respectively.
Cari nilai p dan bilangan tekaan yang perlu supaya nilai mean dan sisihan piawai bagi bilangan tekaan yang betul adalah 36 *dan* $\frac{5\sqrt{5}}{2}$ *masing-masing.*

ii) If a player makes 6 guesses, find the probability that at least 5 of them are wrong.
Sekiranya seorang pemain membuat 6 tekaan, cari kebarangkalian sekurang-kurangnya 5 daripadanya adalah salah.

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

b) Diagram 5 shows a probability distribution graph for a random variable X that is normally distributed with a standard deviation of 5. X represents the height, in cm of ladies. The graph is symmetrical about the vertical line PQ.
Rajah 5 menunjukkan graf taburan kebarangkalian bagi pemboleh ubah rawak X yang bertaburan secara normal dengan sisihan piawai 5. X mewakili tinggi, dalam cm, bagi wanita. Grafnya adalah simetri pada garis menegak PQ.

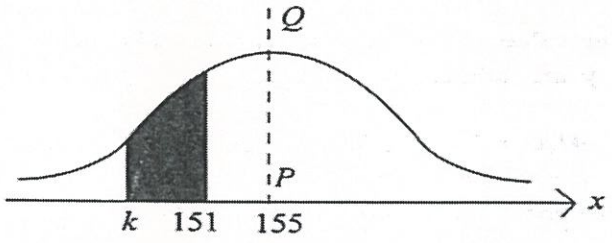


Diagram 5
Rajah 5

i) If the z-score obtained by standardizing the value of k is -1, find the value of k.
Sekiranya skor-z yang diperoleh dengan mempiawaikan nilai k ialah -1, *cari nilai k.*

ii) The height qualification for a female flight attendant is at least 158 cm. 100 ladies tested a new product to increase their height. After six months of consuming the product, estimate the number of ladies who will achieve the height qualification to be a flight attendant. [5 *marks*]
Kelayakan ketinggian bagi seorang atendan penerbangan wanita ialah sekurang-kurangnya 158 cm. 100 *orang wanita mengambil produk baru untuk meningkatkan ketinggian mereka. Selepas enam bulan mengambil produk itu, anggarkan bilangan wanita yang akan mencapai kelayakan tinggi sebagai atendan penerbangan.* [5 *markah*]

QUESTION 6/ SOALAN 6

A survey was conducted on senior citizens aged 60 years and above in Taman Murni.

Satu tinjauan dijalankan berkenaan warga emas iaitu mereka yang berusia 60 tahun dan ke atas di Taman Murni.

(a) It is found that the mean of the number of senior citizens is 320, the standard deviation is 8 and the probability that a resident is categorized as senior citizens is p.

Didapati bahawa min bilangan warga emas ialah 320, sisihan piawainya ialah 8 dan kebarangkalian seorang penduduk dikategorikan sebagai warga emas ialah p.

(i) Find the value of p.

Cari nilai p.

(ii) If 10 peoples from Taman Murni are chosen at random, find the probability that more than 2 peoples are **not** senior citizens.

*Jika10 orang penduduk dari Taman Murni dipilih secara rawak, cari kebarangkalian lebih daripada 2 orang penduduk **bukan** warga emas.*

[6 *marks*]
[6 *markah*]

(b) The age of the customer of the restaurant in Taman Murni normally distributed with mean 34.5 and standard deviation 12.75. If a senior citizen is given a free meal of RM13.50, calculate the cost incurred by the restaurant owner if there are 400 customers on that day.

Umur pelanggan sebuah restoran di Taman Murni adalah mengikut taburan normal dengan min 34.5 dan sisihan piawai 12.75. Jika seorang warga emas diberi makanan percuma yang bernilai RM13.50, hitung kos yang ditanggung oleh pemilik restoran itu sekiranya terdapat 400 orang pengunjung pada hari tersebut.

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

QUESTION 7/ SOALAN 7

(a) A private veterinary centre receives customers that 30% of them are rabbit owners.
Sebuah pusat veterinar swasta menerima pelanggan yang 30% daripadanya adalah pemilik arnab.

(i) If 8 customers of the veterinary centre were taken randomly, find the probability that at least two of the customers are owners of rabbits.
Jika 8 orang pelanggan pusat veterinar itu diambil secara rawak, carikan kebarangkalian sekurang-kurangnya dua pelanggan adalah pemilik arnab.

(ii) If the variance of the number of customers come to the veterinanry centre with rabbit is 168, what is the number of the customers of the veterinary centre?
Jika varians bagi bilangan pelanggan yang datang ke pusat veterinar tersebyt bersama dengan arnab ialah 168, berapakah bilangan pelanggan pusat veterinar itu?

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

(b) A type of flea medicine for cats is found to have a life span that is normally distributed with mean 600 hours and standard deviation of 40 hours.
Sejenis ubat kutu bagi kucing didapati mempunyai tempoh hayat yang bertaburan secara normal dengan min 600 jam dan sisihan piawai 40 jam.

(i) If a bottle of flea medicine is chosen randomly, calculate the probability that the flea medicine has a life span of more than 580 hours.
Jika sebotol ubat kutu dipilih secara rawak, hitungkan kebarangkalian bahawa ubat kutu tersebut mempunyai tempoh hayat lebih daripada 580 jam.

(ii) If 121 out of 500 bottles of the flea medicine have a life span of more than m hours, find the value of m.
Jika 121 daripada 500 botol ubat kutu tersebut mempunyai tempoh hayat lebih daripada m jam, carikan nilai m.

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

QUESTION 8/ SOALAN 8

(a) Usually, when Razman threw his fishing rod, 65% of his thrown will catch the fish.
Kebiasaannya, apabila Razman membaling joran, 65 % daripada balingannya mendapat ikan.

Find,
Cari,

(i) the probability Razman will get at least 5 fishes in 6 thrown,
kebarangkalian Razman mendapat sekurang-kurangnya 5 ekor ikan dengan 6 balingan,

(ii) the number thrown made by Razman so that the probability of getting at least a fish is greater than 0.94.
bilangan balingan yang dibuat oleh Razman supaya kebarangkalian mendapat sekurang-kurangnya seekor ikan lebih daripada 0.94.

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

(b) The age of the visitors to a restaurant is normally distributed with a mean of 23.5 years old and a standard deviation of 4.1 years old.
Umur pengunjung sebuah restoran bertabur secara normal dengan min 23.5 tahun dan sisihan piawai 4.1 tahun.

Find,
Cari,

(i) the probability that a visitor chosen randomly from the restaurant is of age between17 and 23 years old,
kebarangkalian bahawa seorang pengunjung yang dipilih secara rawak di restoran itu berumur di antara 17 hingga 23 tahun,

(ii) the percentage number of visitors of age more than 17 years old.
peratus bilangan pengunjung yang berumur lebih daripada 17 tahun.

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

QUESTION 9/ SOALAN 9

(a) A survey is carried out in Kangar . The result shows that 2 out of every 5 houses owned home internet connection . If 8 houses in Kangar are chosen at random. Find the probability that.

Dalam suatu kajian yang dijalankan di Kangar . Keputusan menunjukkan 2 daripada setiap 5 rumah memiliki sambungan internet rumah . Jika 8 buah rumah di Kangar dipilih secara rawak . Cari kebarangkalian bahawa

(i) exactly 3 houses owned home internet connection,

Tepat 3 buah rumah memiliki sambungan internet rumah,

(ii) more than 5 houses owned home internet connection.

Lebih daripada 5 buah memiliki sambungan internet rumah.

[5 marks / 5 markah]

(b) A study on the body mass of a group of teachers is conducted and it is found that the mass of the teachers is normally distributed with a mean of 70 kg and a variance of 256 kg^2

Suatu kajian ke atas jisim badan sekumpulan guru dijalankan dan didapati bahawa jisim guru bertabur secara normal dengan min 70 kg dan varians 256 kg^2.

(i) If a teacher is selected randomly , calculate the probability that his mass is more than 80 kg.

Jika seorang guru dipilih secara rawak , hitungkan kebarangkalian bahawa jisimnya lebih daripada 80 kg.

(ii) Given that 28 % of the teachers weight less than m kg , find the value of m.

Diberi bahawa 28 % daripada jumlah guru mempunyai jisim kurang daripada m kg , cari nilai m.

QUESTION 10/ SOALAN 10

(*a*) In a survey, at a university, 2 out of 5 students joined the charity work organized in conjunction with the independence month.

Dalam suatu kajian, di sebuah universiti, didapati 2 *daripada* 5 *orang pelajar menyertai kerja amal yang dianjurkan sempena bulan kemerdekaan.*

(i) If 6 students are randomly selected from the university, find the probability of 3 or more to join the independence month charity work.

Jika 6 *orang pelajar dipilih secara rawak dari universiti itu, cari kebarangkalian* 3 *orang atau lebih menyertai kerja amal bulan kemerdekaan.*

(ii) If there are 3270 students in the university, calculate the mean and standard deviation for the number of students joining the independence month charity work.

Sekiranya terdapat 3270 *orang pelajar di universiti itu, hitung min dan sisihan piawai bagi bilangan pelajar yang menyertai kerja amal bulan kemerdekaan itu.*

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

(*b*) In a survey, we found a box of goods at a collection centre poslaju has normal distribution with mean 10 kg and variance 16 kg^2.

Dalam satu kajian, didapati berat sekotak barangan di sebuah pusat pengumpulan poslaju mempunyai taburan normal dengan min 10 kg *dan varians* 16 kg^2.

(i) One package is taken randomly from the centre.
Find the probability that the package has a mass of less than 13 kg.

Satu bungkusan diambil secara rawak dari pusat itu.
Cari kebarangkalian bahawa bungkusan itu mempunyai jisim kurang daripada 13 kg.

(ii) State the ratio of packages in a random sample of 145 packets of mass less than 9·6 kg to mass greater than 13·6 kg.

Nyatakan nisbah bungkusan dalam satu sampel rawak 145 *bungkusan yang jisimnya kurang daripada* 9·6 kg *kepada jisim melebihi* 13·6 kg.

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

QUESTION 11/ SOALAN 11

(*a*) Given 0·75 people in a village will be selected to join the charity run. A sample of 15 people was randomly selected from the village.

Diberi 0·75 *daripada penduduk di sebuah kampung akan terpilih untuk menyertai larian amal. Satu sampel yang terdiri daripada* 15 *orang dipilih secara rawak dari kampung itu.*

(i) Find the probability that at least 12 people will be selected.

Cari kebarangkalian bahawa sekurang-kurangnya 12 *orang akan terpilih.*

(ii) Find the mean of the selected population.

Cari min bagi bilangan penduduk yang terpilih.

[5 *marks*]

[5 *markah*]

(*b*) The mass of a talapia fish produced in a fish breeding pond is normally distributed with a mean of 370 g and a variance of 64 g^2. Talapia fish whose mass is between 355 g and 380 g will be sold.

Jisim sejenis ikan talapia yang dihasilkan di sebuah kolam ternakan ikan adalah bertaburan secara normal dengan min 370 g *dan varians* 64 g^2. *Ikan talapia yang jisimnya antara* 355 g *hingga* 380 g *akan dijual.*

(i) If a talapia is taken at random, find the probability that the fish will be sold.

Jika seekor ikan talapia diambil secara rawak, cari kebarangkalian bahawa ikan itu akan dijual.

(ii) Find the number of fish will be sold if the fish pond produces 3 130 fish.

Cari bilangan ikan yang akan dijual jika kolam ikan itu menghasilkan 3 130 *ekor ikan.*

[5 *marks*]

[5 *markah*]

QUESTION 12/ SOALAN 12

(*a*) Probability Iqbal gets a fish from each throw is 40%. Calculate
Kebarangkalian Iqbal mendapat ikan dari setiap balingan adalah 40%. *Hitungkan*

(i) the probability Iqbal will catch exactly 6 fishes from 8 throws,
kebarangkalian Iqbal mendapat tepat 6 *ekor ikan daripada* 8 *balingan*,

(ii) the standard deviation of the distribution if Iqbal make 30 throws.
sisihan piawai taburan itu jika Iqbal membuat 30 *balingan.*

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

(*b*) The mass of the fish caught by Iqbal follows a normal distribution with mean 300g and a standard deviation of 50g.

Berat ikan yang ditangkap oleh Iqbal adalah mengikut taburan normal dengan min 300g *dan sisihan piawai* 50g.

Find
Carikan

(i) the probability that a fish caught Iqbal has a mass of not more than 400g.
kebarangkalian ikan yang ditangkap oleh Iqbal berjisim tidak melebihi 400g.

(ii) the value of h if 35.2% of the fishes caught by Iqbal has mass of less than h g.

nilai h jika 35.2% *daripada ikan yang ditangkap oleh Iqbal mempunyai jisim kurang dari h* g.

[6 *marks*]
[6 *markah*]

QUESTION 13/ SOALAN 13

(a) In a study carried out in a college, one out of three students surf the internet everyday.
Dalam satu kajian yang dilakukan di sebuah kolej, didapati seorang daripada tiga orang pelajar melayari internet setiap hari.

(i) If five of the students is selected by random from the college, find the probability that two or more of them surf the internet everyday.
[2 marks]

Jika lima orang pelajar dipilih secara rawak daripada kolej itu, carikan kebarangkalian bahawa dua orang atau lebih daripada mereka melayari internet setiap hari.
[2 markah]

(ii) If a sample of 57 students is selected randomly from the college, calculate the mean and standard deviation of the number of students that surf the internet everyday.
[2 marks]

Sekiranya satu sample seramai 57 orang pelajar dipilih secara rawak dari kolej itu, hitungkan min dan sisihan piawai bilangan pelajar yang melayari internet setiap hari.
[2 markah]

(b) Besides that, another study about the grade point average of the students for first semester examination is being carried out. The study shows that the grade point average of the students in the college has a normal distribution with a mean of 3.672 and a varians of 0.2704.
Di samping itu, satu kajian lain tentang gred purata pelajar untuk peperiksaan Semester 1 telah dilaksanakan. Kajian ini mendapati gred purata pelajar di kolej itu mempunyai taburan normal dengan min 3.672 dan varians 0.2704

(i) If a student is selected by random from the college, find the probability that the student has a grade point average more than 3.75.
[3 marks]
Jika seorang pelajar dipilih secara rawak dari kolej itu, carikan kebarangkalian bahawa pelajar itu mempunyai gred purata lebih daripada 3.75.
[3 markah]

(ii) Find the percentage for the number of students with a grade point average in between of 3.0 and 3.75.
[3 marks]

Carikan peratus bagi bilangan pelajar yang gred puratanya antara 3.0 dan 3.75
[3 markah]

QUESTION 14/ SOALAN 14

(a) In a basket of mangoes, it is found that 15% of the mangoes are rotten.
Di dalam sebakul mangga, 15% daripada buah mangga tersebut didapati rosak.

If 8 mangoes are chosen at random from the basket, calculate the probability that at least 6 mangoes are good. [4 marks]
Sekiranya 8 biji mangga dipilih secara rawak daripada bakul tersebut, hitung kebarangkalian bahawa sekurang-kurangnya 6 biji mangga adalah dalam keadaan baik. [4 *markah*]

(b) In a school, 180 students sit for Additional Mathematics examination. The marks obtained is normally distributed with mean 48 marks and standard deviation of 6 marks.
Dalam sebuah sekolah, 180 pelajar menduduki peperiksaan Matematik Tambahan. Markah yang diperolehi didapati tertabur secara normal dengan min 48 markah dan sisihan piawai 6 markah.

(i) If a student is chosen at random, find the probability that the student obtained the marks between 35 mark and 66 mark. Hence, find the number of students that obtained the marks between 35 mark ang 66 mark.
Sekiranya seorang pelajar dipilih secara rawak, cari kebarangkalian pelajar tersebut mendapat markah di antara 35 markah dan 66 markah. Seterusnya, cari bilangan pelajar yang mendapat markah di antara 35 markah dan 66 markah.

(ii) Students who failed have to attend remedial classes. If 5% of the students attended remedial classes, find the passing mark for Additional Mathematics examination.
Pelajar yang gagal dikehendaki menghadiri kelas pemulihan. Didapati 5% daripada pelajar menghadiri kelas pemulihan, cari markah lulus untuk peperiksaan Matematik Tambahan. [6 marks]
[6 *markah*]

QUESTION 15/ SOALAN 15

(a) Diagram 8(a) shows some baskets of durians. In a basket, 60% of durians are in good condition. Ahmad chooses 4 durians from a basket.

Rajah 8(a) *menunjukkan beberapa bakul buah durian. Dalam sebuah bakul,* 60% *durian adalah elok. Ahmad memilih* 4 *biji durian dari sebuah bakul.*

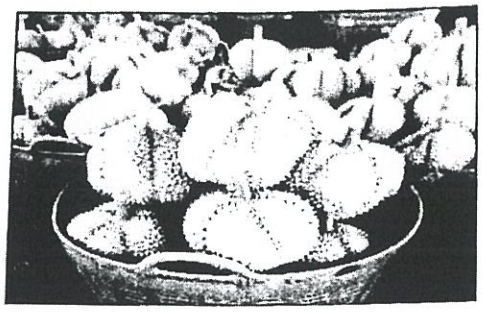


Diagram 8(a)
Rajah 8(a)

Draw a binomial distribution graph of a variable X represents the number of good durian chosen by Ahmad.

Lukis sebuah graf taburan binomial bagi pembolehubah X *mewakili bilangan durian elok yang dipilih oleh Ahmad.*

[5 marks]
[5 *markah*]

(b) Diagram 8(b) shows a normal distribution curve such that $X \sim N(27, 6.4^2)$
Rajah 8(b) *menunjukkan satu lengkung taburan normal dengan keadaan* $X \sim N(27, 6.4^2)$.

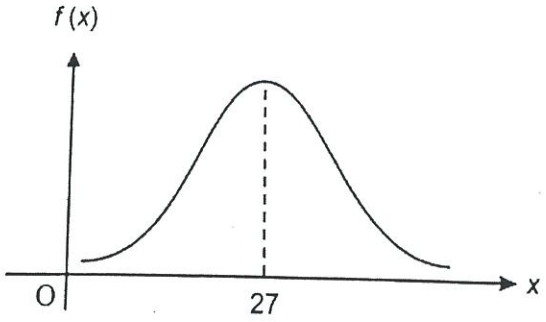


Diagram 8(b)
Rajah 8(b)

Find
Cari

(i) the value of X if the z-score is 0.85,
nilai X *jika skor-z ialah* 0.85,

(ii) $P(Z < 0.85)$.

[5 marks]
[5 *markah*]

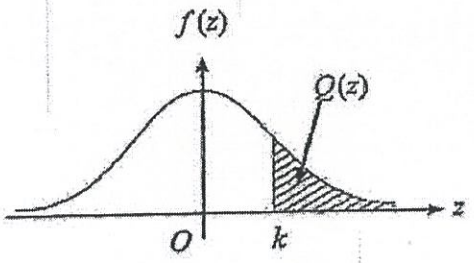
THE UPPER TAIL PROBABILITY Q(z) FOR THE NORMAL DISTRIBUTION N(0,1)
KEBARANGKALIAN HUJUNG ATAS Q(z) BAGI TABURAN NORMAL N(0,1)

z	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
											TOLAK								
0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641	4	8	12	16	20	24	28	32	36
0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247	4	8	12	16	20	24	28	32	36
0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859	4	8	12	15	19	23	27	31	35
0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483	4	7	11	15	19	22	26	30	34
0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121	4	7	11	14	18	22	25	29	32
0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776	3	7	10	14	17	20	24	27	31
0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451	3	7	10	13	16	19	23	26	29
0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148	3	6	9	12	15	18	21	24	27
0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867	3	5	8	11	14	16	19	22	25
0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611	3	5	8	10	13	15	18	20	23
1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379	2	5	7	9	12	14	16	19	21
1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170	2	4	6	8	10	12	14	16	18
1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985	2	4	6	7	9	11	13	15	17
1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823	2	3	5	6	8	10	11	13	14
1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681	1	3	4	6	7	8	10	11	13
1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559	1	2	4	5	6	7	8	10	11
1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455	1	2	3	4	5	6	7	8	9
1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367	1	2	3	4	4	5	6	7	8
1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294	1	1	2	3	4	4	5	6	6
1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233	1	1	2	2	3	4	4	5	5
2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183	0	1	1	2	2	3	3	4	4
2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143	0	1	1	2	2	2	3	3	4
2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110	0	1	1	1	2	2	2	3	3
2.3	.0107	.0104	.0102								0	1	1	1	1	2	2	2	2
				.$0^3$990	.$0^3$964	.$0^3$939	.$0^3$914				3	5	8	10	13	15	18	20	23
								.$0^3$889	.$0^3$866	.$0^3$842	2	5	7	9	12	14	16	18	21
2.4	.$0^3$820	.$0^3$798	.$0^3$776	.$0^3$755	.$0^3$734						2	4	6	8	11	13	15	17	19
						.$0^3$714	.$0^3$695	.$0^3$676	.$0^3$657	.$0^3$639	2	4	6	7	9	11	13	15	17
2.5	.$0^3$621	.$0^3$604	.$0^3$587	.$0^3$570	.$0^3$554	.$0^3$539	.$0^3$523	.$0^3$508	.$0^3$494	.$0^3$480	2	3	5	6	8	9	11	12	14
2.6	.$0^3$466	.$0^3$453	.$0^3$440	.$0^3$427	.$0^3$415	.$0^3$402	.$0^3$391	.$0^3$379	.$0^3$368	.$0^3$357	1	2	3	5	6	7	8	9	10
2.7	.$0^3$347	.$0^3$336	.$0^3$326	.$0^3$317	.$0^3$307	.$0^3$298	.$0^3$289	.$0^3$280	.$0^3$272	.$0^3$264	1	2	3	4	5	6	7	8	9
2.8	.$0^3$256	.$0^3$248	.$0^3$240	.$0^3$233	.$0^3$226	.$0^3$219	.$0^3$212	.$0^3$205	.$0^3$199	.$0^3$193	1	1	2	3	4	4	5	6	6
2.9	.$0^3$187	.$0^3$181	.$0^3$175	.$0^3$169	.$0^3$164	.$0^3$159	.$0^3$154	.$0^3$149	.$0^3$144	.$0^3$139	0	1	1	2	2	3	3	4	4
3.0	.$0^3$135	.$0^3$131	.$0^3$126	.$0^3$122	.$0^3$118	.$0^3$114	.$0^3$111	.$0^3$107	.$0^3$104	.$0^3$100	0	1	1	2	2	2	3	3	4

For negative z use relation:
Bagi z negatif guna hubungan:
$Q(z) = 1 - Q(-z) = P(-z)$

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

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



Example / *Contoh*:
If $X \sim N(0, 1)$, then
Jika $X \sim N(0, 1)$, *maka*
$P(X > k) = Q(k)$
$P(X > 2.1) = Q(2.1) = 0.0179$

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QUESTION 1

QUESTION 2

(a) $p = 0.25$ or $q = 0.75$

$P(X = 3) = {}^{10}C_3 (0.25)^3 (0.75)^7$

0.2503

(b) (i) $P(X > 60) = P\left(Z > \frac{60 - 54}{12}\right)$

$= 0.3085$

(ii) 0.524 or -0.524

$\frac{m - 54}{12} = -0.524$

$m = 47.71$

QUESTION 3

(a) (i) $P(X = 6) = {}^6C_6 (p)^6 (1-p)^0$ atau $P(X = 6) = {}^6C_6 (p)^6 (q)^0$

${}^6C_6 (p)^6 (1-p)^0 = 0.046656$ K1

$p = 0.6$ N1

ii) $P(x > 4) = P(X = 5) + P(X = 6)$ P1

$= {}^6C_5 (0.6)^5 (0.4)^1 + {}^6C_6 (0.6)^6 (0.4)^0$ K1

$= 0.2333$ N1

(b) (i) $P(X > V) = 0.409$

$P\left(z > \frac{V - 900}{17}\right) = 0.409$

$z = 0.23$ N1

$\frac{v - 900}{17} = 0.23$ K1

$V = 903.91$ N1

(ii) $P(866 < X < 951)$

$= P\left(\frac{866 - 900}{17} < z < \frac{951 - 900}{17}\right)$ K1

$= P(-2 < z < 3)$

$= 0.9759$ N1

QUESTION 4

(a) (i) ${}^7C_4 \left(\frac{4}{7}\right)^4 \left(\frac{3}{7}\right)^1$

0.1044

(ii) ${}^7C_0 \left(\frac{3}{7}\right)^0 \left(\frac{4}{7}\right)^7$ or ${}^7C_1 \left(\frac{3}{7}\right)^1 \left(\frac{4}{7}\right)^6$

$1 - {}^7C_0 \left(\frac{3}{7}\right)^0 \left(\frac{4}{7}\right)^7 - {}^7C_1 \left(\frac{3}{7}\right)^1 \left(\frac{4}{7}\right)^6$ or

${}^7C_2 \left(\frac{3}{7}\right)^2 \left(\frac{4}{7}\right)^5 + {}^7C_3 \left(\frac{3}{7}\right)^3 \left(\frac{4}{7}\right)^4 + \ldots + {}^7C_7 \left(\frac{3}{7}\right)^7 \left(\frac{4}{7}\right)^0$

0.8757

(b) (i) $\frac{81 - 90}{12}$ or $\frac{108 - 90}{12}$

0.2934

(ii) $[-]1.645$

$\frac{t - 90}{12} = -1.645$

70.26

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QUESTION 5

(a)(i)	$np = 36$ or $npq = \left(\frac{5\sqrt{5}}{2}\right)^2$
	$q = 0.8681$
	$p = 0.1319$ and $n = 272$
(a)(ii)	$P(X = 5) + P(X = 6)$
	${}^6C_5\ (0.8681)^5(0.1319)^1 + {}^6C_6\ (0.8681)^6(0.1319)^0$
	0.8181
(b)(i)	$\frac{k-155}{5} = -1$
	150
(b)(ii)	$P\left(Z > \frac{158-155}{5}\right)$
	0.2743
	0.2743 x 100
	27

QUESTION 6

(a)

(i) $np = 320, npq = 64$

$320q = 64$

$q = 0.2$

$p = 1 - 0.2$

$p = 0.8$

(ii) $n = 10, p = 0.2, q = 0.8$

$P(X > 2) = 1 - \left({}^{10}C_2 \times 0.2^2 \times 0.8^8\right) - \left({}^{10}C_1 \times 0.2^1 \times 0.8^9\right)$

$-\left({}^{10}C_0 \times 0.2^0 \times 0.8^{10}\right)$

$P(X > 2) = 0.3222$

(b) $P\left(Z > \frac{60-34.5}{12.75}\right)$

$P(Z > 2) = 0.02275$

$0.02275 = \frac{x}{400}$

RM13.50×9

RM121.50

QUESTION 7

(a)(i)

$P(x \geq 2) = 1 - P(x = 1) - P(x = 0)$

$1 - {}^8C_0\,(0.3)^0\,(0.7)^8 - {}^8C_1\,(0.3)(0.7)^7$

$= 0.7447$

(ii) $n(0.3)(0.7) = 168$

$n = 800$

(b)(i) $P(x > 580) = P\left(z > \frac{580 - 600}{40}\right)$

$= 0.69146$

(ii) $\frac{121}{500}$

$\frac{m - 600}{40} = 0.7$

$m = 628$

QUESTION 8

(a)

i. 0.3191

ii. $n = 3$

(b)

i. 0.3950

ii. 94.35%

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QUESTION 9

(a)(i) Use ${}^nC_r(p)^r(q)^{n-r}$, $p+q=1$ **P1**

Substitute $X=3$ into ${}^8C_3(0.4)^3(0.6)^5$ **K1**

0.2787 **N1**

(ii) Write $P(X=6)+P(X=7)+P(X=8)$ **K1**

${}^8C_6(0.4)^6(0.6)^2 + {}^8C_7(0.4)^7(0.6)^1 + {}^8C_8(0.4)^8(0.6)^0$

0.04981 **N1**

(b)(i) $P\left(z > \frac{80-70}{16}\right)$ or $P(z > 0.625)$ **K1**

0.266 **N1**

(ii) ± 0.583 **P1**

$\frac{m-70}{16} = -0.583$ **K1**

$m = 60.67$ **N1**

QUESTION 10

a) $p = \frac{2}{5}$ or $q = \frac{3}{5}$

(i) 1- P (X=0) – P (X=1) – P (X=2) *or*
1- 0.0467 – 0.1866 – 0.31104
0.4557

(ii) 1308

σ = 28.01

b)(i) $\frac{13-10}{4}$ @ 0.75 *seen*

0.7734

(ii) P ($X > 136$) *or* P ($X < 9.6$)
0.1841 x 145 or 0.4602 x 145

13: 33

QUESTION 11

(a) $p = 0.75$ or $q = 0.25$ or

${}^{15}C_r(0.75)^r(0.25)^{n-r}$

(i) $P(X \geq 12)$
$P(X=12)+P(X=13)+P(X=14)+P(X=15)$
0.4 613

(ii) $\mu = 15 \times 0.75$
11.25

(b)(i) $\mu = 370$ $\sigma = 8$

$P\left(\frac{355-370}{8} < Z < \frac{380-370}{8}\right)$ or $P(-1.875 < Z < 1.25)$

0.8641 0.86396

(ii) 0.8641 x 3130

2704

QUESTION 12

(a) (i) ${}^8C_6(0.4)^6(0.6)^2$

0.04129

(ii) $\sqrt{30(0.4)(0.6)}$

2.683

(b) (i) $z = \frac{400-300}{50}$

$1 - P(z > 2)$

0.9772

(ii) $z = -0.38$

$\frac{h-300}{50} = -0.38$

$h = 281$

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QUESTION 13

(i) $P(x \geq 2) = 1 - P(x = 1) - P(x = 0)$

$= 1 - {}^5C_1\left(\frac{1}{3}\right)^1\left(\frac{2}{3}\right)^4 - {}^5C_0\left(\frac{1}{3}\right)^0\left(\frac{2}{3}\right)^5$

$= \frac{131}{243}$ atau 0.5391

(ii) $\mu = 19$,

$\sigma = 3.559$

(b) (i) $P(x > 3.75)$

$= P\left(z > \frac{3.75-3.672}{\sqrt{0.2704}}\right)$

$= P(z > 0.15)$

$= 0.4404$

(ii) $P(3.0 < x < 3.75)$

$= P\left(\frac{3.0-3.672}{\sqrt{0.2704}} < x < \frac{3.75-3.672}{\sqrt{0.2704}}\right)$

$= P(-1.292 < z < 0.15)$

$= 1 - 0.4404 - 0.0981$

$= 0.4615$

$= 46.15\ \%$

QUESTION 14

(a)

Use p=0.85 and q=0.15

${}^8C_6(0.85)^6(0.15)^2$ OR ${}^8C_7(0.85)^7(0.15)^1$ OR ${}^8C_8(0.85)^8(0.15)^0$

$P(X \geq 6) = P(X = 6) + P(X = 7) + P(X = 8)$

0.8948

(b)(i) $P(35 \leq X \leq 66) = P\left(\frac{35-48}{6} \leq Z \leq \frac{66-48}{6}\right)$

$= P(-2.167 \leq Z \leq 3)$

$= 0.9835$

0.9835 X 180 = 177

(ii) $P(X \leq m) = 0.05$

$\frac{m-48}{6} = -1.645$

$m = 38.13$

QUESTION 15

(a)

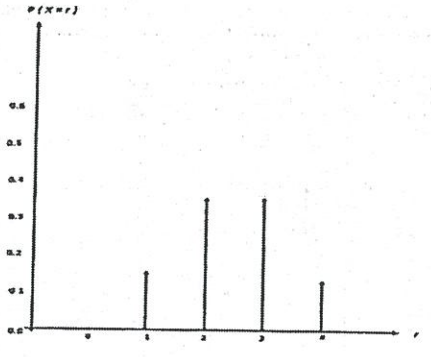
$P(X = 0) = {}^4C_0(0.60)^0(0.40)^4 = 0.0256$

$P(X = 1) = {}^4C_1(0.60)^1(0.40)^3 = 0.1536$

$P(X = 2) = {}^4C_2(0.60)^2(0.40)^2 = 0.3456$

$P(X = 3) = {}^4C_3(0.60)^3(0.40)^1 = 0.3456$

$P(X = 4) = {}^4C_4(0.60)^4(0.40)^0 = 0.1296$



(b)
(i) $\frac{X-27}{6.4} = 0.85$

$X = 32.44$

(ii) $1 - 0.1977$

0.8023

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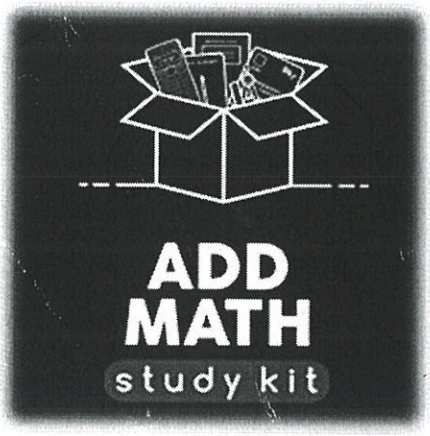
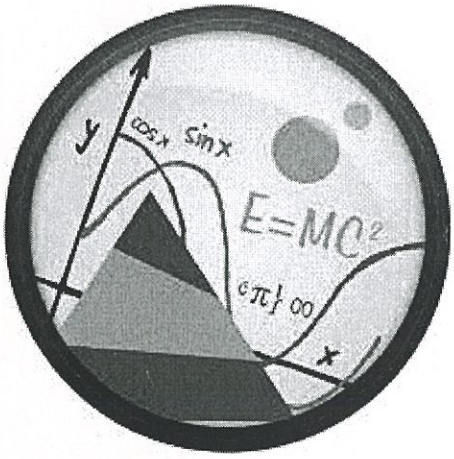
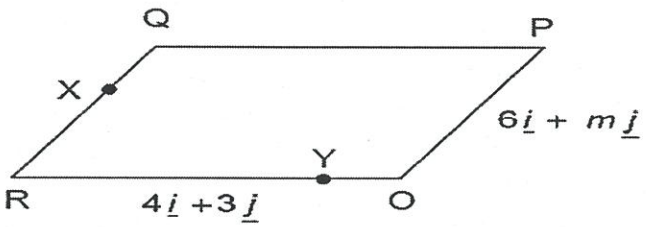




QUESTION 1/ SOALAN 1

Diagram 11 shows a parallelogram *OPQR*.
Rajah 11 menunjukkan sebuah segiempat selari OPQR.



Diagram/ *Rajah* 11

Given that $\overrightarrow{OP} = 6\underline{i} + m\underline{j}$, $\overrightarrow{OR} = 4\underline{i} + 3\underline{j}$ and $|\overrightarrow{OP}| = 10$ units.

Diberi bahawa $\overrightarrow{OP} = 6\underline{i} + m\underline{j}$, $\overrightarrow{OR} = 4\underline{i} + 3\underline{j}$ *dan* $|\overrightarrow{OP}| = 10$ unit.

(a) Find/ Cari

(i) the positive value of m.
nilai positif bagi m.

(ii) $\overrightarrow{OQ}$.

[4 marks/ *markah*]

(b) Given $\overrightarrow{RX} = \frac{2}{3}\overrightarrow{RQ}$ and $\overrightarrow{OY} = \frac{1}{3}\overrightarrow{OR}$. Find $\overrightarrow{XY}$.

Diberi $\overrightarrow{RX} = \frac{2}{3}\overrightarrow{RQ}$ dan $\overrightarrow{OY} = \frac{1}{3}\overrightarrow{OR}$. Cari $\overrightarrow{XY}$.

[2 marks/ *markah*]

(c) Given that T is a point such that $\overrightarrow{RT} = 5\underline{i} + 9\underline{j}$.

Diberi bahawa T ialah satu titik dengan keadaan $\overrightarrow{RT} = 5\underline{i} + 9\underline{j}$.

(i) Find $\overrightarrow{PT}$,

Cari $\overrightarrow{PT}$,

(ii) Show that the points O, P and T are collinear.
Tunjukkan bahawa titik-titik O, P dan T adalah segaris.

[4 marks/ *markah*]

QUESTION 2/ SOALAN 2

4. Diagram 3 shows a quadrilateral $OABC$ such that OB intersects AD at E.
Rajah 3 menunjukkan sisi empat OABC dengan keadaan garis OB bersilang dengan garis AD di E.

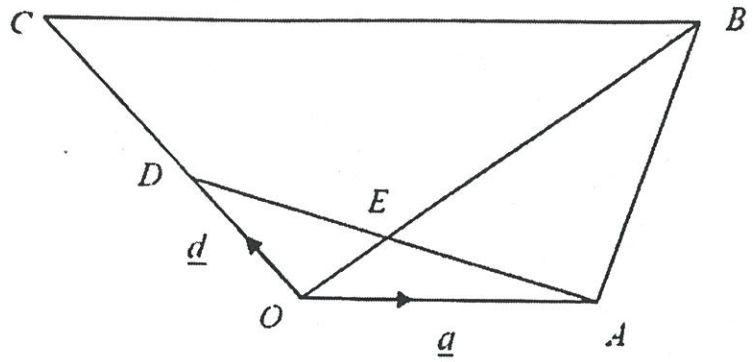


Diagram 3
Rajah 3

Given $OA : CB = 1 : 2$, $OC : OD = 3 : 1$, $\overrightarrow{AE} = m\overrightarrow{AD}$ and $\overrightarrow{OE} = n\overrightarrow{OB}$.

Diberi $OA : CB = 1 : 2$, $OC : OD = 3 : 1$, $\overrightarrow{AE} = m\overrightarrow{AD}$ *dan* $\overrightarrow{OE} = n\overrightarrow{OB}$.

(a) Show that $\overrightarrow{OE} = m\underline{d} + (1-n)\underline{a}$. [2 *marks*]

Tunjukkan $\overrightarrow{OE} = m\underline{d} + (1-n)\underline{a}$. [2 *markah*]

(b) Find

Cari

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

(ii) the ratio of DE : EA.
nisbah bagi DE : EA.

[5 marks]

[5 *markah*]

QUESTION 3/ SOALAN 3

Diagram 2 shows a triangle ABC.

Rajah 2 menunjukkan segi tiga ABC.

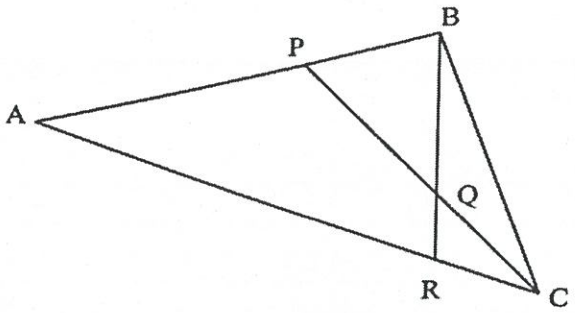


Diagram 2

Rajah 2

It is given that $AR : RC = 4 : 1$, $BP : PA = 1 : 2$, $\overrightarrow{AC} = 15\underline{a}$ and $\overrightarrow{BC} = 6\underline{b}$.

Diberi bahawa $AR : RC = 4 : 1$, $BP : PA = 1 : 2$, $\overrightarrow{AC} = 15\underline{a}$ *dan* $\overrightarrow{BC} = 6\underline{b}$.

(*a*) Express in terms of $\underline{a}$ and $\underline{b}$:

Ungkapkan dalam sebutan $\underline{a}$ *dan* $\underline{b}$:

(i) $\overrightarrow{RB}$,

(ii) $\overrightarrow{AP}$.

[3 marks]

[3 *markah*]

(*b*) It is given that $\overrightarrow{RQ} = m\overrightarrow{RB}$ and $\overrightarrow{QP} = n\overrightarrow{CP}$, where m and n are constants.

Find the values of m and n.

Diberi bahawa $\overrightarrow{RQ} = m\overrightarrow{RB}$ *dan* $\overrightarrow{QP} = n\overrightarrow{CP}$, *dengan keadaan m dan n adalah pemalar. Cari nilai m dan nilai n.*

[5 marks]

[5 *markah*]

QUESTION 4/ SOALAN 4

Diagram 2 shows a parallelogram $PQRS$. The straight line PT intersects with the straight line SR at point U.

Rajah 2 menunjukkan sebuah segi empat selari PQRS. Garis lurus PT bersilang dengan garis lurus SR di titik U.

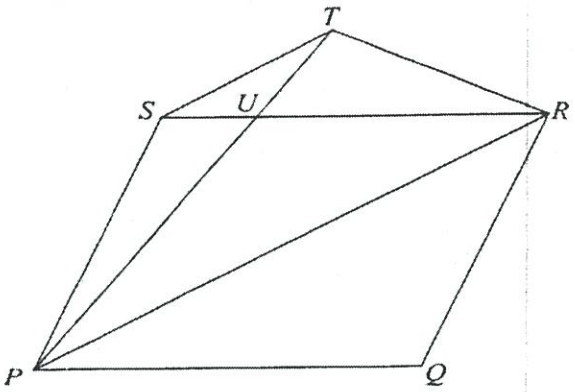


Diagram 2
Rajah 2

It is given that $\overrightarrow{PQ} = 8\underline{p}$, $\overrightarrow{PS} = 2\underline{q}$ and $\overrightarrow{SU} = \frac{1}{4}\overrightarrow{SR}$.

Diberi bahawa $\overrightarrow{PQ} = 8\underline{p}$, $\overrightarrow{PS} = 2\underline{q}$ *dan* $\overrightarrow{SU} = \frac{1}{4}\overrightarrow{SR}$.

(*a*) Express in terms of $\underline{p}$ and / or $\underline{q}$:

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

(i) $\overrightarrow{SU}$,

(ii) $\overrightarrow{PR}$.

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

(*b*) Given $\overrightarrow{PT} = m\overrightarrow{PU}$, where m is a constant, express $\overrightarrow{ST}$ in terms of m, p and q.

Diberi $\overrightarrow{PT} = m\overrightarrow{PU}$, *dengan keadaan* m *ialah pemalar, ungkapkan* $\overrightarrow{ST}$ *dalam sebutan* m, p *dan* q.

[1 *mark*]
[1 *markah*]

(*c*) Given $PRTS$ is a trapezium, find the value of m.

Diberi $PRTS$ *adalah trapezium, cari nilai* m.

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

QUESTION 5/ SOALAN 5

Diagram 4 shows a triangle *ABD*.
Rajah 4 menunjukkan sebuah segi tiga ABD.

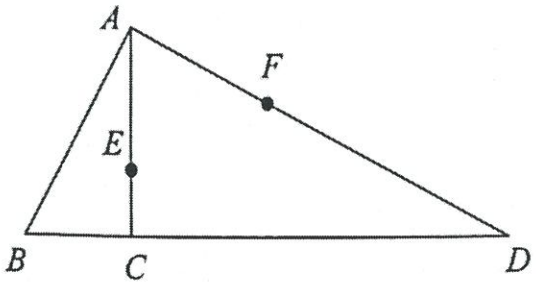


Diagram 4
Rajah 4

BCD is a straight line such that $CD = 3BC$. *E* and *F* are two points on the straight lines *AC* and *AD* respectively such that $AE : AC = 2 : 3$ and $DF : FA = 2 : 1$. It is given that $\overrightarrow{BC} = \underline{x}$ and $\overrightarrow{BA} = \underline{y}$.

BCD ialah suatu garis lurus dengan keadaan $CD = 3BC$. *E dan F ialah dua titik yang terletak pada garis lurus AC dan garis lurus AD masing-masing dengan keadaan* $AE : AC = 2 : 3$ *dan* $DF : FA = 2 : 1$. *Diberi bahawa* $\overrightarrow{BC} = \underline{x}$ *dan* $\overrightarrow{BA} = \underline{y}$.

a) Express $\overrightarrow{BF}$ and $\overrightarrow{CE}$ in terms of $\underline{x}$ and $\underline{y}$. [4 *marks*]
Ungkapkan $\overrightarrow{BF}$ *dan* $\overrightarrow{CE}$ *dalam sebutan* $\underline{x}$ *dan* $\underline{y}$. [4 *markah*]

b) Show that points *B*, *E* and *F* are collinear. [4 *marks*]
Tunjukkan bahawa titik-titik B, E dan F adalah segaris. [4 *markah*]

c) Given the area of triangle *ABC* is 5 cm^2, find the area of triangle *ABD*. [2 *marks*]
Diberi luas segi tiga ABC adalah 5 cm^2, *cari luas segi tiga ABD.* [2 *markah*]

QUESTION 5/ SOALAN 5

Diagram 4 shows a triangle *ABD*.
Rajah 4 menunjukkan sebuah segi tiga ABD.

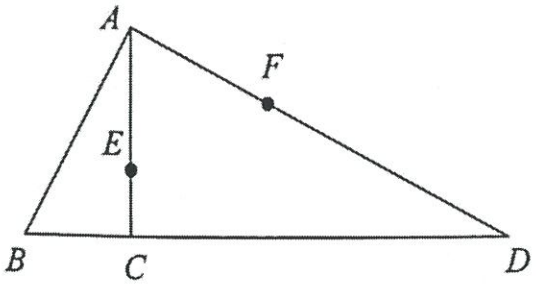


Diagram 4
Rajah 4

BCD is a straight line such that $CD = 3BC$. *E* and *F* are two points on the straight lines *AC* and *AD* respectively such that $AE : AC = 2 : 3$ and $DF : FA = 2 : 1$. It is given that $\overrightarrow{BC} = \underline{x}$ and $\overrightarrow{BA} = \underline{y}$.

BCD ialah suatu garis lurus dengan keadaan $CD = 3BC$. *E dan F ialah dua titik yang terletak pada garis lurus AC dan garis lurus AD masing-masing dengan keadaan* $AE : AC = 2 : 3$ *dan* $DF : FA = 2 : 1$. *Diberi bahawa* $\overrightarrow{BC} = \underline{x}$ *dan* $\overrightarrow{BA} = \underline{y}$.

a) Express $\overrightarrow{BF}$ and $\overrightarrow{CE}$ in terms of $\underline{x}$ and $\underline{y}$. [4 *marks*]
Ungkapkan $\overrightarrow{BF}$ *dan* $\overrightarrow{CE}$ *dalam sebutan* $\underline{x}$ *dan* $\underline{y}$. [4 *markah*]

b) Show that points *B*, *E* and *F* are collinear. [4 *marks*]
Tunjukkan bahawa titik-titik B, E dan F adalah segaris. [4 *markah*]

c) Given the area of triangle *ABC* is 5 cm^2, find the area of triangle *ABD*. [2 *marks*]
Diberi luas segi tiga ABC adalah 5 cm^2, *cari luas segi tiga ABD.* [2 *markah*]

QUESTION 6/ SOALAN 6

Diagram 1 shows a quadrilateral *ABCD*. *AXY* and *BXD* are straight line.
Rajah 1 menunjukkan sebuah sisi empat ABCD. AXY dan BXD ialah garis lurus.

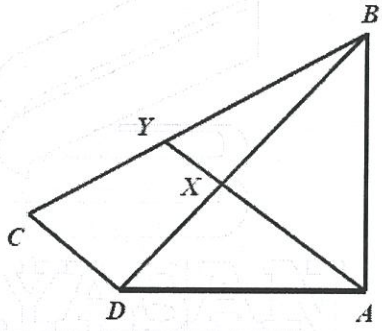


Diagram 1 /Rajah 1

It is given that $\overrightarrow{AD} = 4\underset{\sim}{a}$, $\overrightarrow{AB} = 2b$, $\overrightarrow{CD} = -2\underset{\sim}{a} - \underset{\sim}{b}$ and $2\overrightarrow{CD} = \overrightarrow{YA}$
Diberi bahawa $\overrightarrow{AD} = 4\underset{\sim}{a}$, $\overrightarrow{AB} = 2b$, $\overrightarrow{CD} = -2\underset{\sim}{a} - \underset{\sim}{b}$ *dan* $2\overrightarrow{CD} = \overrightarrow{YA}$

(a) Express in terms of $\underline{a}$ and $\underline{b}$.
Ungkapkan dalam sebutan $\underline{a}$ *dan* $\underline{b}$.

(i) $\overrightarrow{BD}$

(ii) $\overrightarrow{AY}$

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

(b) It is given that $\overrightarrow{AX} = h\overrightarrow{AY}$ and $\overrightarrow{BX} = k\overrightarrow{BD}$, where h and k are constants, find the value of h and of k.

Diberi bahawa $\overrightarrow{AX} = h\overrightarrow{AY}$ *dan* $\overrightarrow{BX} = k\overrightarrow{BD}$, *dengan keadaan h dan k ialah pemalar, cari nilai h dan nilai k.*

[5 *markah*]
[5 *markah*

QUESTION 7/ SOALAN 7

Diagram 4 shows a triangle ABC. Point R lies on BP and point T lies on BC.
Rajah 4 menunjukkan sebuah segi tiga ABC. Titik R terletak pada BP dan titik T terletak pada BC.

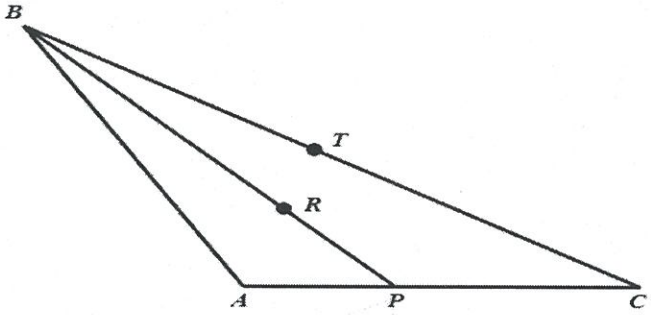


Diagram 4
Rajah 4

It is given that $\overrightarrow{AB} = 6\underset{\sim}{x}, \overrightarrow{AC} = 4\underset{\sim}{y}, 3AP = PC$ and point T is the midpoints of BC.

Diberi bahawa, $\overrightarrow{AB} = 6\underset{\sim}{x}, \overrightarrow{AC} = 4\underset{\sim}{y}, 3AP = PC$ *dan* titik T *adalah titik tengah bagi* BC.

(a) Express in terms of $\underset{\sim}{x}$ and $\underset{\sim}{y}$.

Ungkapkan dalam sebutan $\underset{\sim}{x}$ *dan* $\underset{\sim}{y}$.

(i) $\overrightarrow{BC}$,

(ii) $\overrightarrow{AT}$.

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

(b) It is given that $\overrightarrow{AR} = k\overrightarrow{AT}$ and $\overrightarrow{AR} = \overrightarrow{AP} - h\overrightarrow{BP}$, where h and k are constants.

Diberi bahawa $\overrightarrow{AR} = k\overrightarrow{AT}$ *dan* $\overrightarrow{AR} = \overrightarrow{AP} - h\overrightarrow{BP}$, *dengan keadaan h dan k ialah pemalar.*

Find the value of h and of k

Cari nilai h dan nilai k.

[6 *marks*]
[6 *markah*]

QUESTION 8/ SOALAN 8

In Diagram 6, $PQRS$ is a parallelogram. BAP, SAR and BRQ are straight lines.

Dalam Rajah 6, $PQRS$ ialah sebuah segi empat selari. BAP, SAR dan BRQ ialah garis lurus.

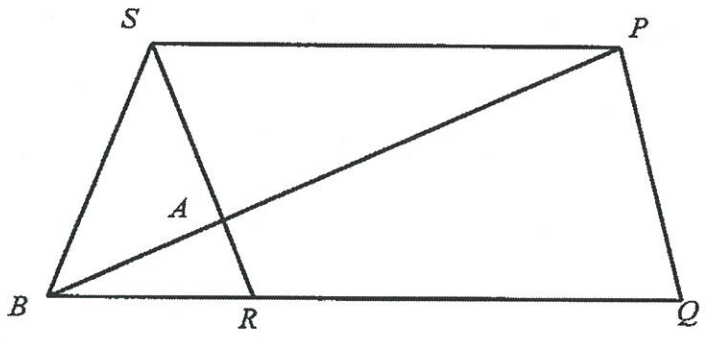


Diagram 6 / *Rajah 6*

It is given that $\overrightarrow{SP} = 4\underline{x}$, $\overrightarrow{SR} = 9\underline{y}$ and $BR : RQ = 1 : 2$,

Diberi bahawa $\overrightarrow{SP} = 4\underline{x}$, $\overrightarrow{SR} = 9\underline{y}$ *dan* $BR : RQ = 1 : 2$.

(a) Express $\overrightarrow{BS}$ and $\overrightarrow{PB}$ in terms of $\underline{x}$ and/or $\underline{y}$. [3 *marks*]

Ungkapkan $\overrightarrow{BS}$ *dan* $\overrightarrow{PB}$ *dalam sebutan* $\underline{x}$ *dan/atau* $\underline{y}$. [3 *markah*]

(*b*) It is given that $\overrightarrow{BA} = h\overrightarrow{BP}$ and $\overrightarrow{SA} = k\overrightarrow{SR}$, where h and k are constants. Find the value of h and of k. [6 *marks*]

Diberi bahawa $\overrightarrow{BA} = h\overrightarrow{BP}$ *dan* $\overrightarrow{SA} = k\overrightarrow{SR}$, *dengan keadaan h dan k adalah pemalar. cari nilai h dan nilai k.* [6 *markah*]

(c) Hence, write the equation that relate $\overrightarrow{BA}$ and $\overrightarrow{AP}$. [1 *mark*]

Seterusnya, tuliskan persamaan yang menghubungkan $\overrightarrow{BA}$ *dan* $\overrightarrow{AP}$. [1 *markah*]

QUESTION 9/ SOALAN 9

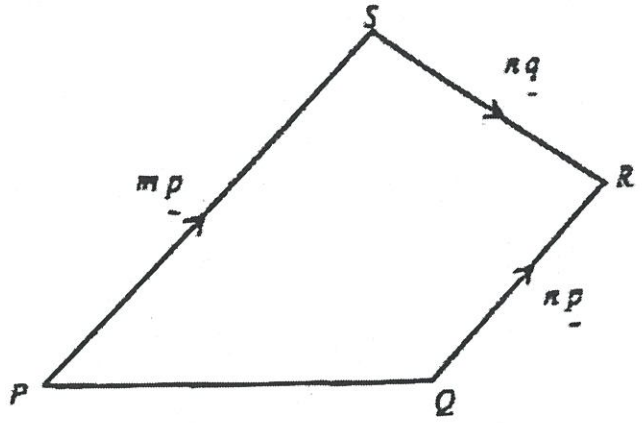


Diagram 4/ *Rajah 4*

Diagram 4 shows a quadrilateral $PQRS$ where $\overrightarrow{PS} = m\underset{\sim}{p}$, $\overrightarrow{SR} = n\underset{\sim}{q}$ and $\overrightarrow{QR} = n\underset{\sim}{p}$ where m and n are constants. If $\overrightarrow{PQ} = 4\underset{\sim}{p} + \left(\frac{m-1}{4}\right)\underset{\sim}{q}$. Find,

Rajah 4 diatas menunjukkan sisiempat PQRS dengan keadaan $\overrightarrow{PS} = m\underset{\sim}{p}$, $\overrightarrow{SR} = n\underset{\sim}{q}$ *dan* $\overrightarrow{QR} = = n\underset{\sim}{p}$ *dengan keadaan m dan n ialah pemalar.*

Jika $\overrightarrow{PQ} = 4\underset{\sim}{p} + \left(\frac{m-1}{4}\right)\underset{\sim}{q}$. *Cari,*

(a) the values of m and n.
nilai m dan n,

(b) the area of triangle PQR if the area of triangle PQS is 30 unit persquare.
luas segitiga PQR jika luas segitiga PQS ialah 30 unit persegi.

[7 marks/7 *markah*]

QUESTION 10/ SOALAN 10

Diagram 3 shows the positions of points P and Q relative to a fixed point O, with the position vectors **a** and **b** respectively. Point R lies on OP produced such that $OP : PR = 1 : 2$. Point A lies on PQ such that $PA : AQ = 1 : 2$.

Rajah 3 menunjukkan kedudukan titik P dan Q relatif kepada titik tetap O, masing-masing dengan vektor kedudukan **a** *dan* **b**. *Titik R terletak pada OP yang dipanjangkan dengan keadaan* $OP : PR = 1 : 2$. *Titik A terletak pada PQ dengan keadaan* $PA : AQ = 1 : 2$.

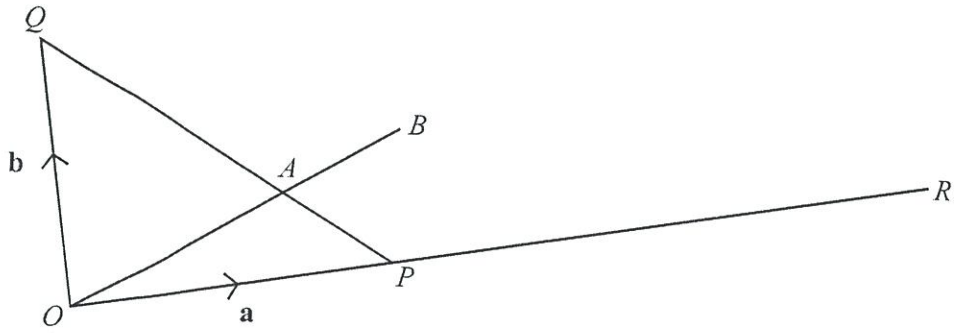


Diagram 3
Rajah 3

(*a*) Find the following vectors in terms of **a** and **b**.
Cari vektor berikut dalam sebutan **a** *dan* **b**.

(i) $\overrightarrow{OR}$

(ii) $\overrightarrow{PQ}$

(iii) $\overrightarrow{PA}$

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

(*b*) Point B lies on OA produced such that $OA : AB = 5 : 4$.
Find the position vector of B.

[2 *marks*]

Titik B terletak pada OA yang dipanjangkan dengan keadaan $OA : AB = 5 : 4$.
Cari vektor kedudukan B.

[2 *markah*]

QUESTION 11/ SOALAN 11

Diagram 3 shows a quadrilateral $ABCD$. Given $\overrightarrow{AB} = q\mathbf{a}$, $\overrightarrow{BC} = q\mathbf{b}$ and $\overrightarrow{DC} = p\mathbf{a}$, where p and q are constants.

Rajah 3 menunjukkan sisi empat ABCD. Diberi $\overrightarrow{AB} = q\mathbf{a}$, $\overrightarrow{BC} = q\mathbf{b}$ *dan* $\overrightarrow{DC} = p\mathbf{a}$, *dengan p dan q ialah pemalar.*

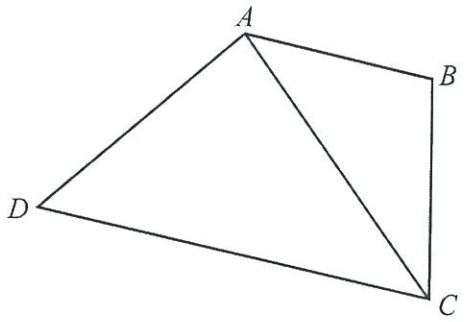


Diagram 3
Rajah 3

(*a*) If $\overrightarrow{AD} = -5\mathbf{a} + \left(\frac{p+3}{2}\right)\mathbf{b}$, find the values of p and of q. [3 *marks*]

Jika $\overrightarrow{AD} = -5\mathbf{a} + \left(\frac{p+3}{2}\right)\mathbf{b}$, *cari nilai p dan nilai q.* [3 *markah*]

(*b*) Given the area of triangle ACD is 52 units^2 and the perpendicular distance from A to DC is 4 units, find the value of $|\mathbf{a}|$. [3 *marks*]

Diberi luas segi tiga ACD adalah 52 unit^2 *dan jarak serenjang dari A ke DC ialah 4 unit, cari nilai* $|\mathbf{a}|$. [3 *markah*]

QUESTION 12/ SOALAN 12

Diagram 1 shows a trapezium $ABCD$. Straight lines AC and DF intersect at E. Given $\vec{AF} = \frac{2}{3}\vec{AB}$, $\vec{DC} = \vec{AF}$, $\vec{AE} = \frac{1}{2}\vec{AC}$, $\vec{AF} = 4\underset{\sim}{x}$ and $\vec{AD} = 3\underset{\sim}{y}$.

Rajah 1 menunjukkan satu trapezium ABCD. Garis lurus AC an DF bersilang di E. Diberi $\vec{AF} = \frac{2}{3}\vec{AB}$, $\vec{DC} = \vec{AF}$, $\vec{AE} = \frac{1}{2}\vec{AC}$, $\vec{AF} = 4\underset{\sim}{x}$ *dan* $\vec{AD} = 3\underset{\sim}{y}$.

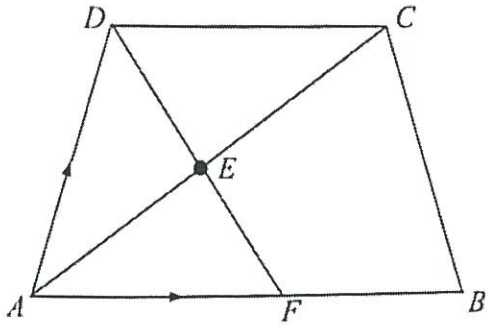


Diagram 1
Rajah 1

(*a*) Express, in terms of x and/or y,
Ungkapkan, dalam sebutan x dan/atau y,

(i) $\vec{AE}$

(ii) $\vec{CB}$

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

(*b*) Given the area of ΔBCF is 12 unit^2, find the area of ΔACF.
Hence, find the shortest distance from point C to AB when $|x| = 2$ units.

Diberi luas bagi ΔBCF *ialah* 12 *unit*^{2}, *cari luas bagi* ΔACF.
Seterusnya, cari jarak terdekat dari titik C ke titik AB apabila $|x| = 2$ unit.

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

QUESTION 13/ SOALAN 13

Diagram 1 shows a trapezium PQRS.
Rajah 1 menunjukkan trapezium PQRS

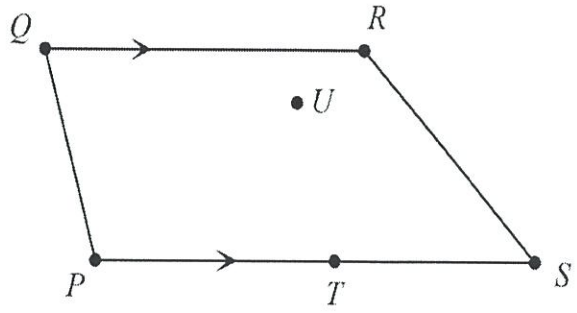


Diagram 1/ *Rajah 1*

It is given that $\overrightarrow{PQ} = 2\underset{\sim}{y}$, $\overrightarrow{PS} = 11\underset{\sim}{x}$, $\overrightarrow{PT} = \frac{6}{11}\overrightarrow{PS}$ and $\overrightarrow{QR} = \frac{8}{11}\overrightarrow{PS}$.

Diberi bahawa $\overrightarrow{PQ} = 2\underset{\sim}{y}$, $\overrightarrow{PS} = 11\underset{\sim}{x}$, $\overrightarrow{PT} = \frac{6}{11}\overrightarrow{PS}$ *dan* $\overrightarrow{QR} = \frac{8}{11}\overrightarrow{PS}$.

(a) Express $\overrightarrow{PR}$ in terms of $\underset{\sim}{x}$ and $\underset{\sim}{y}$.

[2 marks]

Ungkapkan $\overrightarrow{PR}$ *dalam sebutan* $\underset{\sim}{x}$ *dan* $\underset{\sim}{y}$.

[2 markah]

(b) Point U lies inside the trapezium $PQRS$ such that $2\overrightarrow{TU} = k\overrightarrow{PQ}$ and k is a constant.

Titik U terletak di dalam trapezium PQRS dengan keadaan $2\overrightarrow{TU} = k\overrightarrow{PQ}$ *dan k ialah pemalar.*

(i) Express $\overrightarrow{PU}$ in terms of k, $\underset{\sim}{x}$ and $\underset{\sim}{y}$.

Ungkapkan $\overrightarrow{PU}$ *dalam sebutan k,* $\underset{\sim}{x}$ *dan* $\underset{\sim}{y}$.

(ii) Hence, if the points P, U and R are collinear, find the value of k
Seterusnya, jika titik-titik P, U dan R adalah segaris, cari nilai k.

[5 marks]
[5 markah]

QUESTION 14/ SOALAN 14

. Diagram 5 shows a trapezium PQRS where PS is parallel to QR.

Rajah 5 menunjukkan sebuah trapezium dengan keadaan PS adalah selari dengan QR.

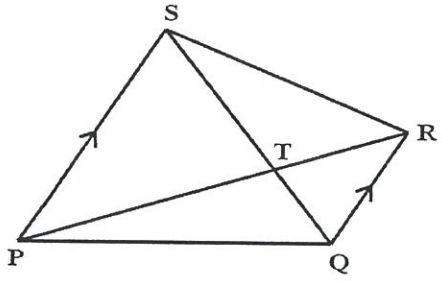


Diagram 5 / *Rajah 5*

It is given that $\overrightarrow{PQ} = 8\underline{a}$, $\overrightarrow{PS} = 10\underline{b}$ and $\overrightarrow{QR} = \frac{2}{5}\overrightarrow{PS}$.

Diberi bahawa $\overrightarrow{PQ} = 8\underline{a}$, $\overrightarrow{PS} = 10\underline{b}$ *dan* $\overrightarrow{QR} = \frac{2}{5}\overrightarrow{PS}$.

(a) Express in terms of $\underline{a}$ and $\underline{b}$:

Ungkapkan dalam sebutan $\underline{a}$ *dan* $\underline{b}$:

(i) $\overrightarrow{PR}$

(ii) $\overrightarrow{SQ}$

[3 marks]

(b) It is given that $\overrightarrow{PT} = m\overrightarrow{PR}$ and $\overrightarrow{ST} = n\overrightarrow{SQ}$, where *m* and *n* are constants.

Diberi bahawa $\overrightarrow{PT} = m\overrightarrow{PR}$ *dan* $\overrightarrow{ST} = n\overrightarrow{SQ}$, *dengan keadaan m dan n adalah pemalar.*

Express $\overrightarrow{PT}$

Ungkapkan $\overrightarrow{PT}$

(i) in terms of *m*, $\underline{a}$ and $\underline{b}$

dalam sebutan m, $\underline{a}$ and $\underline{b}$

(ii) in terms of *n*, $\underline{a}$ and $\underline{b}$ [3 marks]

dalam sebutan n, $\underline{a}$ and $\underline{b}$ [3 *markah*]

(c) Hence, find the value of *m* and *n*. [4 marks]

Seterusnya, cari nilai m dan n. [4 *markah*]

QUESTION 15/ SOALAN 15

(b) Show that points *L*, *E* and *F* are collinear. [3 marks]
Tunjukkan titik-titik L, E dan F adalah segaris. [3 *markah*]

(c) Given the area of triangle *KLM* is 6 cm^2, state the area of triangle *KLN*. [1 mark]
Diberi luas segitiga KLM adalah 6 cm^2 *, nyatakan luas segitiga KLN.* [1 *markah*]

Diagram 2 shows a triangle *KLN*.
Rajah 2 menunjukkan segitiga KLN.

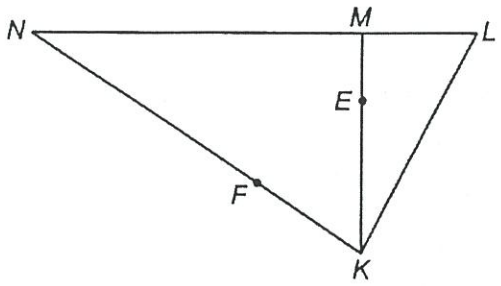


Diagram 2
Rajah 2

NML is a straight line such that *NM* = 3*ML*. *E* and *F* are two points on the lines *MK* and *NK* respectively such that *KE* : *KM* = 2 : 3 and *NF* : *FK* = 2 : 1. It is given that $\overrightarrow{LM} = \underset{\sim}{x}$ and $\overrightarrow{LK} = \underset{\sim}{y}$.

NML adalah garis lurus dengan keadaan NM=3ML. E dan F adalah dua titik terletak pada garis lurus MK dan NK masing-masing dengan keadaan KE : KM = 2 : 3 dan NF : FK = 2 : 1. Diberi $\overrightarrow{LM} = \underset{\sim}{x}$ *dan* $\overrightarrow{LK} = \underset{\sim}{y}$.

(a) Express each of the following vectors in terms of $\underset{\sim}{x}$ and $\underset{\sim}{y}$.
Ungkapkan vektor berikut dalam sebutan $\underset{\sim}{x}$ *dan* $\underset{\sim}{y}$.

(i) $\overrightarrow{LF}$,

(ii) $\overrightarrow{ME}$.

[3 marks]
[3 *markah*]

ANSWER / JAWAPAN

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QUESTION 1

QUESTION 2

(a) $\overrightarrow{AO} + \overrightarrow{OE} = m(\overrightarrow{AO} + \overrightarrow{OD})$

$\overrightarrow{OE} = (1-m)\underline{a} + m\underline{d}$

(b)

(i) $\overrightarrow{OE} = 2n\underline{a} + 3n\underline{d}$

Selesaikan persamaan serentak

$2n = 1 - m$

$m = 3n$

$m = \frac{3}{5}$, $n = \frac{1}{5}$

(ii) $\overrightarrow{AE} = \frac{3}{5}\overrightarrow{AD}$

DE : EA = 2 : 3

QUESTION 3

(a)(i) $\overrightarrow{RB} = \overrightarrow{RC} + \overrightarrow{CB}$

$3\underline{a} - 6\underline{b}$

(ii) $10a - 4b$

(b) $\overrightarrow{RQ} = 3m\underline{a} - 6m\underline{b}$

$\overrightarrow{QP} = -5n\underline{a} - 4n\underline{b}$

$-5n\underline{a} - 4n\underline{b} = (6m - 4)\underline{b} - (3m + 2)\underline{a}$

$3m + 2 = 5n$ @ $6m - 4 = -4n$

$m = \frac{2}{7}$, $n = \frac{4}{7}$ (both)

QUESTION 4

(a) (i) $\overrightarrow{SU} = 2\underline{p}$

(ii) $\overrightarrow{PR} = \overrightarrow{PQ} + \overrightarrow{QR}$

$= 8\underline{p} + 2\underline{q}$

(b) $\overrightarrow{PU} = 2\underline{p} + 2\underline{q}$

$\overrightarrow{ST} = -2\underline{q} + m(2\underline{p} + 2\underline{q})$

$= 2m\underline{p} + (2m - 2)\underline{q}$

(c) $^{\bullet}2m\underline{p} + (2m-2)\underline{q} = \lambda^{\bullet}(8\underline{p} + 2\underline{q})$

$^{\bullet}2m = {}^{\bullet}8\lambda$ $\quad$ $^{\bullet}2m - 2 = {}^{\bullet}2\lambda$

$m = \frac{4}{3}$

ANSWER / JAWAPAN

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QUESTION 5

(a)

$\overrightarrow{AD} = \overrightarrow{AB} + \overrightarrow{BD}$

$= -\underset{\sim}{y} + 4\underset{\sim}{x}$

$\overrightarrow{BF} = \overrightarrow{BA} + \overrightarrow{AF}$

$\overrightarrow{BF} = \overrightarrow{BA} + \frac{1}{3}\overrightarrow{AD}$

$= \underset{\sim}{y} + \frac{1}{3}(-\underset{\sim}{y} + 4\underset{\sim}{x})$

$= \frac{2}{3}\underset{\sim}{y} + \frac{4}{3}\underset{\sim}{x}$

$\overrightarrow{CA} = \overrightarrow{CB} + \overrightarrow{BA}$

$= -\underset{\sim}{x} + \underset{\sim}{y}$

$\overrightarrow{CE} = \frac{1}{3}\overrightarrow{CA}$

$= -\frac{1}{3}\underset{\sim}{x} + \frac{1}{3}\underset{\sim}{y}$

(b)

$\overrightarrow{BE} = \overrightarrow{BC} + \overrightarrow{CE}$

$= \underset{\sim}{x} - \frac{1}{3}\underset{\sim}{x} + \frac{1}{3}\underset{\sim}{y}$

$= \frac{2}{3}\underset{\sim}{x} + \frac{1}{3}\underset{\sim}{y}$ or $\frac{1}{3}(2\underset{\sim}{x} + \underset{\sim}{y})$

$\overrightarrow{BF} = \frac{2}{3}\underset{\sim}{y} + \frac{4}{3}\underset{\sim}{x}$ or $\frac{2}{3}(2\underset{\sim}{x} + \underset{\sim}{y})$

$\overrightarrow{BF} = 2\overrightarrow{BE}$

$\overrightarrow{BF}$ and $\overrightarrow{BE}$ are parallel and B is a common point. Therefore points B, E and F are collinear.

(c)

5 × 4

20

QUESTION 6

(a) $\overrightarrow{OX} = \overrightarrow{OA} + \overrightarrow{AX}$ or $\overrightarrow{BY} = \overrightarrow{BO} + \overrightarrow{OY}$

$\overrightarrow{OX} = \frac{16}{5}\underset{\sim}{a} + \frac{3}{5}\underset{\sim}{b}$

$\overrightarrow{BY} = \frac{32}{5}\underset{\sim}{a} - \frac{9}{5}\underset{\sim}{b}$

(b) $\overrightarrow{OC} = 4h\underset{\sim}{a}$

$\overrightarrow{BC} = \frac{32}{5}k\underset{\sim}{a} - \frac{9}{5}k\underset{\sim}{b}$

Use $\overrightarrow{OC} = \overrightarrow{OB} + \overrightarrow{BC}$ and compare

$4h = \frac{32}{5}k$ or $-3 = -\frac{9}{5}k$

$4h = \frac{32}{5}\left(\frac{5}{3}\right)$

$k = \frac{5}{3}, \quad h = \frac{8}{3}$

QUESTION 7

(a) (i) $\overrightarrow{BC} = \overrightarrow{BA} + \overrightarrow{AC}$

$= -6x + 4y$

(ii) $\overrightarrow{AT} = \overrightarrow{AB} + \frac{1}{2}\overrightarrow{BC}$ or $\overrightarrow{AT} = \overrightarrow{AC} + \overrightarrow{CT}$

$= 3x + 2y$

(b) $\overrightarrow{AR} = k\overrightarrow{AT}$

$= k(3x + 2y)$

$\overrightarrow{AR} = \overrightarrow{AP} - h\overrightarrow{BP}$

$= y - h(-6x + y)$

$= 6hx + (1-h)y$

Compare : $3k = 6h$, $2k = 1 - h$ *and solve*

$h = \frac{1}{5}$, $k = \frac{2}{5}$

QUESTION 8

(a) $\overrightarrow{BS} = \overrightarrow{BR} + \overrightarrow{RS}$ or $\overrightarrow{PB} = \overrightarrow{PQ} + \overrightarrow{QB}$ K1

$\overrightarrow{BS} = 2\underset{\sim}{x} - 9\underset{\sim}{y}$ N1

$\overrightarrow{PB} = -6\underset{\sim}{x} + 9\underset{\sim}{y}$ N1

(b) $\overrightarrow{BA} = h^*(6\underset{\sim}{x} + 9\underset{\sim}{y})$ in term of x, y and h. K1

$\overrightarrow{BA} = \overrightarrow{BS} + k\overrightarrow{SR}$ K1

$\overrightarrow{BA} = 2\underset{\sim}{x} + (9k - 9)\underset{\sim}{y}$ N1

$6h = 2$ or $9h = -9 + 9k$ K1

$h = \frac{1}{3}$ N1

$k = \frac{2}{3}$ N1

(c) $\overrightarrow{AP} = 2\overrightarrow{BA}$ N1

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QUESTION 9

(a)

$m - n = 4$ or $n = \frac{m-1}{4}$ or equivalent

Solve simualtaneous linear equation

$m - (\frac{m-1}{4}) = 4$ or equivalent K1

$m = 5$ N1 $n = 1$ N1

(b)

$\overrightarrow{PS} = 5p$ or $\overrightarrow{QR} = 1p$ P1

Area Δ PQR $= \frac{1}{5} \times 30$ K1

$6\ unit^2$ N1

QUESTION 10

(a) (i) 3a

(ii) -a + b

(iii) $PA = \frac{1}{3}PQ$

$-\frac{1}{3} + \frac{1}{3}$ b (accept answer without working)

(b) $\overrightarrow{OB} = \frac{9}{5}(\overrightarrow{OP} + \overrightarrow{PA})$

$\frac{6}{5}$a + $\frac{3}{5}$b

QUESTION 11

a) $\overrightarrow{AD} = \overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CD}$

$\overrightarrow{AD} = (q-p)a + qb$

$q - p = -5$ or $q = \frac{p+3}{2}$

$p = 13$ and $q = 8$

(b) $\frac{1}{2}$ x DC x 4 = 52

p |a| = 26

2

QUESTION 12

(a) $AE = \frac{1}{2}(AD + DC)$ or $CB = CA + AB$

(i) $AE = \frac{1}{2}y + 2x$

(ii) $CB = 2x - 3y$

(b)

Area of triangle $ACF = 2(12)$

$= 24$

$\frac{1}{2}(h)(12) = 36$ or equivalent

Shortest distance, $h = 6$

ANSWER / JAWAPAN

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QUESTION 13

(a)

$\overrightarrow{PR} = \overrightarrow{PQ} + \overrightarrow{QR}$

$= 2\underset{\sim}{y} + \frac{8}{11}\overrightarrow{PS}$

$= 2\underset{\sim}{y} + \frac{8}{11}(11\underset{\sim}{x})$

$= 2\underset{\sim}{y} + 8\underset{\sim}{x}$

(b)(i)

$\overrightarrow{PU} = \overrightarrow{PT} + \overrightarrow{TU}$

$= 6\underset{\sim}{x} + \frac{k}{2}\overrightarrow{PQ}$

$= 6\underset{\sim}{x} + \frac{k}{2}(2\underset{\sim}{y})$

$= 6\underset{\sim}{x} + k\underset{\sim}{y}$

(ii)

$\overrightarrow{PU} = m\,\overrightarrow{PR}$ *m is a constant*

$6\underset{\sim}{x} + k\underset{\sim}{y} = m(2\underset{\sim}{y} + 8\underset{\sim}{x})$

$k\underset{\sim}{y} + 6\underset{\sim}{x} = 2m\underset{\sim}{y} + 8m\underset{\sim}{x}$

Bandingkan:

$8m = 6$ or $k = 2m$

$m = \frac{2}{3}$ $= 2(\frac{2}{3})$

$= \frac{4}{3}$

$\therefore m = \frac{2}{3}, k = \frac{4}{3}$

QUESTION 14

(a) (i) $\overrightarrow{QR} = 4\underline{b}$

$8\underline{a} + 4\underline{b}$

(ii) $8\underline{a} - 10\underline{b}$

(b)(i) $PT = 8m\underline{a} + 4m\underline{b}$

(ii) $PT = 10\underline{b} + n(8\underline{a} - 10\underline{b})$

$PT = 8n\underline{a} + (10 - 10n)\underline{b}$

(c) $8m = 8n$ or $4m = 10 - 10n$

Solve to find m and n

$m = \frac{5}{7}$

$n = \frac{5}{7}$

QUESTION 15

(a) (i) Use law of polygon $\overrightarrow{LF} = \overrightarrow{LN} + \overrightarrow{NF}$

or

$\overrightarrow{ME} = \frac{1}{3}(\overrightarrow{ML} + \overrightarrow{LK})$

$\overrightarrow{LF} = \frac{2}{3}(2\underset{\sim}{x} + \underset{\sim}{y})$

(ii) $\overrightarrow{ME} = \frac{1}{3}(-\underset{\sim}{x} + \underset{\sim}{y})$

(b) Use law of poligon

$\overrightarrow{LE} = \frac{1}{3}(2\underset{\sim}{x} + \underset{\sim}{y})$

$\overrightarrow{LF} = 2\overrightarrow{LE}$

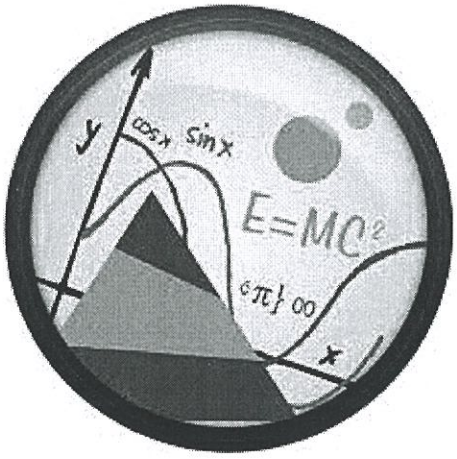
L is common point, point L, E and F are collinear.

(c) $LN = 4\,LM$

Area of $\Delta\,KLN = 24$

ADDMATHS
2019

LOG AND INDICES
(6 MARKS/6 MARKAH)



QUESTION 1/ SOALAN 1

Solve the equation

Selesaikan persamaan

$$\log_9 x^2 - \log_3 (x-4) = \log_3 5.$$

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

QUESTION 2/ SOALAN 2

a) (i) Simplify:

Permudahkan

$$\log_2(3x+4)-7\log_4 x^2+6\log_2 x$$

(ii) Hence, solve the equation:

Seterusnya, selesaikan persamaan:

$$\log_2(3x+4)-7\log_4 x^2+6\log_2 x=2$$

[6 *marks*]
[6 *markah*]

(b) Find the value of n if $2^n+2^{n+1}=6$

Cari nilai n jika $2^n+2^{n+1}=6$

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

QUESTION 3/ SOALAN 3

(a) Given $v = \frac{1}{u^4}$, find the value of

Diberi $v = \frac{1}{u^4}$, *cari nilai*

(i) $\frac{5}{2}\log_u v$

(ii) $3\log_v u$

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

(b) It is given that $2^{4x} = h$, $2^y = k$ and $2^{y+4x} = 7 + 16^x$. Express h in terms of k.

Diberi $2^{4x} = h$, $2^y = k$ *dan* $2^{y+4x} = 7 + 16^x$. *Ungkapkan h dalam sebutan k.*

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

QUESTION 4/ SOALAN 4

(a) If $3^{2x} = 8(2^{3x})$. Show that $x \log_a \left(\frac{9}{8}\right) = \log_a 8$.

Jika $3^{2x} = 8(2^{3x})$. Buktikan bahawa $x \log_a \left(\frac{9}{8}\right) = \log_a 8$.

[3 marks/ markah]

(b) If $a^x + a^{-x} = \sqrt{6}$. Show that $(a^x - 2)(a^x + 2) = -\frac{1}{a^{2x}}$.

Jika $a^x + a^{-x} = \sqrt{6}$. Buktikan $(a^x - 2)(a^x + 2) = -\frac{1}{a^{2x}}$.

[2 marks/ *markah*]

(c) Solve $\log_{10} x = 10^{\log_{10} 3}$.

Selesaikan $\log_{10} x = 10^{\log_{10} 3}$.

[2 marks/ *markah*]

QUESTION 5/ SOALAN 5

Diagram 1 shows a drinking water flowing out of a container according to the equation $H = 90(0.25)^t$ such that H is the height of the drinking water, in cm and t is the time, in seconds of drinking water began flowing out of the container.

Rajah 1 menunjukkan air minuman mengalir keluar dari sebuah bekas mengikut persamaan $H = 90(0.25)^t$ *dengan keadaan H ialah tinggi air minuman, dalam* cm *dan t ialah masa, dalam saat air minuman mula mengalir keluar dari bekas itu.*

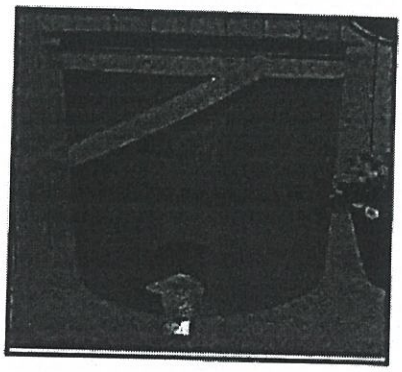


Diagram 1 / *Rajah* 1

Determine
Tentukan

(a) the original height of drinking water in the container,
tinggi asal air minuman di dalam bekas tersebut,

(b) the time when the height of the drinking water is 35 cm.
masa apabila tinggi air minuman ialah 35 cm.

[5 marks/5 *markah*]

QUESTION 6/ SOALAN 6

(*a*) Show that $x = 1$ is a solution of the equation $2^{3x} - 4x \cdot 2^x + 2^x - 2 = 0$. [2 *marks*]

Tunjukkan bahawa $x = 1$ *ialah penyelesaian bagi* $2^{3x} - 4x \cdot 2^x + 2^x - 2 = 0$. [2 *markah*]

(*b*) Given that $\log_a N = \frac{1}{2}(\log_a 24 - \log_a 0{\cdot}375 - 6\log_a 3)$, find the value of N.

Hence, calculate the value of $\log_a N$ when $a = \frac{2}{3}$. [6 *marks*]

Diberi bahawa $\log_a N = \frac{1}{2}(\log_a 24 - \log_a 0{\cdot}375 - 6\log_a 3)$, *cari nilai* N.

Seterusnya, hitung nilai $\log_a N$ *apabila* $a = \frac{2}{3}$. [6 *markah*]

QUESTION 7/ SOALAN 7

(*a*) Given that $\log_8 n = \frac{1}{3}$, find the value of n. [2 *marks*]

Diberi $\log_8 n = \frac{1}{3}$, *cari nilai* n. [2 *markah*]

(*b*) Given that $\log_3 x = r$ and $\log_9 y = s$.
Find the value of r and of s if $xy^2 = 81$ and $\frac{x^2}{y} = \frac{1}{3}$. [6 *marks*]

Diberi $\log_3 x = r$ *dan* $\log_9 y = s$.
Cari nilai r *dan* s *jika* $xy^2 = 81$ *dan* $\frac{x^2}{y} = \frac{1}{3}$. [6 *markah*]

QUESTION 8/ SOALAN 8

Find the value of p and of q for the following equation
Cari nilai bagi p dan nilai q bagi persamaan berikut:

$$3^p \times 27^q = 1 \quad , \quad \log_2 6 - \log_4 (12q - 2p) = 1$$

[6 *marks*]
[6 *markah*]

QUESTION 9/ SOALAN 9

(a) Given $\boldsymbol{h = 3^p}$ and $\boldsymbol{k = 2^q}$, express $\boldsymbol{\log_8 k^2 - \log_9 \sqrt[3]{h}}$ in terms of p and q

[3 marks]

Diberi $\boldsymbol{h = 3^p}$ *dan* $\boldsymbol{k = 2^q}$, *ungkapkan* $\boldsymbol{\log_8 k^2 - \log_9 \sqrt[3]{h}}$ *dalam sebutan p dan q*

[3 markah]

(b) Solve the following equation :

$$\boldsymbol{\log_3[\log_3(80x + 3)] = \log_4 16}$$

[4 marks]

Selesaikan persamaan yang berikut :

$$\boldsymbol{\log_3[\log_3(80x + 3)] = \log_4 16}$$

[4 markah]

QUESTION 10/ SOALAN 10

(a) A RM5000 deposit is made at a bank that pays interest rate 7% annually. The total amount receive, A, after *n* years without withdraw the interest is given by $A=5000\ (1.07)^n$. When the amount in the account exceed more than RM10 000 for the first time? [3 marks]

Sejumlah deposit RM5000 dibuat di sebuah bank yang membayar kadar faedah tahunan 7%. Jumlah wang yang diperoleh, A, selepas n tahun tanpa mengeluarkan faedah diberi oleh $A = 5000\ (1.07)^n$. *Bilakah amaun wang dalam akaun melebihi RM10 000 pada kali yang pertama?* [3 *markah*]

(b) Given $h = 3^x$ and $k = 3^y$. Express $\log_9 \frac{9h^2}{k}$ in terms of x and y. [5 marks]

Diberi $h = 3^x$ *dan* $k = 3^y$. *Express* $\log_9 \frac{9h^2}{k}$ *in terms of x and y.* [5 *markah*]

QUESTION 11/ SOALAN 11

Solve the following simultaneous equations :

Selesaikan persamaan serentak yang berikut :

$$\frac{4^x}{8^y} = 64, \qquad \log_2(4x-5) - \log_4 y^2 = 3$$

[6 marks]
[6 *markah*]

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QUESTION 1

$$\log_9 x^2 - \log_3 (x-4) = \log_3 5$$

$$\frac{\log_3 x^2}{\log_3 9} - \log_3 (x-4) = \log_3 5$$

$$\frac{\log_3 x^2}{2} - \log_3 (x-4) = \log_3 5$$

$$\log_3 x - \log_3 (x-4) = \log_3 5$$

$$\log_3 \left(\frac{x}{x-4}\right) = \log_3 5$$

$$\frac{x}{x-4} = 5$$

$$x = 5$$

QUESTION 2

a) (i)

$$\log_2 (3x-4) - 7\frac{\left(\log_2 x^2\right)}{\left(\log_2 4\right)} + 6\log_2 x$$

$$\log_2 (3x-4) - \frac{7}{2}\log_2 x^2 + \log_2 x^6$$

$$\log_2 \frac{(3x+4)\times x^6}{x^7}$$

$$\log_2 \frac{(3x+4)}{x}$$

(ii)

$$\log_2 \frac{(3x+4)}{x} = 2$$

$$2^2 = \frac{(3x+4)}{x}$$

$$x = 4$$

b) $2^2(1+2) = 6$

$$n = 1$$

QUESTION 3

(a)(i) $\log_4 v = \log_4 \left(\frac{1}{u^4}\right)$ or $\frac{3\log_2 u}{\log_2 v}$ [from question a (ii)]

.10

(ii) $\frac{3}{4}$

(b) $2^{4x} \times 2^y$ or $7 + 2^{4x}$

$hk = 7 + h$ or equivalent

$h = \frac{7}{k-1}$

QUESTION 4

ANSWER / JAWAPAN

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QUESTION 5

(a)

Substitute $t = 0$ *into* $H = 90(0.25)^t$

$90(0.25)^0$

$90\ cm$ N1

(b)

Equate

$35 = 90(0.25)^t$

Use log_{10}

$\log_{10}\frac{7}{18} = \log_{10} 0.25^t$

$0.68\ saat$

QUESTION 6

a) $2^{3(1)} - 4(1)\cdot 2^1 + 2^1 - 2$

0

b) $\log_a N = \frac{1}{2}(\log_a 24 - \log_a 0.375 - \log_a 729)$

$\log_a N = \frac{1}{2}(\log_a \frac{24}{(0.375)(729)})$

$\log_a N = \log_a (\frac{64}{729})^{\frac{1}{2}}$

$\log_a N = \log_a \frac{8}{27}$

$N = \frac{8}{27}$

$\log_a N = 3$

QUESTION 7

(a)

$8^{\frac{1}{3}}$

$n = 2$ Accept answer without working for K1N1

b)

$3^r(9^s)^2 = 81$ or $\frac{(3^r)^2}{9^s} = \frac{1}{3}$ or equivalent

$3^r(3)^{4s} = 3^4$ or $3^{2r-2s} = 3^{-1}$ or equivalent

$r + 4s = 4$ or $2r-2s = -1$ or equivalent

Accept any method of solving simultaneous equation

$r = \frac{2}{5}$

$s = \frac{9}{10}$

QUESTION 8

ANSWER / JAWAPAN

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QUESTION 9

(a) $\log_3 h = p$ and $\log_2 k = q$

$$\frac{\log_2 k^2}{\log_2 2^3} - \frac{\log_3 h^{\frac{1}{3}}}{\log_3 3^2}$$

$$\frac{2\log_2 k}{3\log_2 2} - \frac{\frac{1}{3}\log_3 h}{2\log_3 3}$$

$$\frac{2}{3}q - \frac{1}{6}p$$

(b) $\log_3[\log_3(80x+3)] = \log_4 4^2$

$[\log_3(80x+3)] = 9$

$80x + 3 = 3^9$

$x = 246$

QUESTION 10

(a) $5000(1.07)^n > 10000$

$n\log_{10} 1.07 > \log_{10} 10000$ or n >10.24

n=11

(b) $x = \log_3 h \qquad y = \log_3 k$

$\log_9 9 + \log_9 h^2 - \log_9 k$

$1 + 2\left(\frac{\log_3 h}{\log_3 9}\right) - \left(\frac{\log_3 k}{\log_3 9}\right)$

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

QUESTION 11

$\frac{2^{2x}}{2^{3y}} = 2^6$

$2x - 3y = 6$

$\log_2(4x-5) - \frac{\log_2 y^2}{\log_2 4} = 3$

$4x - 5 = 8y$

$y = \frac{2x-6}{3}$ or $x = \frac{3y+6}{2}$

$4x - 5 = 8\left(\frac{2x-6}{3}\right)$ or $4\left(\frac{3y+6}{2}\right) - 5 = 8y$

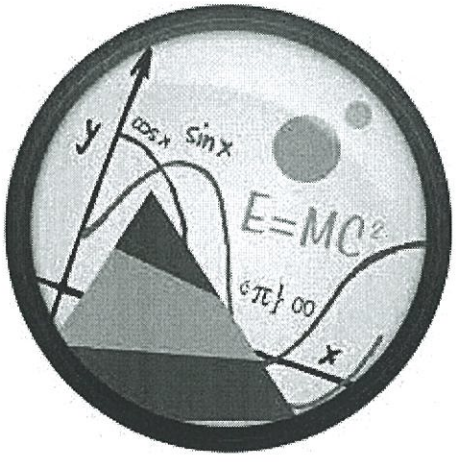
$x = \frac{33}{4}$

$y = \frac{7}{2}$

ADDMATHS
2019

LINEAR LAW/HUKUM LINEAR

(10 MARKS/10 MARKAH)



QUESTION 1/ SOALAN 1

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

Table 1 shows the values of two variables, x and y, obtained from an experiment. Variables x and y are related by the equation $y = px + kx^2$, where p and k are constants .

Jadual 1 menunjukkan nilai-nilai bagi dua pembolehubah ,x and y, yang diperolehi daripada satu eksperimen . Pembolehubah x dan y dihubungkan oleh persamaan $y = px + kx^2$, *dengan keadaan p dan k ialah pemalar.*

x	1	2	3	5	6	7.4
y	3·8	11·2	20·5	50·6	70·8	103.6

Table 1
Jadual 1

(*a*) Plot $\frac{y}{x}$ against x, using a scale of 2 cm to 1 units on the x-axis and 2 cm to 2 unit on the $\frac{y}{x}$-axis . Hence, draw the line of best fit. [4 *marks*]

Plot $\frac{y}{x}$ *melawan x, dengan menggunakan skala* 2 cm *kepada* 1 *unit pada paksi-x dan* 2 cm *kepada* 2 *unit pada paksi-* $\frac{y}{x}$. *Seterusnya, lukis garis lurus penyuaian terbaik.* [4 *markah*]

(*b*) Use the graph in 7(*a*) to find the value of
Gunakan graf anda di 7(*a*) *untuk mencari nilai*

(i) p,

(ii) k,

(iii) x when $y = 5x$.
x *bila* $y = 5x$.

[6 marks]
[6 *markah*]

QUESTION 2/ SOALAN 2

Table 9 shows the value of two variables V and R, obtained form an experiment.

Jadual 9 menunjukkan nilai-nilai bagi pemboleh ubah V dan R yang diperoleh daripada suatu ujikaji.

A particle moving in a certain medium with speed v m s^{-1} experiences a resistance toward the motion of R Newton. It is believed that R and V are related by the equation $R = pv^{2X}$, where p and q are constants.

Suatu zarah bergerak dalam suatu medium dengan halaju v m s^{-1} mengalami rintangan terhadap pergerakan R Newton. Diketahui bahawa R dan V dihubungkan oleh persamaan $R = pv^{2X}$ dengan keadaan p dan q adalah pemalar.

V	5	10	15	20	25	30
R	32	96	180	302	410	562

Table 9/Jadual 9

By using a scale 2 cm to 0.2 unit on x-axis and 2 cm to 0.5 unit on y-axis.

Dengan menggunakan skala 2 cm kepada 0.2 cm pada paksi-x dan 2 cm kepada 0.5 unit pada paksi-y.

(a) draw the graph of $\log_{10} R$ against $\log_{10} V$

Lukiskan graf $\log_{10} R$ melawan $\log_{10} V$ (5 marks)

(5 markah)

(b) use your graph, estimate the value of

Dengan menggunakan graf anda anggarkan nilai bagi

(i) p and q

p dan q

(ii) the speed for which the resistance is 125 Newton

Halaju zarah apabila rintangan berjumlah 125 Newton (5 marks)

(5 markah)

QUESTION 3 / SOALAN 3

Table 2 shows the values of two variables, x and y, obtained from an experiment. The variables x and y are related by the equation, $y = p(x+1)^q$, where p and q are constants.

Jadual 2 menunjukkan nilai-nilai bagi dua pembolehubah, x dan y, yang diperolehi daripada satu ujikaji. Pembolehubah x dan y dihubungkan oleh persamaan $y = p(x+1)^q$, *dengan keadaan p* dan *q ialah pemalar.*

x	1	2	3	4	5	6
y	5	6.5	7.8	8.9	10	10.9

Table 2

Jadual 2

(a) Based on Table 8, construct a table for the values of $\log_{10} y$ and $\log_{10}(x+1)$.

[2 *marks*]

Berdasarkan Jadual 8, bina satu jadual bagi nilai-nilai $\log_{10} y$ *dan* $\log_{10}(x+1)$.

[2 *markah*]

(b) Plot $\log_{10} y$ against $\log_{10}(x+1)$, using a scale of 2 cm to 0.1 unit on both axes. Hence draw the line of best fit.

[4 *marks*]

Plot $\log_{10} y$ *melawan* $\log_{10}(x+1)$, *dengan menggunakan skala* 2 cm *kepada* 0.1 *unit pada kedua-dua paksi. Seterusnya, lukiskan garis lurus penyuaian terbaik.*

[4 *markah*]

(c) Use your graph in 9*(b)* to find the value of

Guna graf anda di 9(b) untuk mencari nilai

(i) p

(ii) q

[4 *marks*]

[4 *markah*]

QUESTION 4/ SOALAN 4

Table 1 shows the values of two variables, x and y, obtained from an experiment. A straight line will be obtained when a graph of xy against x^2 is plotted.
Jadual 1 menunjukkan nilai-nilai bagi dua pembolehubah, x dan y, yang diperoleh daripada suatu eksperimen. Satu garis lurus akan diperoleh apabila graf xy melawan x^2 diplotkan.

x	1	2	3	4	5	6
y	3.40	2.30	2.33	2.35	2.68	3.00

Table 1 /*Jadual 1*

(a) Based on Table 1, construct a table for the values of x^2 and xy. [2 *marks*]
Berdasarkan Jadual 1, bina satu jadual bagi nilai-nilai x^2 dan xy. [2 *markah*]

(b) Plot xy against x^2, using a scale of 2 cm to 5 units on the x^2-axis and 2 cm to 2 units on the xy-axis.
Hence, draw the line of best fit. [3 *marks*]
Plot xy melawan x^2, menggunakan skala 2 cm kepada 5 unit pada paksi-x^2 dan 2 cm kepada 2 unit pada paksi-xy.
Seterusnya, lukis garis lurus penyuaian terbaik. [3 *markah*]

(c) Using the graph in 9(b)
Menggunakan graf di 9(b)

(i) find the value of y when $x = 4.5$
cari nilai y apabila $x = 4.5$

(ii) express y in terms of x.
ungkapkan y dalam sebutan x.

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

QUESTION 5/ SOALAN 5

Use the graph paper provided on page **23** to answer this question. Detach the graph paper and tie together with your answer booklet.

Gunakan kertas graf yang disediakan pada halaman **23** *untuk menjawab soalan ini. Ceraikan kertas graf itu dan ikat bersama-sama buku jawapan anda.*

Table 1 shows the values of two variables, x and y, obtained from an experiment. Variable x and y are related by the equation $y = rx^2 + \frac{s}{x}$, where r and s are constants.

Jadual 1 *menunjukkan nilai-nilai bagi dua pembolehubah,* x *dan* y *yang diperoleh daripada satu eksperimen. Pembolehubah* x *dan pembolehubah* y *dihubungkan oleh persamaan* $y = rx^2 + \frac{s}{x}$, *dengan keadaan* r *dan* s *ialah pemalar.*

x	0·82	1.00	1·15	1·30	1·45	1·54
y	106·10	80.00	63·48	48·46	35·17	27·27

Table 1
Jadual 1

(*a*) Plot xy against x^3, by using a scale of 2 cm to 0·5 unit on the x^3-axis and 2 cm to 10 units on the xy-axis. Hence, draw the line of best fit. [5 *marks*]

Plot xy *melawan* x^3, *dengan menggunakan skala* 2 cm *kepada* 0.5 *unit pada paksi-*x^3 *dan* 2 cm *kepada* 10 *unit pada paksi-*xy. *Seterusnya, lukis graf garis lurus penyuaian terbaik.* [5 *markah*]

(*b*) Use your graph from 10(*a*) to find the value of

Gunakan graf anda dari 10(*a*) *untuk mencari nilai*

(i) r,

(ii) s,

(iii) x if $y = \frac{45}{x}$.

x *jika* $y = \frac{45}{x}$.

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

QUESTION 6/ SOALAN 6

Table 1 shows the values of two variables, x and y, obtained from an experiment. Variables x and y are related by the equation $px^2 - y = qx$, where p and q are constants.
Jadual 1 menunjukkan nilai-nilai bagi dua pembolehubah, x dan y, yang diperoleh daripada suatu eksperimen. Pembolehubah x dan y dihubungkan oleh persamaan $px^2 - y = qx$, dengan keadaan p dan q ialah pemalar.

x	2	3	4	5	6	7
y	4.4	10.5	19.6	31.5	46.2	63

Table 1
Jadual 1

(a) Based on Table 8, construct a table for the values of $\frac{y}{x}$. [1 *marks*]

Berdasarkan Jadual 8, bina satu jadual bagi nilai-nilai $\frac{y}{x}$. [1 *markah*]

(b) Plot $\frac{y}{x}$ against x, using scale of 2 cm to 1 unit on both axis.

Hence, draw the line of the best fit. [3 *marks*]

Plot $\frac{y}{x}$ *melawan* x, *dengan menggunakan skala* 2 cm *kepada* 1 *unit kepada kedua-dua paksi.*

Seterusnya, lukis garis lurus penyuaian yang terbaik. [3 *markah*]

(c) Using the graph in 8 (b), find the value of
Menggunakan graf di 8 (b), *cari nilai*

(i) y when $x = 1.2$,
y *apabila* $x = 1.2$,

(ii) p

(iii) q

[6 *marks*]
[6 *markah*]

QUESTION 7 / SOALAN 7

Use graph paper to answer this question.

Gunakan kertas graf untuk menjawab soalan ini.

Table 2 shows the values of two variable , x and y, obtained from an experiment. The variables x and y are related by the equations $y = p\sqrt{x} + \frac{1}{q\sqrt{x}}$, where p and q are constant.

Jadual 2 menunjukkan nilai-nilai bagi dua pemboleh ubah, x dan y yang diperoleh daripada suatu eksperiment. Pemboleh ubah x dan y dihubungkan oleh persamaan $y = p\sqrt{x} + \frac{1}{q\sqrt{x}}$ dengan p dan q adalah pemalar.

x	4	8	12	16	20	24
y	8.88	10.61	11.55	12.75	13.64	15.11

Table 2
Jadual 2

(a) Based on table 2, construct a table for the values of $y\sqrt{x}$ [1 *mark*]

Berdasarkan Jadual 2, bina satu jadual bagi nilai $y\sqrt{x}$ [1 *markah*]

(b) Plot $y\sqrt{x}$ against x ,using a scale of 2 cm to 4 unit on the x -axis and 2 cm to 10 unit on the $y\sqrt{x}$ -axis.

Hence, draw the line of best fit. [3 *marks*]

Plot $y\sqrt{x}$ melawan x, dengan menggunakan skala 2 cm *kepada* 4 *unit pada paksi- x dan* 2 cm *kepada* 10 *unit pada paksi- $y\sqrt{x}$.*

Seterusnya, lukis garis lurus penyuaian terbaik. [3 *markah*]

(c) Use the graph in 8(*b*) to find the values of

Gunakan graf di 8(b) untuk mencari nilai

(i) y when $x = 10$
y *bila* $x = 10$

(ii) p

(iii) q

[6 *marks*]

[6 *markah*]

QUESTION 8/ SOALAN 8

Table 2 shows the value of two variables, x and y, obtained from an experiment. The variables x and y are related by the equation $y + hx = kx^3$, where h and k are constants.

Jadual 2 menunjukkan nilai-nilai bagi dua pemboleh ubah, x dan y, yang diperoleh daripada suatu eksperimen. Pemboleh ubah x dan y dihubungkan oleh persamaan $y + hx = kx^3$, *dengan keadaan h dan k ialah pemalar.*

x	0.50	1.00	1.25	1.50	1.75	2.00
y	2.20	3.55	3.69	3.30	2.28	0.50

Table 2

Jadual 2

a) Plot $\frac{y}{x}$ against x^2, using a scale of 2 cm to 0.5 unit on both axes. Hence, draw the line of best fit. [5 *marks*]

Plot $\frac{y}{x}$ *melawan* x^2, *menggunakan skala* 2 cm to 0.5 *unit pada kedua-dua paksi. Seterusnya, lukis garis lurus penyuaian terbaik.* [5 *markah*]

b) Using the graph in 10(a), find the value of

Menggunakan graf 10(a), *cari nilai*

i) h

ii) k

iii) y if $y = 2x$.

y *jika* $y = 2x$.

[5 *marks*]

[5 *markah*]

QUESTION 9/ SOALAN 9

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

x	2	4	6	7	8	9
y	4.5	12.5	27.0	38.0	52.0	69.3

Table/ *Jadual* 9

Table 9 shows the values of two variables, x and y, obtained from an experiment. Variables x and y are related by the equation $y = px + qx^3$, where p and q are constants.
Jadual menunjukkan nilai-nilai bagi dua pembolehubah, x dan y, yang diperoleh daripada satu eksperimen. Pembolehubah x dan y dihubungkan oleh persamaan $y = px + qx^3$, dengan keadaan p dan q ialah pemalar.

[4 marks/ *markah*]

(a) Plot $\frac{y}{x}$ against x^2 using a suitable scales on both axis. Hence draw the line of best fit.

Plot $\frac{y}{x}$ melawan x^2 dengan menggunakan skala yang sesuai pada kedua-dua paksi. Seterusnya, lukiskan garis lurus penyuaian terbaik.

(b) Use your graph in 9(*a*) to find the value of
Gunakan graf di 9(a) untuk mencari nilai

(i) p

(ii) q

(iii) y when x = 5.
y apabila x = 5.

[6 marks/ *markah*]

QUESTION 10/ SOALAN 10

Table 10 shows the values of two variables, x and y, obtained from an experiment.
The variables x and y are related by the equation $y = pk^x$, where p and k are constants.

Jadual 10 *menunjukkan nilai-nilai bagi dua pemboleh ubah, x dan y, yang diperoleh daripada suatu eksperimen.*
Pemboleh ubah x dan y dihubungkan oleh persamaan $y = pk^x$, *dengan keadaan p dan k ialah pemalar.*

x	1	2	3	4	5	6
y	1·80	2·70	4·05	6·08	9·11	11·22

Table 10
Jadual 10

One of the values of y is incorrectly recorded.
Satu daripada nilai y telah salah direkodkan.

(*a*) Based on Table 10, construct the table for the values of $\log_{10} y$. [2 *marks*]
Berdasarkan Jadual 10, *bina jadual untuk nilai-nilai* $\log_{10} y$. [2 *markah*]

(*b*) Plot $\log_{10} y$ against x, using a scale of 2 cm to 1 unit on the x-axis and 2 cm to 0·1 unit of the $\log_{10} y$-axis.
Hence, draw the line of best fit. [5 *marks*]

Plot $\log_{10} y$ *melawan x, menggunakan skala* 2 cm *kepada* 1 *unit pada paksi-x dan* 2 cm *kepada* 0·1 *unit pada paksi-*$\log_{10} y$.
Seterusnya, lukis garis lurus penyuaian terbaik. [5 *markah*]

(*c*) Using the graph in **10**(*b*)
Menggunakan graf di **10**(*b*)

(i) state the value of y which is incorrectly recorded and find its actual value.
nyatakan nilai y yang tersalah rekod dan cari nilai sebenarnya.

(ii) find the value of p and of k.
cari nilai p dan nilai k.

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

QUESTION 11/ SOALAN 11

Table 10 shows the values of two variables, x and y, obtained from an experiment.
The variables x and y are related by the equation $ky = hx - xy$, where h and k are constants.

Jadual 10 *menunjukkan nilai-nilai bagi dua pemboleh ubah,* x *dan* y, *yang diperoleh daripada suatu eksperimen.*
Pemboleh ubah x *dan* y *dihubungkan oleh persamaan* $ky = hx - xy$, *dengan keadaan* h *dan* k *ialah pemalar.*

x	1·5	2·5	4·0	5·0	6·0	8·0	10·0
y	4·55	1·10	0·77	0·70	0·66	0·64	0·60

Table 10
Jadual 10

(*a*) Based on Table 10, construct the table for the values of $\frac{1}{y}$ and $\frac{1}{x}$. [2 *marks*]

Berdasarkan Jadual 10, *bina jadual bagi nilai-nilai* $\frac{1}{y}$ *dan* $\frac{1}{x}$. [2 *markah*]

(*b*) Plot $\frac{1}{y}$ against $\frac{1}{x}$, using a scale of 2 cm to 0·1 unit on the $\frac{1}{x}$-axis and 2 cm to 0·2 unit on the $\frac{1}{y}$-axis.

Hence, draw the line of best fit. [3 *marks*]

Plot $\frac{1}{y}$ *melawan* $\frac{1}{x}$, *menggunakan skala* 2 cm *kepada* 0·1 *unit pada paksi-*$\frac{1}{x}$ *dan* 2 cm *kepada* 0·2 *unit pada paksi-*$\frac{1}{y}$.

Seterusnya, lukis garis lurus penyuaian terbaik. [3 *markah*]

(*c*) Using the graph in **10**(*b*), find the value of
Menggunakan graf di **10**(*b*), *cari nilai*

(i) h

(ii) k

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

QUESTION 12/ SOALAN 12

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

Table 2 shows the values of two variables, x and y, obtained from an experiment. The variables x and y are related by the equation $y = \frac{2k}{p^x}$, where k and p are constants.

Jadual 2 menunjukkan nilai-nilai bagi dua pembolehubah, x dan y, yang diperoleh daripada suatu eksperimen. Pembolehubah x dan y dihubungkan oleh persamaan $y = \frac{2k}{p^x}$, *dengan keadaan k dan p ialah pemalar.*

x	1	3	4	5	6.5	8
y	4.17	2.95	2.4	2.14	1.62	1.26

Table 2
Jadual 2

(*a*) Based on Table 2, construct a table for the values of $\log_{10} y$. [1 *marks*]
Berdasarkan Jadual 2, bina satu jadual bagi nilai-nilai $\log_{10} y$. [1 *markah*]

(*b*) Plot $\log_{10} y$ against x, using a scale of 2 cm to 1 unit on the x-axis and 2 cm to 0.1 unit on the $\log_{10} y$-axis. Hence, draw the line of best fit. [3 *marks*]
Plot $\log_{10} y$ *melawan x, menggunakan skala* 2 cm *kepada* 1 *unit pada paksi-x dan* 2 cm *kepada* 0.1 *unit pada paksi-*$\log_{10} y$. *Seterusnya, lukis garis lurus penyuaian terbaik.* [3 *markah*]

(*c*) Using the graph in 7(*b*), find the value of
Menggunakan graf di 7(*b*), *cari nilai*

(i) x when $y = 2$,
x *apabila* $y = 2$,

(ii) k,

(iii) p.

[6 *marks*]
[6 *markah*]

QUESTION 13/ SOALAN 13

Table 9 shows the relation between the rate of reaction of a particular chemical substance, x *moles*$^{-1}$, with the temperature, T °C. Given that T and x are related by the equation $T + 8 = Kn^x$, where K and n are constants.

Jadual 9 menunjukkan hubungan antara kadar tindakbalas suatu bahan kimia, x *mols*$^{-1}$*, dengan suhu,* T °C*. Diberi bahawa* T *dan* x *dihubungkan oleh persamaan* $T + 8 = Kn^x$*, dengan keadaan* K *dan* n *adalah pemalar.*

x (mols^{-1})	0·8	2·5	4·0	5·8	7·5	9·1
T (°C)	–5·23	–2·49	2·13	12·89	33·69	71·43

Table 9/ *Jadual 9*

(a) Plot the graph $\log_{10}(T + 8)$ against x using the scale of 2 cm to 1 unit on the x-axis and 2 cm to 0·2 unit on the $\log_{10}(T + 8)$-axis. Hence, draw a line of best fit.

[4 marks]

Plotkan $\log_{10}(T + 8)$ *melawan* x *dengan menggunakan skala* 2 cm *kepada* 1 unit *pada paksi-*x *dan* 2 cm *kepada* 0·2 *unit pada paksi-*$\log_{10}(T + 8)$. *Seterusnya, lukiskan garis lurus penyuaian terbaik.*

[4 markah]

(b) Use your graph from (*a*) to find the value of
Gunakan graf anda dari (*a*) *untuk mencari nilai*
(i) k
(ii) n

[5 marks]
[5 markah]

(c) Hence, find the value of T when $x = 6·5$.

Seterusnya, cari nilai T *apabila* $x = 6·5$.

[1 mark]

[1 markah]

QUESTION 14/ SOALAN 14

Table 2 shows the values of two variables *x* and *y*, obtained from an experiment. Variables *x* and *y* are related by the equation $y = hx^3 + (k+h)x^2$, where *h* and *k* are constants.

Jadual 2 menunjukkan nilai-nilai bagi dua pemboleh ubah, x dan y, yang diperoleh daripada satu eksperimen. Pemboleh ubah x dan y dihubungkan oleh persamaan $y = hx^3 + (k+h)x^2$, *dengan keadaan h dan k ialah pemalar.*

x	1	2	4	5	6	8
y	7.00	35.8	208.3	375.1	611.8	1344.5

Table 2
Jadual 2

(a) Plot $\frac{y}{x^2}$ against *x*, using a scale of 2 cm to 1 unit on the *x*-axis and 2 cm to 2 units on the $\frac{y}{x^2}$ -axis. Hence, draw the line of best fit. [4 marks]

Plot $\frac{y}{x^2}$ *melawan x, dengan menggunakan skala 2 cm kepada 1 unit pada paksi-x dan 2 cm kepada 2 unit pada paksi* $\frac{y}{x^2}$. *Seterusnya, lukis satu garis lurus penyuaian terbaik.*

[4 *markah*]

(b) Use the graph in 9(a) to find the value of
Gunakan graf di 9(a) untuk mencari nilai

(i) *h*

(ii) *k*

(iii) *y* when *x* = 2.5.
y apabila *x* = 2.5.

[6 marks]
[6 *markah*]

QUESTION 15/ SOALAN 15

Table 7 shows the values of two variables, x and y, obtained from an experiment. Variables x and y are related from an experiment by $y = \frac{h}{x} + \frac{k}{x^2}$, where h and k are constants.

Jadual 7 menunjukkan nilai-nilai bagi dua pembolehubah, x dan y, yang diperoleh daripada satu eksperimen. Pembolehubah x dan y, dihubungkan oleh persamaan, $y = \frac{h}{x} + \frac{k}{x^2}$ *, dengan keadaan h dan k adalah pemalar.*

x	2.0	4.0	6.0	8.0	10.0
y	0.25	0.31	0.25	0.20	0.17

Diagram 7
Rajah 7

(a) Based on above table, construct a table for the values of x^2y. [1 mark]
Berdasarkan jadual diatas, bina satu jadual bagi nilai-nilai x^2y. [1 *mark*ah]

(b) Plot x^2y against x, using a scale of 2 cm to 1 unit on the x–axis and 2 cm to 2 units on the x^2y –axis. Hence, draw the line of best fit.

[3 marks]

Plot x^2y *melawan x, dengan menggunakan skala* 2 cm *kepada* 1 unit *pada paksi–x dan* 2 cm *kepada* 2 unit *pada paksi–* x^2y. *Seterusnya, lukis garis lurus penyuaian terbaik.*

[3 *mark*ah]

(c) Use your graph to find the value of
Gunakan graf anda untuk mencari nilai

(i) y when x = 2.5,
y *apabila* x = 2.5,

(ii) h,

(iii) k.

[6 marks]
[6 *mark*ah]

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QUESTION 1

No.7

x	1	2	3	5	6	7.4
y	3.8	5.6	6.83	10.12	11.8	14

N1

$\frac{y}{x} = kx + p$ P1

b(i) p = y – Intercept = 2.2 N1

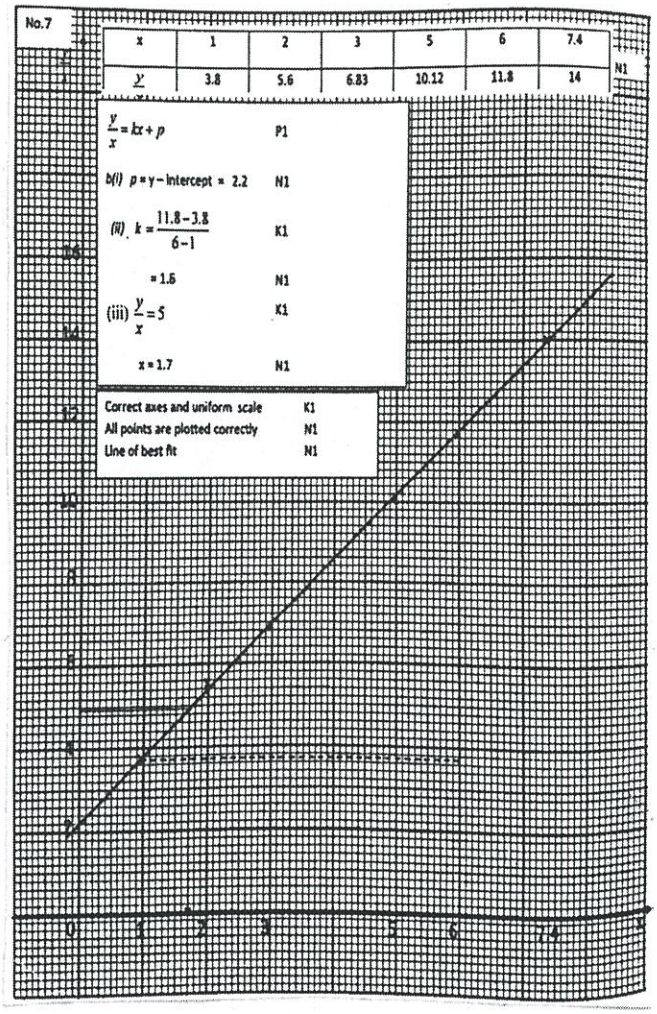
(ii) $k = \frac{11.8 - 3.8}{6 - 1}$ K1

$= 1.6$ N1

(iii) $\frac{y}{x} = 5$ K1

$x = 1.7$ N1

Correct axes and uniform scale K1
All points are plotted correctly N1
Line of best fit N1



QUESTION 2

(a)

$log_{10}V$	0.700	1.00	1.176	1.301	1.398	1.477
$log_{10}R$	1.505	1.982	2.255	2.480	2.613	2.750

Plot $log_{10}R$ against $log_{10}V$
(Correct axes and uniform scales)

6 *points plotted correctly

Line of best fit

(at least *5 points plotted)

(Refer graph on page 17)

(b) $log_{10}R = 2q\, log_{10}V + log_{10}P$ P1

(i) Use $*m = 2q$ or $*c = log_{10}P$

$2q = \frac{2.9 - 1}{1.6 - 0.4}$ $log_{10}P = 0.4$

$q = 7917$ N1 $P = 2.512$ N1

(ii) V = 12.02 N1

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QUESTION 3

(a)

$\log_{10}(x+1)$	0.30	0.48	0.60	0.70	0.78	0.85
$\log_{10} y$	0.70	0.81	0.89	0.95	1.00	1.04

(b) **RUJUK GRAF**

$\log_{10} y = q \log_{10}(x+1) + \log_{10} p$ **P1**

(c)

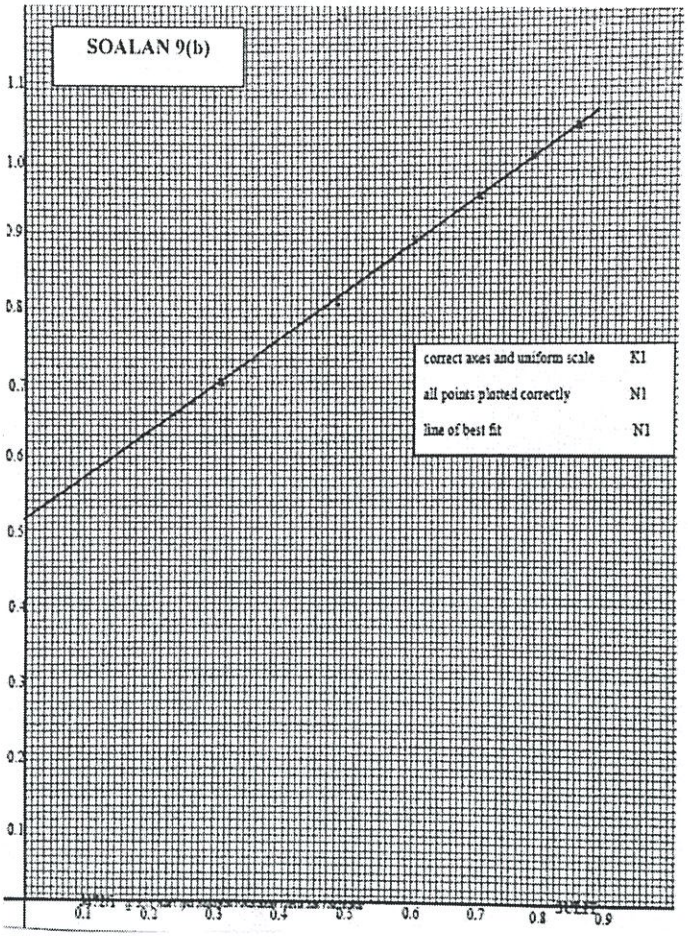
(i) $\log_{10} p = 00.515$ K1

$p = 3.27$ N1

(ii) $q = \dfrac{1.04 - 0.7}{0.85 - 0.3}$ atau setara K1

$q = 0.6$ N1

QUESTION 3



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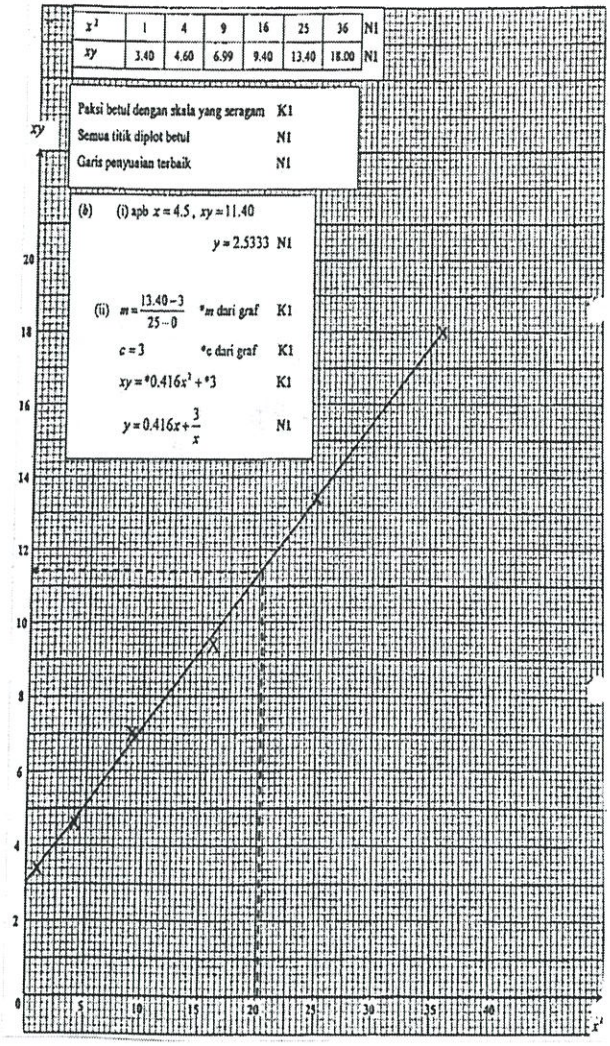
QUESTION 4

x^2	1	4	9	16	25	36	N1
xy	3.40	4.60	6.99	9.40	13.40	18.00	N1

Paksi betul dengan skala yang seragam K1
Semua titik diplot betul N1
Garis penyuaian terbaik N1

(b) (i) apb $x = 4.5$, $xy = 11.40$
$y = 2.5333$ N1

(ii) $m = \frac{13.40 - 3}{25 - 0}$ *m dari graf K1
$c = 3$ *c dari graf K1
$xy = *0.416x^2 + *3$ K1
$y = 0.416x + \frac{3}{x}$ N1



QUESTION 5

(b) $xy = rx^2 + s$

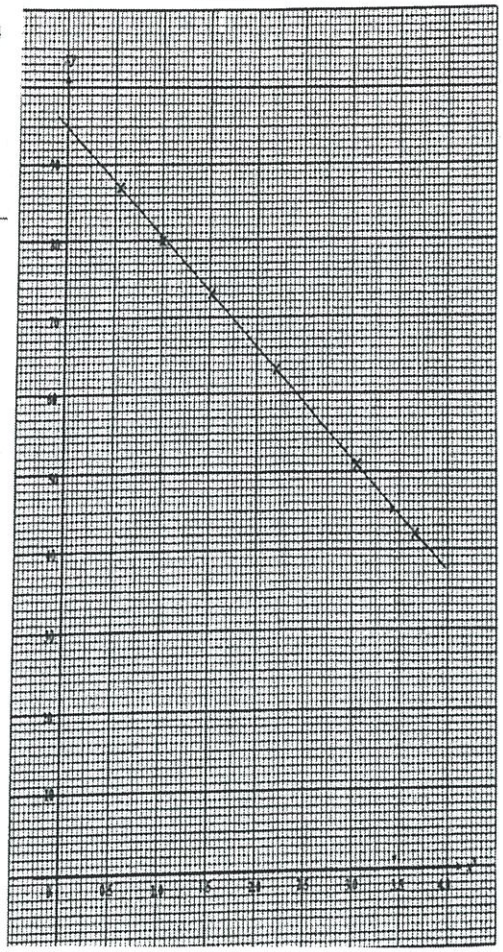
(i) $r = -15.4 \leftrightarrow -13.4$

(ii) $s = 93.7 \leftrightarrow 95.7$

(iii) $x = 1.46 \leftrightarrow 1.56$

Graph for Question 10

x^2	0.55	1.00	1.52	2.20	3.05	3.65
xy	87	80	73	63	51	42



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QUESTION 6

x	2	3	4	5	6	7
$\frac{y}{x}$	2.2	3.5	4.9	6.3	7.7	9

(b) Rujuk lampiran

Plot one point correctly

Plot all point correctly

Line of best fit

(c) $\frac{y}{x} = px - q$

(i) $y = 1.32 \pm 0.2$

(ii) $p = m$

$p = 1.327 \pm 0.2$

(iii) $-q = c$

$q = 0.5$

QUESTION 7

(a)

$y\sqrt{x}$	17.76	30.01	40.01	50.99	61.00	74.02

(b) Refer graph

Plot one point correctly

Plot all points correctly

Line Of best fit

(c) $y\sqrt{x} = px + \frac{1}{q}$

(i) $y = 11.68 \pm 0.5$

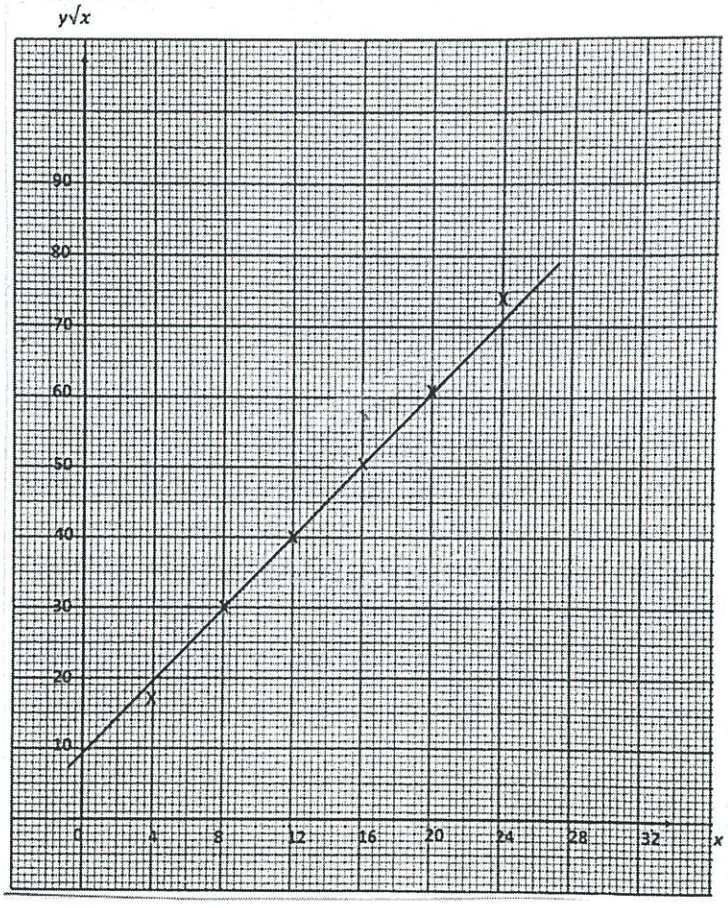
(ii) $m = \frac{40.01 - 30.01}{12 - 8}$

$= 2.50$

$\therefore p = 2.50 \pm 0.5$

(iii) $9 = \frac{1}{q}$

$q = 0.1111 \pm 0.2$



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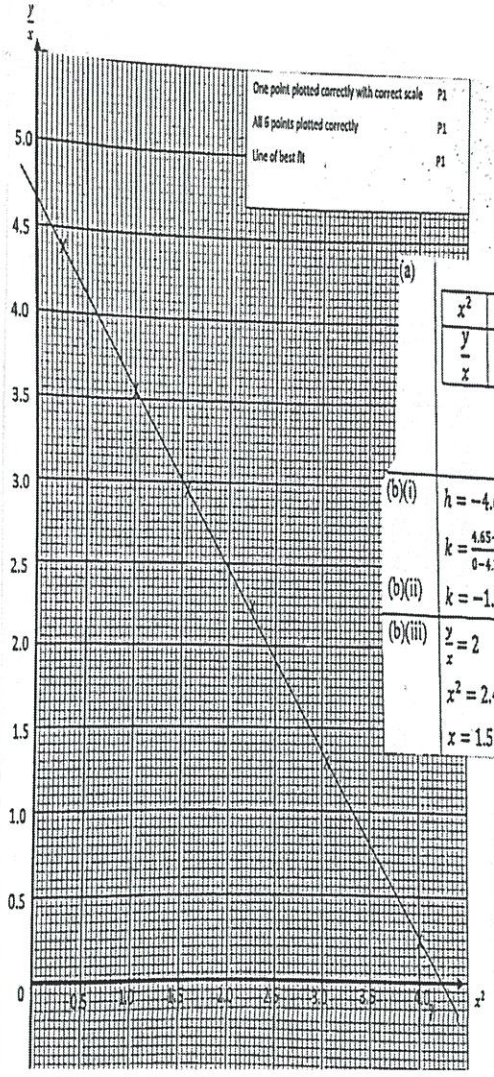
QUESTION 8



(a)

x^2	0.25	1.00	1.56	2.25	3.06	4.00
$\frac{y}{x}$	4.40	3.55	2.95	2.20	1.30	0.25

$y + hx = kx^3$

$\frac{y}{x} = kx^2 - h$

(b)(i) $h = -4.65$

$k = \frac{4.65 - 0}{0 - 4.25}$

(b)(ii) $k = -1.094$

(b)(iii) $\frac{y}{x} = 2$

$x^2 = 2.4$

$x = 1.549$

QUESTION 9

ANSWER / JAWAPAN

SIR VEN : 012 – 351 6764
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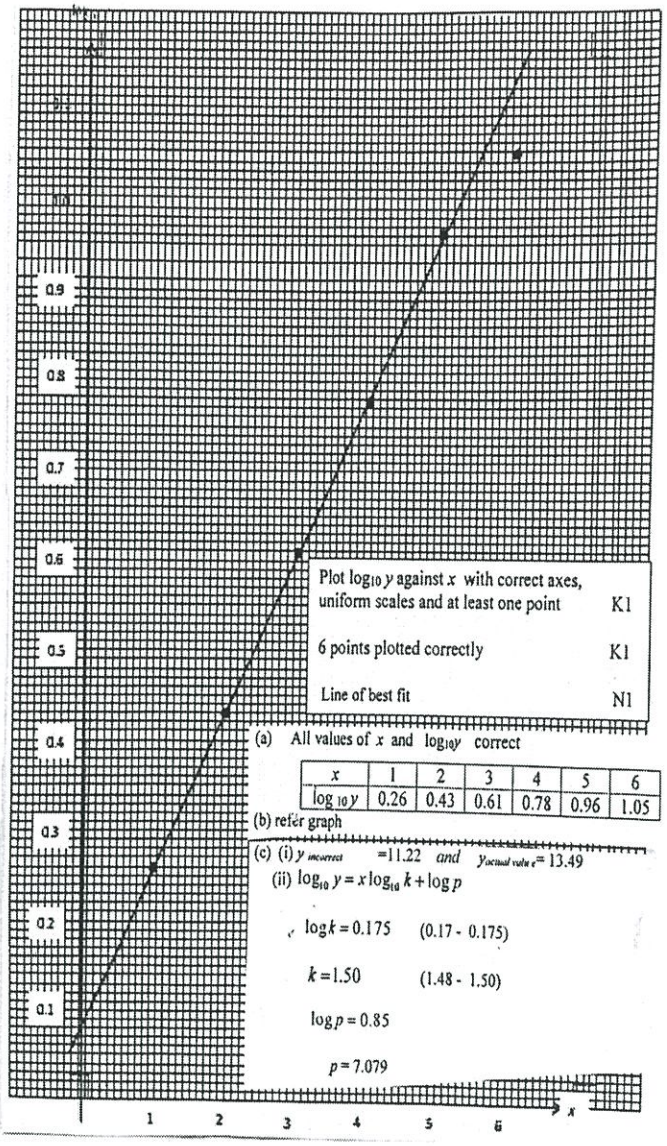
QUESTION 10



Plot $\log_{10} y$ against x with correct axes, uniform scales and at least one point — K1

6 points plotted correctly — K1

Line of best fit — N1

(a) All values of x and $\log_{10} y$ correct

x	1	2	3	4	5	6
$\log_{10} y$	0.26	0.43	0.61	0.78	0.96	1.05

(b) refer graph

(c) (i) $y_{\text{incorrect}} = 11.22$ and $y_{\text{actual value}} = 13.49$

(ii) $\log_{10} y = x \log_{10} k + \log p$

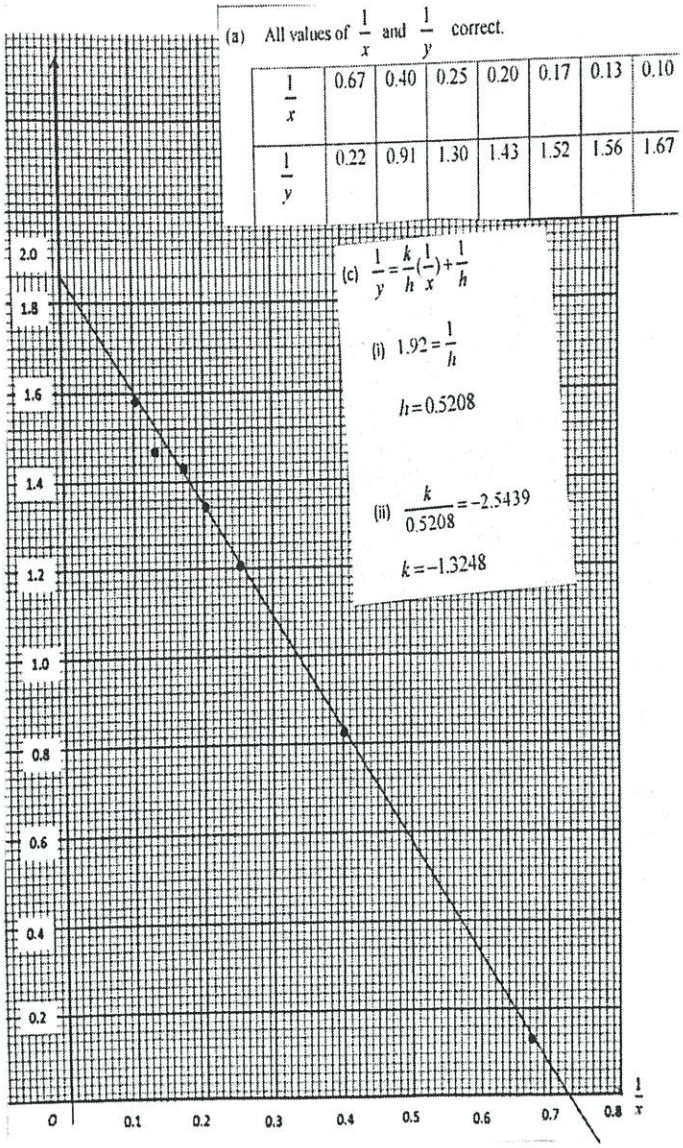
$\log k = 0.175$ (0.17 - 0.175)

$k = 1.50$ (1.48 - 1.50)

$\log p = 0.85$

$p = 7.079$

QUESTION 11



(a) All values of $\frac{1}{x}$ and $\frac{1}{y}$ correct.

$\frac{1}{x}$	0.67	0.40	0.25	0.20	0.17	0.13	0.10
$\frac{1}{y}$	0.22	0.91	1.30	1.43	1.52	1.56	1.67

(c) $\frac{1}{y} = \frac{k}{h}\left(\frac{1}{x}\right) + \frac{1}{h}$

(i) $1.92 = \frac{1}{h}$

$h = 0.5208$

(ii) $\frac{k}{0.5208} = -2.5439$

$k = -1.3248$

ANSWER / JAWAPAN

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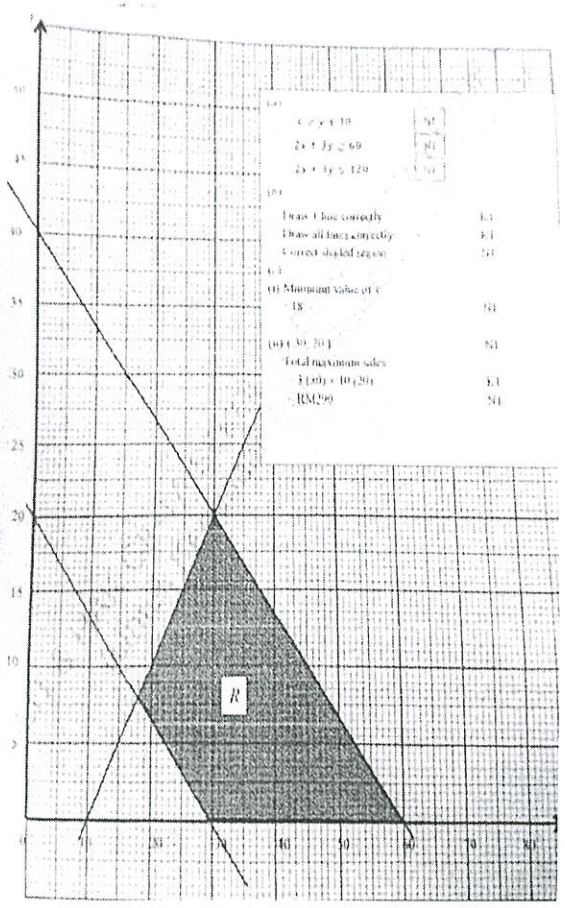
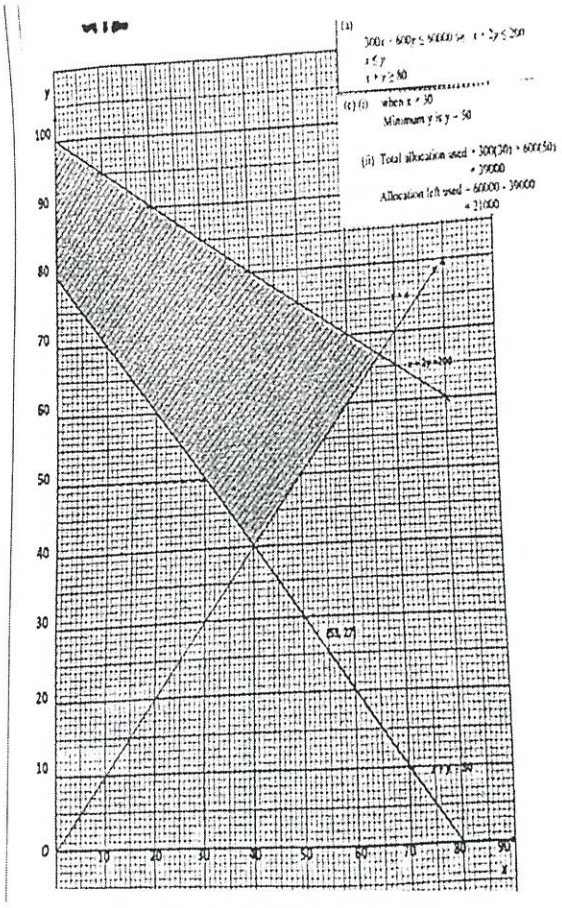
QUESTION 11



QUESTION 12



ANSWER / JAWAPAN

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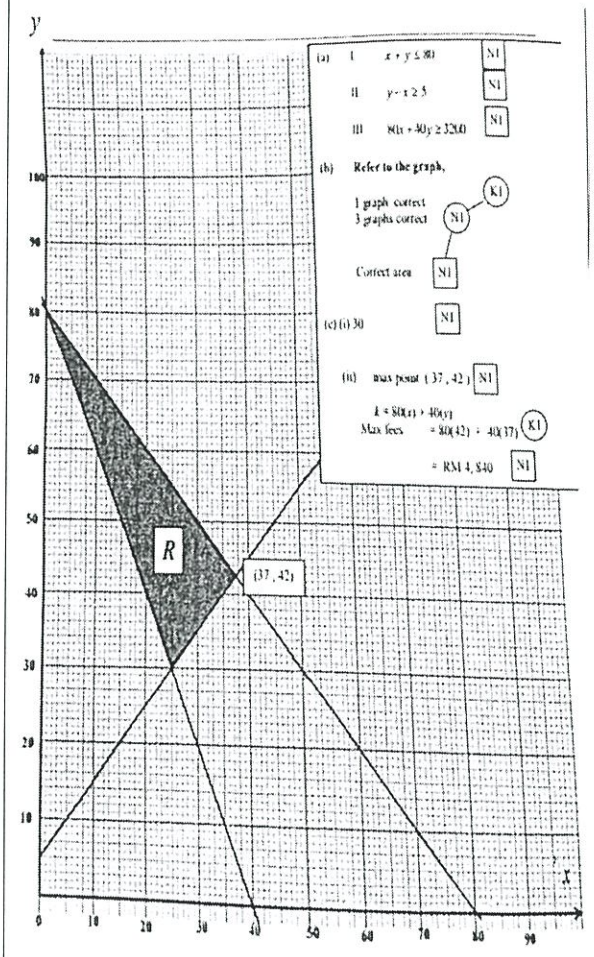
QUESTION 13



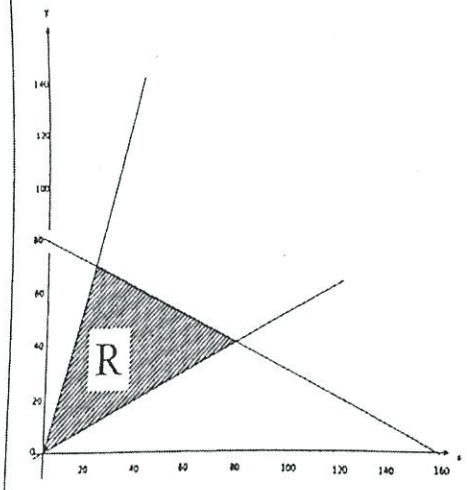
QUESTION 14

(a) I $5x + 10y \leq 800$

II $y \leq \frac{7}{2}x$

III $2y \geq x$

(b)



(c) (i) 60

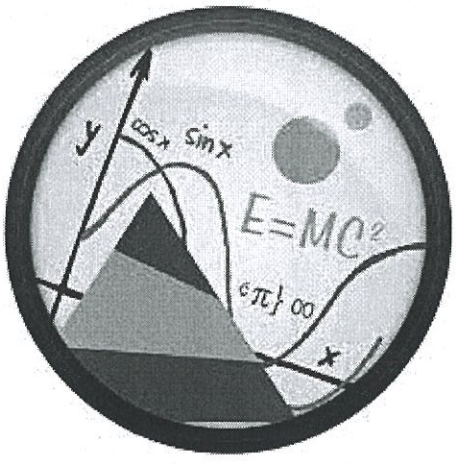
(ii) Titik maksimum (80, 40)

Keuntungan maksimum : 3(80) + 5(40)

RM440

ADDMATHS
2019

SOLUTION OF TRIANGLE/PENYELESAIAN SEGITIGA
(10 MARKS/10 MARKAH)



QUESTION 1/ SOALAN 1

Diagram 13 shows a quadrilateral *JKLM*.
Rajah 13 *menunjukkan sisi empat JKLM.*

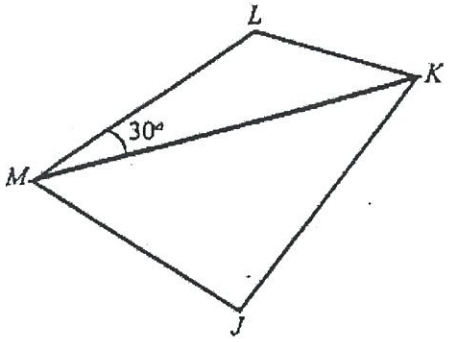


Diagram 13 / *Rajah* 13

It is given that $JK = 15$ cm, $KL = 11$ cm, $JM = 13$ cm, $\angle KML = 30°$ and the area of triangle *JKM* is 90 cm^2.
Diberi bahawa $JK = 15$ cm, $KL = 11$ cm, $JM = 13$ cm, $\angle KML = 30°$ *dan luas segitiga JKM* ialah 90 cm^2.

Calculate
Hitung

(a) (i) $\angle KJM$,

(ii) the length, in cm, of *KM*.
panjang, dalam cm, *bagi KM.*

[4 marks/4 *markah*]

(b) (i) Find $\angle MKL$ if $\angle KLM$ is an obtuse angle.
Cari $\angle MKL$ *jika* $\angle KLM$ *ialah sudut cakah.*

(ii) Hence, calculate the area, in cm^2, of quadrilateral *JKLM*.
Seterusnya, hitung luas, dalam cm^2, *bagi sisi empat JKLM.*

[6 marks/6 *markah*]

QUESTION 2/ SOALAN 2

Diagram 7 shows a triangle PQR

Rajah 7 menunjukkan satu segitiga PQR

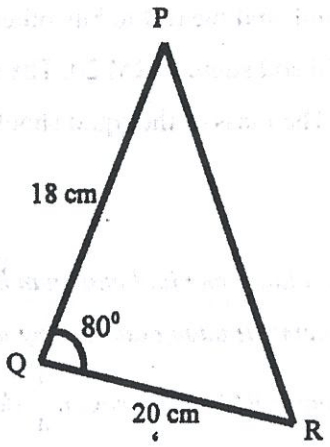


Diagram 7
Rajah 7

(*a*) Calculate length, in cm, *PR*, [2 marks]
Kira panjang, dalam cm, PR, [2 *markah*]

(*b*) A quadrilateral *PQRS* is formed with *PR* is diagonal, $\angle PRS = 40^0$ and *PS* = 16 cm. Calculate the possible values for $\angle PSR$. [3 marks]

Segiempat PQRS dibentuk dengan PR adalah pepenjuru, $\angle PRS = 40^0$ *dan PS* = 16 *cm. Kira nilai-nilai yang mungkin bagi* $\angle PSR$. [3 *markah*]

(*c*) By using a acute angle of (*b*).
Dengan menggunakan sudut tirus $\angle PSR$ *dari* (*b*).

Find
Cari

(i) length, in cm , *RS*,
panjang , dalam cm, RS,

(ii) area, in cm^2, quadrilateral *PQRS*. [5 marks]
luas, dalam cm^2, *segiempat PQRS.* [5 *markah*]

QUESTION 3/ SOALAN 3

Diagram 8 shows a triangle PQR and T lies on QR.
Rajah 8 menunjukkan sebuah segi tiga PQR dan T berada pada QR.

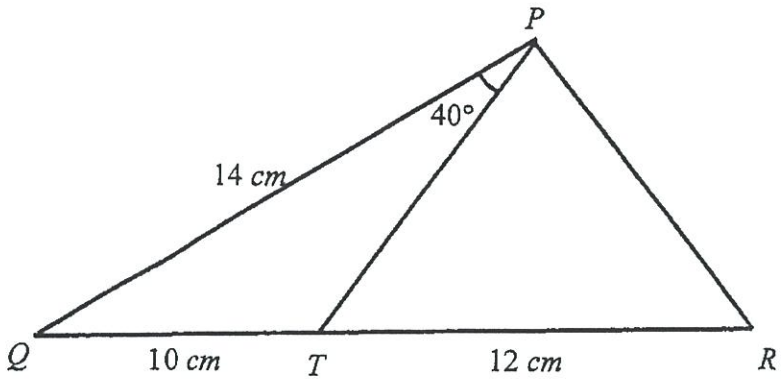


Diagram 8 / *Rajah* 8

(*a*) Find
Cari

(i) $\angle QTP$,

(ii) the length, in cm, of PR,
panjang, dalam cm, bagi PR,

(iii) the area, in cm^2, of the triangle PTR.
luas, dalam cm^2, *bagi segi tiga PTR.*

[8 *marks*]
[8 *markah*]

(*b*) Sketch and label a new triangle $QT'P$ of different shape from triangle QTP, such that the length of $QT = QT'$ and $\angle QPT = \angle QPT'$.
Hence, state $\angle QT'P$.
[2 *marks*]

Lakar dan label sebuah segi tiga $QT'P$ *yang berlainan bentuk daripada segi tiga* QTP, *dengan keadaan* $QT = QT'$ *dan* $\angle QPT = \angle QPT'$.
Seterusnya, nyatakan $\angle QT'P$.
[2 *markah*]

QUESTION 4/ SOALAN 4

Diagram 8 shows a triangle *PRS*.

Rajah 8 *menunjukkan sebuah segi tiga PRS.*

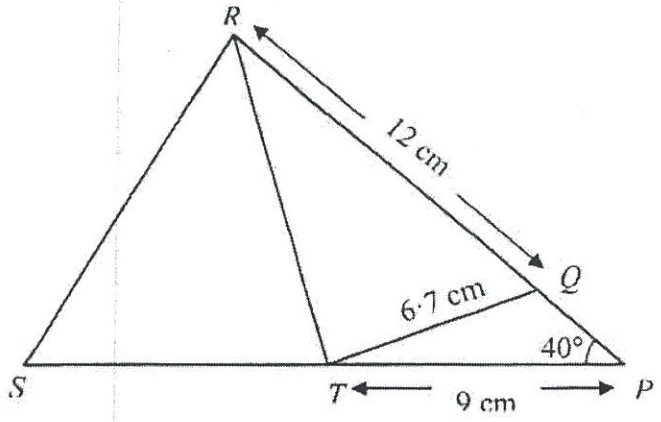


Diagram 8
Rajah 8

It is given that *PQR* and *PTS* are straight lines and $\angle PQT$ is an obtuse angle.

Diberi bahawa PQR dan PTS ialah garis lurus dan $\angle PQT$ *ialah sudut cakah.*

(*a*) Find

(i) the length, in cm, of *RT*,

Cari panjang, dalam cm, *bagi RT*,

(ii) $\angle QTR$. [6 *marks*]
[6 *markah*]

(*b*) If the area of triangle *RST* is 45 cm^2, calculate the length, in cm, of *ST*. [3 *marks*]

Jika luas segi tiga RST ialah 45 cm^2, *hitung panjang, dalam* cm, *bagi ST*.
[3 *markah*]

(*c*) Point *Q*' lies on *RP* such that *TQ*' = *TQ*. Sketch the triangle *PTQ*'. [1 *mark*]

Titik Q' berada pada RP dengan keadaan TQ' = TQ. Lakarkan segi tiga PTQ'.
[1 *markah*]

QUESTION 5/ SOALAN 5

Diagram 6 shows trapezium *ABCD*.
Rajah 6 menunjukkan trapezium ABCD.

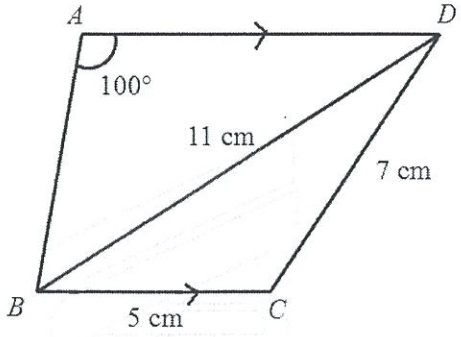


Diagram 6
Rajah 6

(a) Calculate
Hitung

(i) $\angle CBD$

(ii) the length, in cm, of AB.
panjang, dalam cm, *bagi* AB.

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

(b) The straight line BC is extended to C' such that $CD = C'D$.
Garis lurus BC dipanjangkan ke C' dengan keadaan $CD = C'D$.

(i) Sketch the triangle $BC'D$.
Lakarkan segitiga BC'D.

(ii) Calculate the area, in cm^2, of $\Delta CC'D$.
Hitung luas, dalam cm^2, *bagi* $\Delta CC'D$.

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

QUESTION 6/ SOALAN 6

Diagram 6 shows a pyramid with its triangle base placed on a horizontal plane. Vertex V is vertically above P. Given that $\angle PQR = 40°$, $PQ = 12\,\text{cm}$, $QR = 10\,\text{cm}$ and $\angle VQP = 50°$

Rajah 6 menunjukkan sebuah pyramid dengan tapak segitiga yang diletakkan atas satah mengufuk. Puncak V berada tegak di atas P. Diberi $\angle PQR = 40°$, $PQ = 12\,cm$, $QR = 10$ *cm dan* $\angle VQP = 50°$.

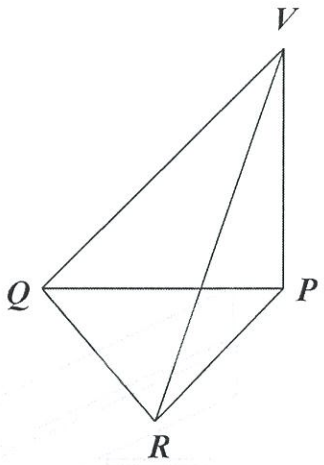


Diagram 6
Rajah 6

Calculate

Hitungkan

(a) the length of PR [2 *marks*]
panjang PR, [2 *markah*]

(b) $\angle VRP$, [2 *marks*]
[2 *markah*]

(c) the angle between the planes VQP and VRP, [2 *marks*]
sudut di antara satah VQP dan VRP, [2 *markah*]

(d) the area of the triangle VQR. [4 marks]
Luas segitiga VQR. [4 *markah*]

QUESTION 7 / SOALAN 7

. Diagram 7 shows a cyclic quadrilateral *ABCD*.
Rajah 7 menunjukkan sisi empat kitaran ABCD.

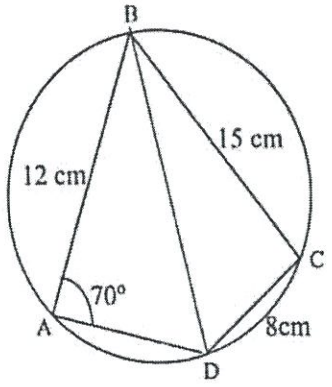


Diagram 7
Rajah 7

(a) Calculate
Hitung
(i) the length, in cm, of *BD*,
panjang, dalam cm, *bagi BD*,
(ii) $\angle ABD$.

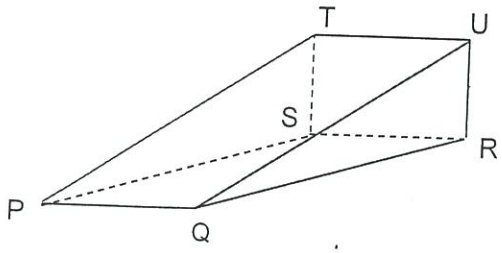
[5 *marks*]
[5 *markah*]

(b) Find
Cari
(i) the area, in cm^2, of quadrilateral *ABCD*,
luas, dalam cm^2, *bagi sisi empat ABCD*,
(ii) the shortest distance, in cm, from point *C* to *BD*.
jarak terdekat, dalam cm , *dari titik C ke BD*.

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

QUESTION 8/ SOALAN 8

(a) Diagram 14(a) shows a solid prism.
Rajah 14(a) *menunjukkan sebuah bungkah berbentuk prisma.*



Diagram/ *Rajah* 14(a)

The plane RSTU is perpendicular to the base PQRS.
Permukaan satah RSTU adalah mencancang dengan tapak PQRS.
Given PQ = SR = TU = 10 cm , TS = UR= 3 cm and ∠TQU = 30°.
Diberi PQ = SR = TU = 10 cm, TS = UR = 3 cm dan ∠TQU = 30°.

Calculate/ *Hitung*

(i) the length of QT,
panjang QT

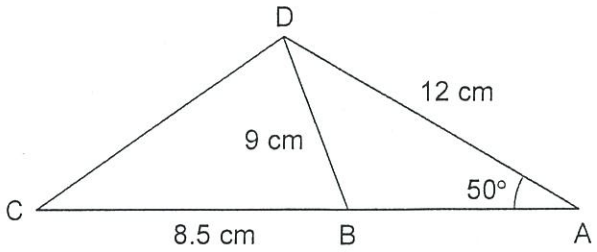
[2 marks/ markah]

ii) the angle between the line TQ and the vertical plane RSTU .
sudut di antara garis TQ dengan satah mencancang RSTU .

[2 *marks/ markah*]

QUESTION 8/ SOALAN 8

(b) Diagram 14(b) shows a triangle ACD where ABC is a straight line.
Rajah 14(b) *menunjukkan sebuah segitiga ACD di mana ABC ialah satu garis lurus.*



Diagram/ *Rajah* 15(b)

Given the length AD = 12 cm, BC = 8.5 cm, BD = 9 cm and $\angle BAD = 50°$.
Diberi panjang AD = 12 cm, BC = 8.5 cm, BD = 9 cm dan $\angle BAD = 50°$.

Calculate/ *Hitung*

(i) the obtuse angle ABD.
sudut cakah ABD.

[2 marks/ *markah*]

(ii) the length of CD.
panjang CD.

[2 marks/ *markah*]

(iii) the area of triangle ADC.
luas segitiga ADC.

[2 marks/ *markah*]

QUESTION 9 / SOALAN 9

Diagram 14 shows a triangle ABC.
Rajah 14 menunjukkan segi tiga ABC.

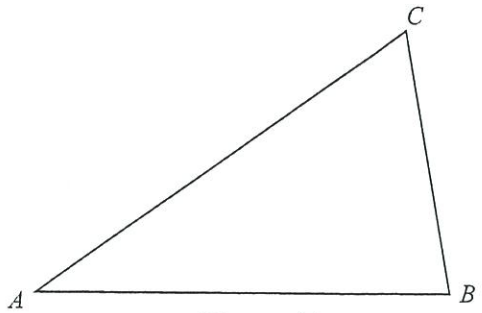


Diagram 14
Rajah 14

It is given that $AB = 5$ cm, $BC = 4{\cdot}7$ cm and $AC = 6{\cdot}5$ cm. Point D lies on line AC such that $AD = BD$.

Diberi bahawa $AB = 5$ cm, $BC = 4{\cdot}7$ cm *dan* $AC = 6{\cdot}5$ cm. *Titik D terletak atas garis AC dengan keadaan* $AD = BD$.

(*a*) Find
Cari

(i) $\angle BAC$,

(ii) the length, in cm, of BD.
panjang, dalam cm, *bagi BD.*

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

(*b*) Sketch the triangle $A'B'C'$ which has a different shape from triangle ABC such that $B'C' = BC$ and $\angle B'A'C' = \angle BAC$.
Then find the $\angle B'C'A'$, [4 *marks*]

Lakar sebuah segi tiga $A'B'C'$ *yang mempunyai bentuk berbeza daripada segi tiga ABC dengan keadaan* $B'C' = BC$ *dan* $\angle B'A'C' = \angle BAC$.
Kemudian, cari $\angle B'C'A'$, [4 *markah*]

(*c*) Calculate the area, in cm^2, of $\Delta A'B'C'$. [2 *marks*]
Hitung luas, dalam cm^2, *bagi* $\Delta A'B'C'$. [2 *markah*]

QUESTION 10/ SOALAN 10

Diagram 14 shows a triangle ABC.
Rajah 14 *menunjukkan segi tiga ABC.*

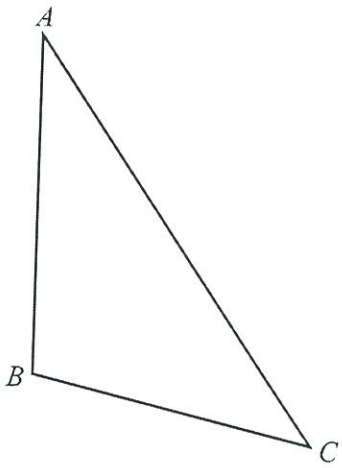


Diagram 14
Rajah 14

Given $\angle ABC = 120°$, $AB = 8$ cm and area of triangle $ABC = 24$ cm^2.
Diberi $\angle ABC = 120°$, $AB = 8$ cm *dan luas segi tiga* $ABC = 24$ cm^2.

(*a*) Calculate
Hitung

(i) the length, in cm, of BC,
panjang, dalam cm, *bagi* BC,

(ii) the length, in cm, of AC,
panjang, dalam cm, *bagi* AC,

(iii) $\angle BAC$

[6 *marks*]
[6 *markah*]

(*b*) Sketch a triangle $A'B'C'$ which has a different shape from triangle ABC such that $B'C' = BC$ and $\angle B'A'C' = \angle BAC$.
Hence, state $\angle B'C'A'$.
[4 *marks*]
Lakar sebuah segi tiga $A'B'C'$ *yang mempunyai bentuk berbeza daripada segi tiga* ABC *dengan keadaan* $B'C' = BC$ *dan* $\angle B'A'C' = \angle BAC$.
Seterusnya, cari $\angle B'C'A'$.
[4 *markah*]

QUESTION 11/ SOALAN 11

Diagram 5 shows a trapezium *PQRS*.
Rajah 5 menunjukkan sebuah trapezium PQRS.

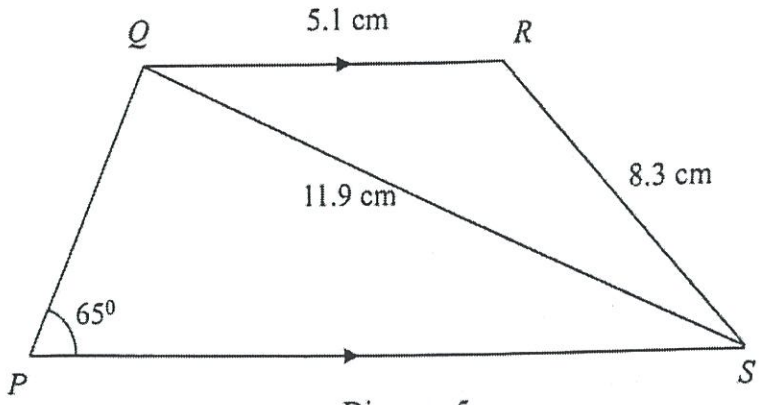


Diagram 5
Rajah 5

(*a*) Calculate
Hitung

(i) $\angle SQR$,

(ii) the length, in cm, of *PS*,
panjang, dalam cm, *bagi PS*,

(iii) the area, in cm^2, of trapezium *PQRS*.
luas, dalam cm^2, *bagi trapezium PQRS*.

[8 *marks*]
[8 *markah*]

(*b*) Sketch a triangle *Q'R'S'* which has a different shape from triangle *QRS* such that $Q'R' = QR$, $S'R' = SR$ and $\angle Q'S'R' = \angle QSR$.
Hence, state $\angle S'Q'R'$.

Lakar sebuah segi tiga Q'R'S' yang mempunyai bentuk berbeza daripada segi tiga QRS dengan keadaan $Q'R' = QR$, $S'R' = SR$ *dan* $\angle Q'S'R' = \angle QSR$.
Seterusnya, nyatakan $\angle S'Q'R'$.

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

QUESTION 12/ SOALAN 12

In Diagram 15, PQR and QRS are two triangles.
Dalam Rajah 15, PQR dan QRS ialah dua buah segi tiga.

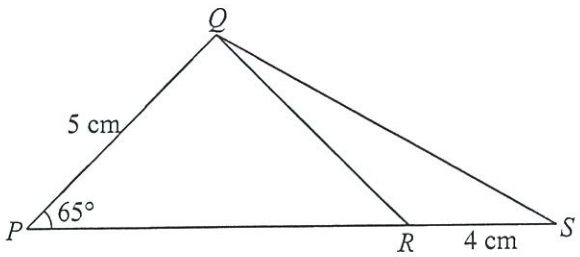


Diagram 15/ Rajah 15

(a) Given that $\angle QPR = 65°$, $PQ = QR = 5$ cm and $SR = 4$ cm, calculate
Diberi $\angle QPR = 65°$, $PQ = QR = 5$ cm *dan* $SR = 4$ cm, *hitungkan*

(i) the length of SQ,
panjang SQ,

(ii) $\angle QSR$,

(iii) the area of ΔPQS.
luas ΔPQS.

[8 marks]
[8 markah]

(b) A triangle $Q'R'S'$ has the same measurement the triangle QRS as in the Diagram 15, that is $Q'R' = 5$ cm, $R'S' = 4$ cm and $\angle R'Q'S' = \angle RQS$, but which is different in shape to triangle QRS.
Sebuah segi tiga $Q'R'S'$ *mempunyai ukuran-ukuran yang sama sebagaimana segi tiga QRS seperti dalam Rajah 15, iaitu* $Q'R' = 5$ cm, $R'S' = 4$ cm *dan* $\angle R'Q'S' = \angle RQS$, *tetapi bentuk yang berbeza daripada segi tiga QRS.*

(i) Sketch the triangle $Q'R'S'$,
Lakarkan segi tiga $Q'R'S'$,

(ii) State the size of $\angle Q'S'R'$.
Nyatakan saiz $\angle Q'S'R'$.

[2 marks]
[2 markah]

QUESTION 13/ SOALAN 13

Diagram shows combination of triangles ACB, BCD and DCA. Given that ∠ACB and ∠BCD are obtuse.

Rajah menunjukkan kombinasi segitiga ACB, BCD dan DCA. Diberi ∠ACB and ∠BCD adalah sudut cakah.

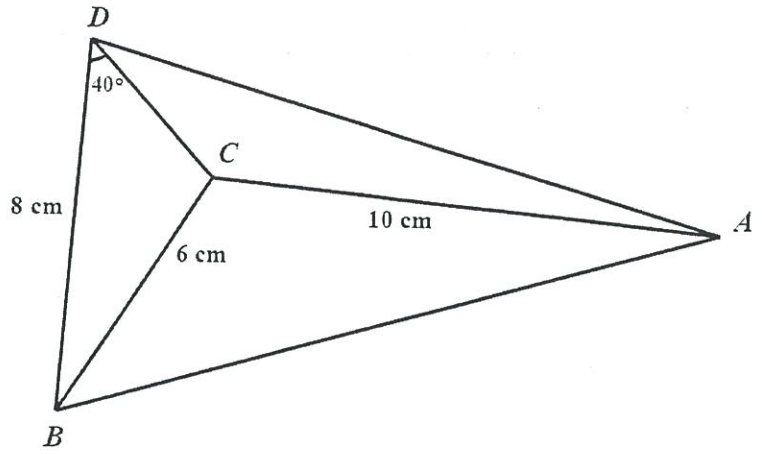


Diagram 7

Rajah 7

It is given that DB= 8 cm, BC= 6 cm, AC = 10 cm and ∠BDC= 40°. If the area of triangle ABC is 22cm², calculate

Diberi DB = 8 cm, BC = 6 cm, AC=10 cm dan ∠BDC= 40°. Jika luas segitiga ABC ialah 22 cm², kirakan

(a) ∠ACB [2 marks]

(b) the length, in cm, of BA. [2 marks]
panjang, dalam cm, bagi BA. [2 *markah*]

(c) ∠DBA [4 marks]

(d) the area, in cm², of triangle ABD. [2 marks]
luas, dalam cm², bagi segitiga ABD [2 *markah*]

QUESTION 14/ SOALAN 14

Diagram 14 shows a triangle *PQR*.
Rajah 14 *menunjukkan sebuah segi tiga PQR.*

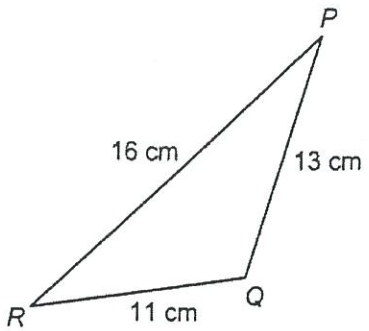


Diagram 14
Rajah 14

(a) Calculate $\angle PQR$.
Hitung $\angle PQR$

[2 marks]
[2 *markah*]

(b) A quadrilateral *PQRS* is to be formed so that *PR* is a diagonal, $\angle PRS = 60^0$ and *PS* = 14 cm. Calculate
Sebuah sisi empat PQRS dibentuk supaya PR ialah pepenjuru, $\angle PRS = 60^0$ dan *PS* = 14 *cm. Hitung*

(i) the two possible values of $\angle$PSR ,
dua nilai yang mungkin bagi $\angle PSR$,

[2 marks]
[2 *markah*]

(ii) the length of *RS* for the acute angle of *PSR*,
panjang RS bagi sudut tirus PSR,

[3 marks]
[3 *markah*]

(iii) the area of Δ *PRS* for the obtuse angle of *PSR*.
luas Δ *PRS bagi sudut cakah PSR.*

[3 marks]
[3 *markah*]

ANSWER / JAWAPAN

SIR VEN : 012 – 351 6764
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QUESTION 1

(i) $\frac{1}{2} \times 13 \times 15 \times \sin\angle KJM = 90$ K1

$67.3801° // 67.38°$ N1

(ii) $(KM)^2 = (13)^2 + (15)^2 - 2(13)(15)\cos 67.3801°$

$= 15.6205 // 15.62$

(b)(i) $\frac{\sin\angle KLM}{15.6205} = \frac{\sin 30°}{11}$

$\angle KLM = 134.7632° // 134.76°$

$\angle MKL = 15.2368° // 15.24°$

(ii) $\frac{1}{2}(11)(15.6205)\sin 15.2368$

$\left[\frac{1}{2}(11)(15.6205)\sin 15.2368\right] + 90$

$= 112.5786 // 112.58$

QUESTION 2

(a) $PR^2 = 18^2 + 20^2 - 2(18)(20)\cos 80°$

$PR = 24.474\ cm$

(b) $\frac{\sin\angle PSR}{24.474} = \frac{\sin 40°}{16}$

$\sin\angle PSR = 79.44°, 100.56°$ (both)

(c) (i) $\angle SPR = 180° - 40° - 79.44°$

$= 60.56°$

$\frac{RS}{\sin 60.56°} = \frac{16}{\sin 40°}$ or $RS^2 = 16^2 + 24.47^2 - 2(16)(24.47)\cos 60.56°$

$RS = 21.677\ cm$

(ii) $\frac{1}{2}(20)(18)\sin 80°$ or $\frac{1}{2}(21.677)(24.474)\sin 40°$

$\frac{1}{2}(20)(18)\sin 80° + \frac{1}{2}(21.677)(24.474)\sin 40°$

$347.77\ cm^2$

QUESTION 3

(i) $\frac{\sin T}{14} = \frac{\sin 40}{10}$

$\angle QTP = 115.85°$

(ii) $PR^2 = 14^2 + 22^2 - 2(14)(22)\cos 75.85°$

$PR = 23.01$

(iii) $luas\ PQR = \frac{1}{2}(14)(22)\sin 75.85°$ atau

Luas = 149.33 – 67.88

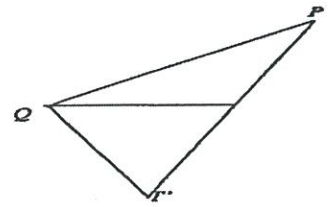
= 81.45

ATAU

$\frac{\sin R}{14} = \frac{\sin 75.85°}{23.01}$

$luas\ PTR = \frac{1}{2}(12)(23.01)\sin 36.15°$

$= 81.44$



QUESTION 4

(i) $\frac{6.7}{\sin 40°} = \frac{9}{\sin\angle PQT}$

$\angle PQT = 120.29° // 120°17'$

$\angle RQT = 180° - 120.29° = 59.71°$

$RT^2 = 12^2 + 6.7^2 - 2(12)(6.7)\cos 59.71°$

$RT = 10.38$

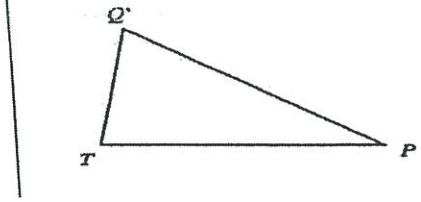
(ii) $\frac{10.38}{\sin 59.71°} = \frac{12}{\sin\angle QTR}$

$\angle QTR = 86.61° // 86°36'$

$\angle RTS = 180° - 86.61° - 19.71° = 73.68°$

$\frac{1}{2}(10.38)(ST)\sin 73.68° = 45$

9.035



ANSWER / JAWAPAN

SIR VEN : 012 – 351 6764
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QUESTION 5

(a) (i) $7^2 = 5^2 + 11^2 - 2(5)(11)\,kos\,D$

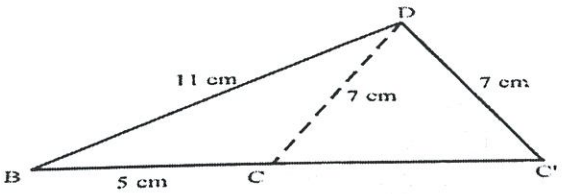
$\angle CBD = 28.14°$

(ii) $\angle ADB = \angle CBD = 28.14°$

$$\frac{AB}{\sin 28.14°} = \frac{11}{\sin 100°}$$

$AB = 5.27$

(b) (i)



(ii) $$\frac{11}{\sin \angle DCB} = \frac{7}{\sin 28.14°}$$

$\angle DCB = \angle DCC' = 47.82°$

$\angle CDC' = 180° - 2(47.82°)$

$$\frac{1}{2} \times 7^2 \times \sin 84.36°$$

Luas $\Delta CC'D = 24.38\ cm^2$

QUESTION 6

(a) $PR^2 = 12^2 + 10^2 - 2(12)(10)Kos40°$

$PR = 7.756\ cm$

(b) Find VP, $\tan 50° = \frac{VP}{12}$

$\angle VRP = 61.53°$

(c) $$\frac{\sin \angle QPR}{10} = \frac{\sin 40°}{7.756}$$

$\angle QPR = 55.97°$

d) $VQ = \sqrt{14.30^2 + 12^2} = 18.67$ or $VR = \sqrt{14.30^2 + 7.756^2} = 16.27$

$10^2 = 18.67^2 + 16.27^2 - 2(18.67)(16.27)\,kos\angle QVR$

Luas $= \frac{1}{2}(18.67)(16.27)\sin 32.34°$

81.25

QUESTION 7

(a)(i)	$BD^2 = 15^2 + 8^2 - 2(15)(8)cos110°$ $BD = 19.26$
(ii)	$\frac{\sin \angle ADB}{12} = \frac{\sin 70°}{19.26}$ $\angle ADB = 35.84°$ $\angle ABD = 180° - 35.84° - 70° = 74.16°$
(b)(i)	$\frac{1}{2}(12)(19.26)\sin 74.16°$ or $\frac{1}{2}(15)(8)\sin 110°$ $\frac{1}{2}(12)(19.26)\sin 74.16° + \frac{1}{2}(15)(8)\sin 110°$ $167.55\ cm^2$
(ii)	$\frac{1}{2}(19.26)(t) = \frac{1}{2}(15)(8)\sin 110°$ $5.855\ cm$

QUESTION 8

ANSWER / JAWAPAN

SIR VEN : 012 – 351 6764
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QUESTION 9

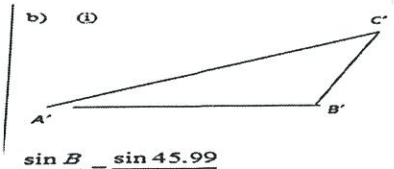
(a) (i) $4.7^2 = 6.5^2 + 5^2 - 2(6.5)(5)\cos A$

45.99

(ii) $\frac{BD}{\sin 45.99} = \frac{5}{\sin 88.02}$

3.598

b) (i)



$\frac{\sin B}{6.5} = \frac{\sin 45.99}{4.7}$

$\angle ABC = 84.08$

$\angle A'C'B' = 38.09$

(c) $\frac{1}{2}(6.5)(4.7)(\sin 38.09)$

9.423

QUESTION 10

(a) (i) $\frac{1}{2}(8)(BC)(\sin 120) = 24$

6.928

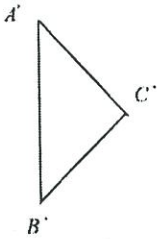
(ii) $AC^2 = 8^2 + 6.928^2 - 2(8)(6.928)\cos 120$

12.94

(iii) $\frac{\sin A}{6.928} = \frac{\sin 120}{12.94}$

27.62

(b)



$180 - 27.62 - 60 = 92.38$

$\frac{1}{2}(12.94)(6.928)\sin 92.38$

45.12

QUESTION 11

(a)(i) $8.3^2 = 5.1^2 + 11.9^2 - 2(5.1)(11.9)\cos \angle SQR$

$\angle SQR = 35.57°$

(ii) $\angle PQS = 79.43°$

$\frac{PS}{\sin 79.43°} = \frac{11.9}{\sin 65°}$

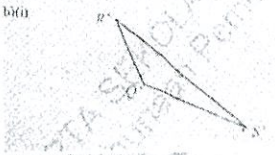
$PS = 12.91\,cm$

(iii) $\frac{1}{2}(5.1)(11.9)\sin 35.57°$ or $\frac{1}{2}(11.9)(12.91)\sin 35.57$

$\frac{1}{2}(5.1)(11.9)\sin 35.57° + \frac{1}{2}(11.9)(12.91)\sin 35.57°$

$62.33\,cm^2$

b(i)



(ii) $\angle SQ'R' = 144.43°$

QUESTION 12

(a)(i)

$\angle QRS = 115°$

$SQ^2 = 4^2 + 5^2 - 2(4)(5)\text{kos } 115°$

$SQ = 7.610$

(a)(ii)

$\frac{\sin \angle QSR}{5} = \frac{\sin 115°}{7.610}$

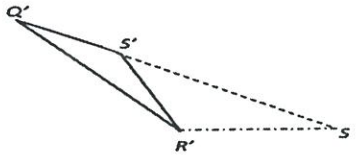
$\angle QSR = 36.55°$ atau $36° 33'$

(a)(iii)

luas $\Delta PQS = \frac{1}{2} \times 5 \times 5 \sin 50° + \frac{1}{2} \times 5 \times 4 \sin 115°$

$= 18.64\ cm^2$

(b)(i)



Note: N1 untuk lakaran rajah dan label bucu

(b)(ii)

$\angle Q'S'R' = 180° - 36.55°$
$= 143.45°$

ANSWER / JAWAPAN

SIR VEN : 012 – 351 6764
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QUESTION 13

(a) $\frac{1}{2}(6)(10)\sin\angle ACB = 22$

$\angle ACB = 47.17$

$\angle ACB = 132.83°$

(b) $(BA)^2 = 6^2 + 10^2 - 2(6)(10)\cos 132.83°$

$= 14.75$

(c) $\frac{\sin\angle BCD}{8} = \frac{\sin 40}{6}$

$\angle BCD = 58.99°$

$\angle BCD = 121.01°\ (obtuse)$

$\angle DBC = 180 - 121.01 - 40 = 18.99$

$\frac{\sin\angle CBA}{10} = \frac{\sin 132.83}{14.75}$

$\angle CBA = 29.82°$

$\angle DBA = 18.99° + 29.82°$

$= 48.81°$

(d) Area $= \frac{1}{2}(8)(14.75)\sin 48.81°$

$= 44.40\ cm^2$

QUESTION 14

(a) $16^2 = 13^2 + 11^2 - 2(13)(11)\ kos\ \angle PQR$

$\angle PQR = 83.17°$

(b) (i) $\frac{\sin\angle PSR}{16} = \frac{\sin 60°}{14}$

$\angle PSR = 81.77°$ or $98.23°$

(ii) $\angle SPR = 180 - 81.77 - 60$

$= 38.23$

$RS^2 = 14^2 + 16^2 - 2(14)(16)\ kos\ 38.23$

$RS = 10\ cm$

(iii) $\angle SPR = 180 - 98.23 - 60$

$= 21.77$

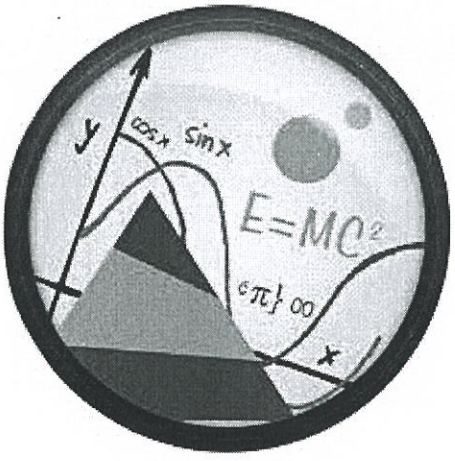
Area of ΔPRS

$= \frac{1}{2}(14)(16)\sin 21.77$

$= 41.54\ cm^2$

ADDMATHS
2019

LINEAR PROGRAMMING/PENGATURCARAAN LINEAR
(10 MARKS/10 MARKAH)



QUESTION 1/ SOALAN 1

A seafood restaurant, selling prawn and squid based foods. Azim was tasked to buy prawn and squid. The restaurant manager gave Azim RM 1200 with $\frac{3}{4}$ of the money to buy the prawn and squid, and the rest to buy other things. The price of per kilogram prawn is RM 30 and squid is RM 20. The squid must be more than prawn for at least 6 kilograms. The mass of the squid should not be more than 4 times of prawn mass.

Sebuah restoran makanan laut , menjual makanan berasaskan udang dan sotong. Azim ditugaskan untuk membeli udang dan sotong tersebut.Pengurus restoran memberikan wang sebanyak RM 1200 *dengan* $\frac{3}{4}$ *daripada wang itu untuk membeli udang dan sotong, manakala selebihnya untuk membeli perkara-perkara lain. Harga sekilogram udang ialah* RM 30 *dan sotong* RM 20. *Sotong yang hendak dibeli mesti melebihi udang sekurang- kurangnya 6 kilogram. Jisim sotong yang hendak dibeli tidak melebihi 4 kali ganda jisim udang.*

(*a*) Write three inequalities, other than $x \geq 0$ and $y \geq 0$, which satisfy all the above contraints. [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 2 kilogram on x-axis and 2 cm to 5 kilogram on y-axis, construct and shade the region R which satisfied all the above contraints. [3 marks]
Menggunakan skala 2 cm kepada 2 kilogram pada paksi-x dan 2 cm kepada 5 kilogram pada paksi-y, bina dan lorek rantau R yang memenuhi semua kekangan di atas. [3 *markah*]

QUESTION 1/ SOALAN 1

(c) Calculate
Hitung

(i) the maximum prawn mass that need to be bought if 26 kilograms of squid is bought by Azim,
jisim maksimum udang yang perlu dibeli jika 26 *kilogram sotong telah dibeli oleh* Azim,

(ii) minimum expenses Azim on a specific day.
perbelanjaan minimum Azim *pada suatu hari tertentu.*

[4 marks]
[4 *markah*]

QUESTION 2/ SOALAN 2

A factory produced x dolls of model A and y dolls of model B per month. The profit for a doll of model A is RM15 and the profit for a doll of model B is RM12. The production of these two models per month is based on the following constraints:

Sebuah kilang menghasilkan x boneka model A dan y boneka model B sebulan. Keuntungan satu boneka model A ialah RM15 *dan keuntungan satu boneka model B ialah* RM12. *Penghasilan sebulan dua model boneka ini adalah berdasarkan kepada kekangan berikut:*

I : The total number of dolls produced is not more than 500.
Jumlah bilangan boneka yang dihasilkan tidak lebih daripada 500.

II : The number of dolls of model A produced is at most three times the number of dolls of model B.
Bilangan boneka model A yang dihasilkan selebih-lebihnya tiga kali bilangan boneka model B.

III : The minimum total profit per month for the dolls of both models is RM4 200.
Jumlah keuntungan minimum sebulan bagi kedua-dua model boneka itu ialah RM4 200.

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

[3 marks /3 *markah*]

(b) Using a scale of 2 cm to 50 dolls on both axes, construct and shade the region R which satisfies all the above constraints.
Menggunakan skala 2 cm *kepada* 50 *boneka pada kedua-dua paksi, bina dan lorek rantau R yang memenuhi semua kekangan di atas.*

[3 marks /3 *markah*]

QUESTION 2/ SOALAN 2

(c) Using the graph constructed in 12(b), find
Menggunakan graf yang dibina di 12(b), *cari*

(i) the minimum number of dolls of model *B* if the number of model *A* produced is 100 per month
bilangan minimum boneka model B jika bilangan boneka model A yang dihasilkan ialah 100 *sebulan.*

[1 mark /1 *markah*]

(ii) the maximum total profit per month.
jumlah keuntungan maksimum sebulan.

[3 marks/3 *markah*]

QUESTION 3/ SOALAN 3

Use the graph paper provided to answer this question.
Guna kertas graf yang disediakan untuk menjawab soalan ini

An institution offers two business courses, Management and Finance. The number of participants for Management course is x and for Finance course *is* y.
Sebuah institusi menawarkan dua kursus peniagaan, Pengurusan dan Kewangan. Bilangan peserta bagi kursus Pengurusan ialah x orang dan bilangan peserta bagi kursus Kewangan ialah y orang.
The enrolment of the participants is based on the following constraints:
Pengambilan peserta adalah berdasarkan kekangan berikut:

I : The total number of participants is not more than 80.
Jumlah peserta tidak melebihi 80 orang.

II : The number of participants for Finance course is not more than 4 times the number of participants for Management course.
Bilangan peserta kursus Kewangan tidak melebihi 4 kali bilangan kursus Pengurusan.

III: The number of participants for Finance course must exceed the number of participants for Management course by at least 10.
Bilangan peserta kursus Kewangan mesti melebihi bilangan peserta kursus Pengurusan sekurang-kurangnya 10 orang.

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

(b) Hence, using a scale of 2 cm to 10 participants for both axes, construct and shade the region R that satisfies all the above constraints. [3 marks]
Seterusnya, dengan menggunakan skala 2 cm kepada 10 peserta pada kedua-dua paksi, bina dan lorekkan rantau R yang memenuhi semua syarat di atas.
[3 *markah*]

QUESTION 3/ SOALAN 3

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

(i) the range of the number of participants for Finance course if the number of participants for Management course is 20.
julat bilangan pesserta bagi kursus Kewangan jika bilangah peserta kursus Pengurusan ialah 20 orang.

(ii) the maximum total fees per week that can be collected if the fees per week for Management courses and Finance course are RM60 and RM70 respectively.
Jumlah yuran maksimum seminggu yang boleh dikutip jika yuran seminggu bagi kursus Pengurusan dan kursus Kewangan masing-masing ialah RM60 dan RM70.

[4 marks]
[4 *markah*]

QUESTION 4/ SOALAN 4

A travel agency offers a special package to a destination. It is limited to 80 tourists. It costs RM100 for an adult and half the price for children aged below 12.
To ensure gaining profit, the agency fixed the ratio of the children to adult must not exceed 1:2 and the total payment collected must be at least RM5000. Assumed that the number of children participating is x, and the number of adult participating is y.
Satu agen pelancongan menawarkan satu pakej istimewa ke satu destinasi. Bilangan pelancong terhad kepada 80 *orang sahaja. Bayaran seorang dewasa ialah* RM100 *dan separuh harga untuk kanak-kanak di bawah* 12 *tahun. Untuk memastikan keuntungan, agensi itu menetapkan nisbah bilangan kanak-kanak kepada bilangan dewasa tidak melebihi* 1:2 *dan jumlah kutipan bayaran sekurang-kurangnya* RM 5000. *Anggapkan terdapat* x *orang kanak-kanak dan* y *orang dewasa mendaftar untuk pakej pelancongan itu.*

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

(*b*) Use a scale of 2 cm to 10 tourists on both axes, construct and shade the region R which satisfies all the above constraints. [3 *marks*]
Gunakan skala 2 cm *kepada* 10 *orang 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 minimum number of adult that is participating.
bilangan minimum orang dewasa yang mengikuti pakej pelancongan ini.

(ii) the minimum of profit if the profit that could be gathered for each adult and children are RM80 and RM20 each.
keuntungan minimum yang dapat dikumpulkan jika keuntungan untuk setiap orang dewasa dan kanak-kanak ialah RM80 *dan* RM20 *masing-masing.*

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

QUESTION 5/ SOALAN 5

Latifah earns a salary of RM3 000 per month. She saves RMx of her salary on children's education and RMy on family recreational activities. She allocates her monthly saving based on the following constraints:

Latifah mendapat gaji sebanyak RM3 000 *sebulan. Dia menyimpan* RMx *dari gajinya untuk pendidikan anak-anak dan* RMy *untuk aktiviti rekreasi keluarga. Dia memperuntukkan simpanan bulanannya berdasarkan kekangan berikut:*

I The monthly saving for her family recreational activities is at most twice the monthly saving for her children's education.

Simpanan bulanan untuk aktiviti rekreasi keluarga adalah selebih-lebihnya dua kali simpanan bulanan untuk pendidikan anak-anaknya.

II The monthly saving for her family recreational activities is at least RM100 more than the monthly saving for her children's education.

Simpanan bulanan untuk aktiviti rekreasi keluarga adalah sekurang-kurangnya RM100 *lebih daripada simpanan bulanan untuk pendidikan anak-anaknya.*

III The total monthly saving for her children's education and family recreational activities does not exceed 25 % of her monthly salary.

Jumlah simpanan bulanan untuk pendidikan anak-anak dan aktiviti rekreasi keluarga tidak melebihi 25 % *daripada gaji bulanannya.*

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

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

(*b*) Using a scale of 2 cm to RM50 on both axes, construct and shade the region R which satisfies all the above constraints. [3 *marks*]

Dengan menggunakan skala 2 cm *kepada* RM50 *pada kedua-dua paksi, bina dan lorek rantau R yang memenuhi semua kekangan di atas.* [3 *markah*]

QUESTION 5/ SOALAN 5

(c) Using the graph constructed in 14(b), find

Menggunakan graf yang dibina di 14(b), *cari*

(i) the range of her saving for family recreational activities if she spends RM200 a month on her children's education,

julat simpanan untuk aktiviti rekreasi keluarga jika dia menyimpan RM200 *sebulan untuk pendidikan anak-anaknya,*

(ii) the minimum total saving for her children's education and family recreational activities in a year.

jumlah simpanan minima untuk pendidikan anak-anaknya dan aktiviti rekreasi keluarga dalam setahun.

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

QUESTION 6/ SOALAN 6

A community college would like to take x male students and y female students for an early intake session. Student's intake is based on the following constraints

Sebuah Kolej Komuniti ingin mengambil x orang pelajar lelaki dan y orang pelajar perempuan untuk sesi pengambilan awal tahun. Pengambilan pelajar adalah berdasarkan kekangan berikut:

I Minimum number of female students taken is 5.

Bilangan minimum pelajar perempuan yang diambil ialah 5 orang.

II The total number of students taken was less than 40.

Jumlah bilangan pelajar yang diambil adalah kurang daripada 40 orang

III The number of female students is at most twice the number of male students

Bilangan pelajar perempuan adalah selebih-lebihnya dua kali bilangan pelajar lelaki.

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

b) Use a scale of 2 cm to 5 student on both axes, construct and shade the region R which satisfies all the above constraints. [3 *marks*]
Gunakan skala 2 cm *kepada* 5 *orang pada kedua-dua paksi, bina dan lorek rantau R yang memenuhi semua kekangan di atas.* [3 *markah*]

c) Use the graph constructed in 15 (b) to answer the following questions:

Gunakan graf yang dibina di 15 (b) *untuk menjawab soalan-soalan berikut:*

(i) Determine the maximum number of male students if 8 female students are taken.
Tentukan bilangan maksimum pelajar lelaki jika 8 *orang pelajar perempuan diambil.*

(ii) Find the maximum cost to make students card if the cost per card id RM10.50.
Cari kos maksimum untuk membuat kad pelajar jika kos setiap kad ialah RM10.50

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

QUESTION 7/ SOALAN 7

A fruit seller sells langsat and duku. He sells x kg of langsat and y kg of Duku. He sells langsat at RM 4.00 a kilogram and duku at RM 5.00 a kilogram. The total amount of the sale of the fruits is at least RM 300.00 a day. He sells at most 60 kg of langsat a day and less than 50 kg of duku a day.

Seorang penjual buah – buahan menjual langsat dan duku. Dia menjual x kg *buah langsat dan y* kg *buah duku. Harga bagi sekilo langsat ialah* RM 4.00 *dan harga bagi sekilo duku* RM 5.00. *Jumlah jualannya sehari sekurang – kurangnya* RM 300.00. *Dia menjual selebih – lebihnya* 60 kg *buah langsat dan kurang dari* 50 kg *buah duku.*

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

Tulis tiga ketaksamaan selain daripada $x \geq 0$ *dan* $x \geq 0$ *, yang memenuhi semua kekangan di atas.* [3 *markah*]

(b) Using a scale of 2 cm to the 10 kg of the both axis, construct and shade the region *R* that satisfies all the above constraints. [3 *marks*]

Menggunakan skala 2 cm *kepada* 10 kg *untuk kedua- dua paksi, bina dan lorek rantau R yang memenuhi semua kekangan di atas.* [3 *markah*]

(c) The profit obtained from the sale of langsat is RM 1.00 and a kilogram and the sale of duku is RM 1.20 a kilogram. If the stall is rented at RM 500 for 30 days, find the maximum amount of money obtained by the fruit seller after 30 days. [4 *marks*]

Keuntungan yang akan diperolehi dari jualan sekilo langsat ialah RM 1.00 *dan sekilo duku* RM 1.20. *Jika gerai tersebut disewa dengan harga* RM 500 *untuk* 30 *hari, cari jumlah duit yang akan diperoleh oleh penjual tersebut selepas* 30 *hari.* [4 *markah*]

QUESTION 8/ SOALAN 8

A tailor shop produces two types of *kebaya* , *A* and *B* . The making of *kebaya* involves two processes, cutting and sewing. Table 4 shows the time taken to cut and sew a *kebaya*.
Sebuah kedai jahit menghasilkan dua jenis kebaya , A dan B . Pembuatan kebaya itu melibatkan dua proses, memotong dan menjahit. Jadual 4 menunjukkan masa yang diambil untuk memotong dan menjahit kebaya A dan B.

Fashion *Fesyen*	Time taken (minutes) *Masa yang diambil (minit)*	
	Cutting *Memotong*	Sewing *Menjahit*
A	40	20
B	50	15

Table 4
Jadual 4

The shop produces x units of *kebaya A* and y units of *kebaya B* per day.
The production per day is based on three constraints, two of the constraints are as follows:
Sebuah kedai menghasilkan x unit kebaya A dan y unit kebaya B dalam sehari. Penghasilan kebaya dalam sehari adalah berdasarkan tiga kekangan, dua daripada kekangan itu adalah seperti berikut:

I : The maximum total time for cutting both *kebayas* is 1800 minutes.
Jumlah masa maksimum untuk memotong kedua-dua kebaya ialah 1800 *minit.*

II : The total time for sewing both kebaya is at least 240 minutes.
Jumlah masa menjahit bagi kedua-dua kebaya adalah sekurang-kurangnya 240 *minit.*

(a) Write two inequalities, other than $x \geq 0$ and $y \geq 0$, which satisfy the two constraints. [2*marks*]
Tulis dua ketaksamaan, selain $x \geq 0$ *and* $y \geq 0$, *yang memenuhi dua kekangan tersebut.* [2 *markah*]

QUESTION 8/ SOALAN 8

(b) The third constraint is represented by the shaded region in the graph on page 19.
Write in words the constraint. [1 *mark*]
Kekangan yang ketiga diwakili oleh rantau berlorek dalam graf pada halaman 19.
Tulis dalam perkataan bagi kekangan itu. [1 *markah*]

(c) On the graph on page 19, construct and shade the region R which satisfies all the three constraints. [3 *marks*]
Pada graf pada halaman 19, *bina dan lorek rantau R yang memenuhi ketiga-tiga kekangan itu.* [3 *markah*]

(d) Using the graph constructed in 15(c), find
Menggunakan graf yang dibina di 15(c), *cari*

(i) the maximum number of *kebaya B* if 10 pieces of *kebaya A* are made per day.
bilangan maksimum kebaya B jika 10 *helai kebaya A dihasilkan sehari.*

(ii) the maximum total profit per day if the profit from a *kebaya A* is RM50 and from a *kebaya B* is RM80.
jumlah keuntungan maksimum sehari jika keuntungan yang diperoleh daripada sehelai kebaya A ialah RM50 *dan daripada sehelai kebaya B ialah* RM80.

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

QUESTION 9/ SOALAN 9

A school plan to organize a trip to Muzium Negara. They decide to rent x buses and y vans to carry the students. The rental of a bus is RM700 and the rental of a van is RM350. The rental of the vehicles is based on the following constraints:
Sebuah sekolah bercadang untuk mengadakan satu lawatan ke Muzium Negara. Mereka membuat keputusan untuk menyewa x buah bus dan y buah van untuk membawa pelajar. Sewaan sebuah bas ialah RM700 dan sewaan sebuah van ialah RM350. Sewaan kenderaan adalah berdasarkan kekangan berikut:

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

II The number of buses is at most 4 times the number of vans.
Blangan bas selebih-lebihnya adalah 4 kali bilangan van.

III The maximum allocation for the rental of the vehicles is RM4200.
Peruntukan maksimum untuk sewaan kenderaan ialah RM4200.

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

b) Using a scale of 2 cm to 1 vehicle on both axes, construct and shade the region R which satisfies all the above constraints.

c) Using the graph constructed in (b), find
Dengan menggunakan graf yang dibina di (b), cari
i. the minimum number of vans rented if 3 buses are rented.
bilangan minimum van yang disewa jika 3 buah bas disewa.
ii. the maximum number of students that can be carried if a bus can accomodate 28 passengers and a van can accomodate 9 passengers.
bilangan maksimum pelajar yang boleh dimuatkan jika sebuah bas boleh membawa 28 orang penumpang dan sbeuah van boleh membawa 9 orang penumpang.

QUESTION 10/ SOALAN 10

Dhiya has an allocation of RM420 to purchase x kg of chocolate cake and y kg vanilla cake. The total mass of the two cakes is not less than 10 kg. The chocolate cake mass is at most twice the amount of vanilla cake. The price per kilogram of chocolate cake is RM10 and the price per kg of vanilla cake is RM8.

Dhiya mempunyai peruntukan RM420 *untuk membeli x kg kek coklat dan y kg kek vanila. Jumlah jisim kedua-dua kek itu adalah tidak kurang daripada* 10 kg. *Jisim kek coklat selebih-lebihnya dua kali jisim kek vanila. Harga sekilogram kek coklat ialah* RM10 *dan harga sekilogram kek vanila ialah* RM8.

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

Tulis tiga ketaksamaan, selain x daripada $x \geq 0$ *dan* $y \geq 0$, *yang memenuhi semua kekangan di atas.* [3 *markah*]

(*b*) Using a scale of 2 cm to 5 kg for both axes, construct and shade the region R that satisfies all the above constraints. [3 *marks*]

Menggunakan skala 2 cm *kepada* 5 kg *pada kedua-dua paksi, bina dan lorek rantau R yang memenuhi semua kekangan di atas.* [3 *markah*]

(*c*) Find the range of the weight of the chocolate cake if Dhiya bought 25 kg vanilla cake. [1 *mark*]

Cari julat berat kek coklat yang dibeli oleh Dhiya jika dia membeli 25 kg *kek vanilla.* [1 *markah*]

(*d*) If Dhiya buys 20 kg chocolate cake, what is the maximum amount of money that could remain from her allocation? [3 *marks*]

Jika Dhiya membeli 20 kg *kek coklat, berapakah baki maksimum daripada peruntukan itu?* [3 *markah*]

QUESTION 11/ SOALAN 11

Given x and y are two positive integers with the following conditions:
Diberi x dan y ialah dua integer positif dengan keadaan berikut:

I: The value of x more than the value of y by 10 or more.
Nilai x melebihi nilai y sebanyak 10 *or more.*

II: The minimum value of $2x+3y$ is 60.
Nilai minimum bagi $2x+3y$ *is* 60.

III: The maximum value of $2x+3y$ is twice of its minimum value.
Nilai maksimum bagi $2x+3y$ *ialah dua kali ganda nilai minimumnya.*

(*a*) Write an inequality for each of the above conditions.
Tulis satu ketaksamaan bagi tiap – tiap keadaan di atas.

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

(*b*) Using a scale of 2 cm to 10 units on the x –axis and 2 cm to 5 units on the y –axis, draw graph for the three inequalities. Mark and shade region R that satisfies the above conditions.
Menggunakan skala 2 cm *kepada* 10 *units pada paksi– x dan* 5 *units pada paksi– y, lukis graf bagi ketiga-tiga ketaksamaan. Tanda dan lorekkan rantau R yang memenuhi semua keadaan di atas.*

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

(*c*) Based on the graph constructed in **15**(*b*), find
Menggunakan graf yang dibina, di **15** (*b*), *cari*

(i) Find the minimum value of x.
Carikan nilai minimum bagi x.

(ii) Given that x and y represents the number of products sold by a company. Find the maximum sales earned by the company if the price per unit of product x and product y are RM3 and RM10 respectively.
Diberi bahawa x dan y mewakili bilangan barang-barang yang dijual oleh sebuat syarikat. Cari jumlah jualan maksimum yang diperolehi oleh syarikat itu jika harga seunit barang x dan barang y masing-masing ialah RM3 *dan* RM10.

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

QUESTION 12/ SOALAN 12

In a Life Long Learning Programme, the government allocates RM60 000 for the public to apply to improve their Bahasa Melayu and English language in a study centre. There are x participants taking Bahasa Melayu and y participants taking English language. The fees for the whole course for Bahasa Melayu is RM300 and for English Language is RM600. The number of Bahasa Melayu participants is at most the number of English Language participants and the total participants must be at least 80.

Dalam suatu Program Belajar Sepanjang Hayat, kerajaan memberi peruntukan RM60 000 bagi orang awam memohon untuk mengikuti kursus Bahasa Melayu dan Bahasa Inggeris di satu pusat pengajian. Terdapat x peserta menyertai kursus Bahasa Melayu dan y peserta menyertai kursus Bahasa Inggeris. Bayaran untuk kursus Bahasa Melayu ialah RM300 dan kursus Bahasa Inggeris ialah RM600. Bilangan peserta Bahasa Melayu selebih-lebihnya bilangan peserta Bahasa Inggeris dan jumlah peserta mesti sekurang-kurang 80 orang.

(a) Write down three inequalities, other than $x \geq 0$ and $y \geq 0$, that satisfy all of the above constraints

[3 marks]

Tuliskan tiga ketaksamaan selain $x \geq 0$ dan $y \geq 0$ yang memenuhi semua syarat di atas

[3 markah]

(b) Using a scale of 2 cm to 10 participants on both axes, construct and shade the region R that satisfies all the above constraints:

[3 marks]

Dengan menggunakan skala 2 cm kepada 10 orang peserta pada kedua-dua paksi, bina dan lorek rantau R yang memenuhi semua kekangan di atas.

[3 markah]

(c) By using your graph constructed in (b).
Dengan menggunakan graf anda daripada (b).

(i) Find the minimum number of English Language course participants if there are 30 Bahasa Melayu course participants.

[1 mark]

Cari bilangan minimum peserta kursus Bahasa Inggeris jika terdapat 30 orang peserta kursus Bahasa Melayu.

[1 markah]

(ii) Hence, find the maximum amount of allocation left unused.

[3 marks]

Seterusnya, cari baki maksimum peruntukan itu.

[3 markah]

QUESTION 13/ SOALAN 13

A tailor makes two types of clothes, trousers and shirt. In a week, he makes x trouser and y shirts. The cost of marking a trouser is RM80 and a shirt is RM40. The production of clothes is based on the following constraints:

Seorang tukang jahit membuat dua jenis pakaian, seluar panjang dan kemeja. Dalam seminggu, dia membuat x helai seluar panjang dan y helai kemeja. Kos untuk menghasilkan sehelai seluar panjang ialah RM80 dan sehelai kemeja ialah RM40. Penghasilan pakaian adalah berdasarkan kekangan berikut:

I : The maximum total number of trousers and shirts must be 80.
Jumlah maksimum seluar panjang dan kemeja ialah 80.

II : The number of shirt must exceed the number of trousers by at least 5.
Bilangan kemeja mesti melebihi bilangan seluar panjang sekurang-kurangnya 5.

III: The minimum cost to produce the clothes is RM3200.
Kos minimum bagi menghasilkan pakaian tersebut ialah RM3200.

(a) Write three inequalities, other than $x \geq 0$ and $y \geq 0$ which satisfy all the above constraints.
Tulis 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 clothes on both axes, construct and shade the region R which satisfy all the above constraints. [3 marks]
Menggunakan skala 2 cm kepada 10 pasukan 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
(i) The minimum number of shirts produced.
Bilangan minimum kemeja yang dihasilkan.
(ii) The maximum cost for the production of the clothes.
Kos maksimum bagi menghasilkan pakaian tersebut.
[4 marks]
[4 *markah*]

QUESTION 14/ SOALAN 14

A shopkeeper buys x sandals and y slippers from a wholesalers. The price of a sandal and a slipper is RM5 and RM10 respectively. The purchase of the items is based on the following constraints :

Seorang peniaga membeli x sandal dan y selipar daripada pemborong. Harga sepasang sandal dan sepasang selipar masing-masing ialah RM5 dan RM10. Pembelian barangan tersebut adalah berdasarkan kepada kekangan berikut.

I : The shopkeeper invests at most RM800.
Peniaga itu melabur sebanyak-banyaknya RM800.

II : The ratio of the number of sandals to the number of slippers is $\frac{2}{7}$ or more.

Nisbah bilangan sandal kepada bilangan selipar ialah $\frac{2}{7}$ *atau lebih.*

III : The number of sandals is at most twice the number of slippers.
Bilangan sandal adalah selebih-lebihnya dua kali bilangan selipar.

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

(b) Using a scale of 2 cm to 20 items on both axes, construct and shade the region R which satisfies all the constraints. [3 marks]
Menggunakan skala 2 cm *kepada* 20 *barangan pada kedua-dua paksi, bina dan lorek rantau* R *yang memenuhi semua kekangan.* [3 *mark*ah]

(c) Using the graph constructed in 13 (b), find
Menggunakan graf yang dibina di 13 (b), *cari*

(i) the maximum number of slippers if the number of the sandals is 40.
bilangan maksimum selipar jika bilangan sandal ialah 40.

(ii) the maximum profit that can be obtained if the shopkeeper sell a sandal for RM8 and a slipper for RM15.
*keuntungan maksimum yang boleh diperolehi jika peniaga tersebut menjual sepasang sandal dengan harga RM*8 *dan sepasang selipar dengan harga RM*15.

[4 marks]
[4 *mark*ah]

ANSWER / JAWAPAN

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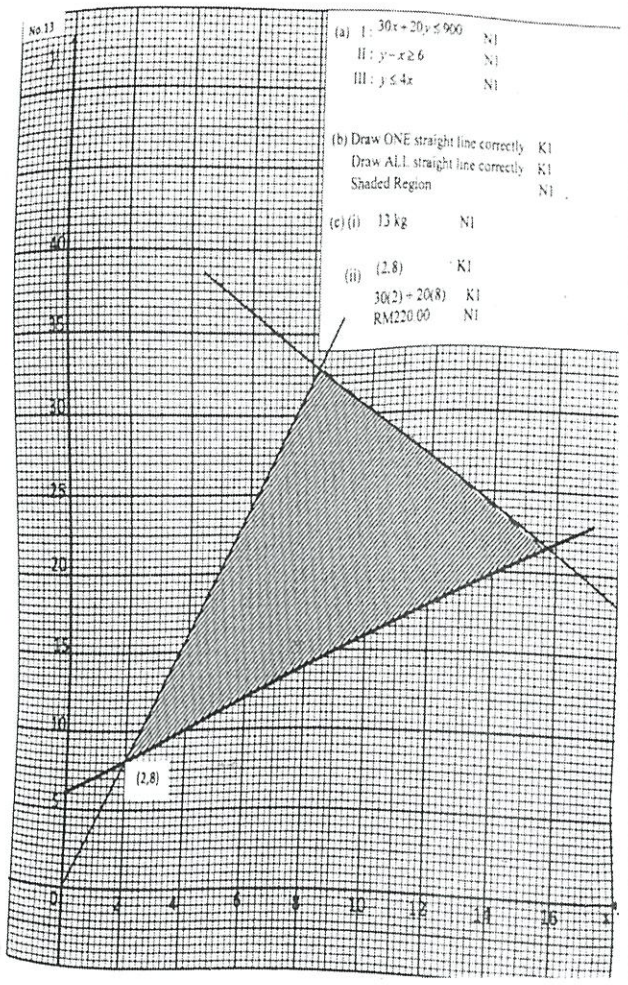
QUESTION 1



QUESTION 2

ANSWER / JAWAPAN

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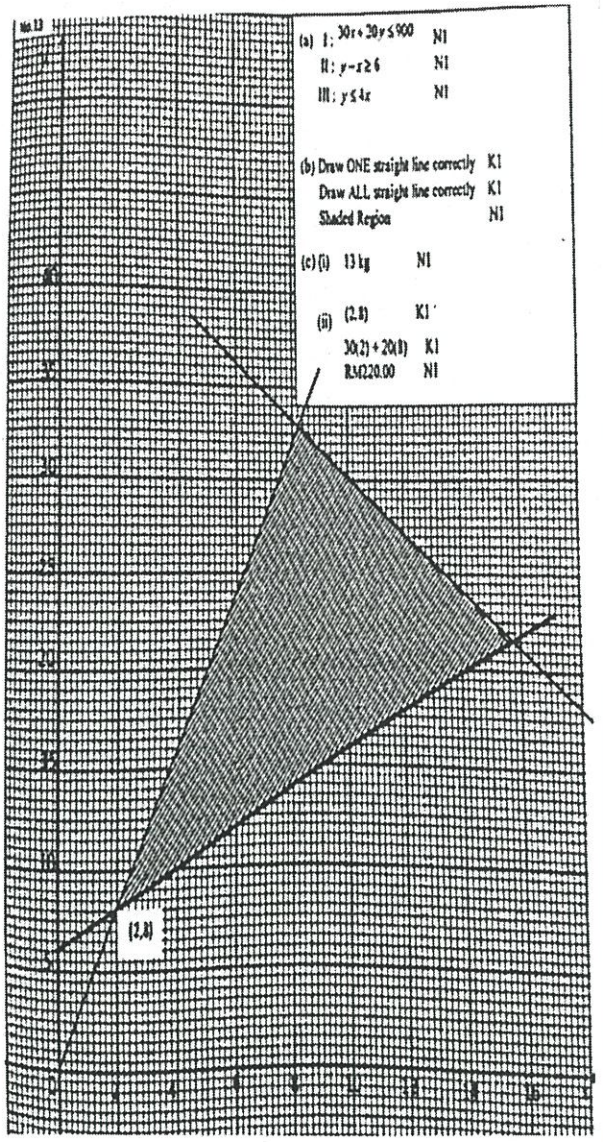
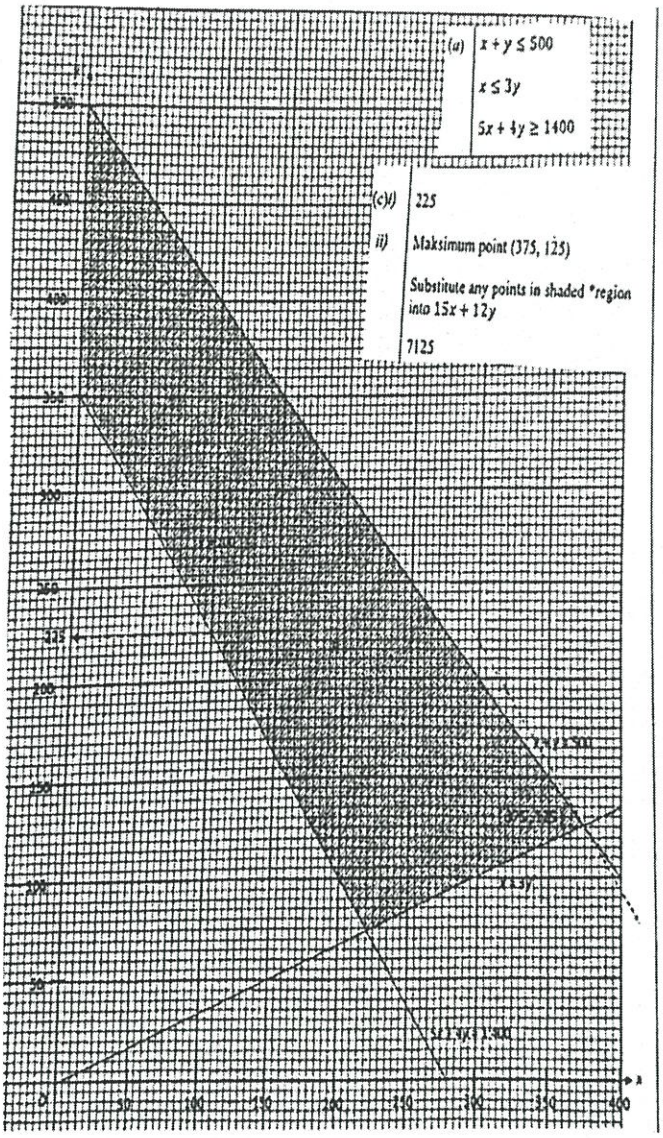
QUESTION 1



QUESTION 2



ANSWER / JAWAPAN

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QUESTION 3

(a) I : $x+y\leq 80$ atau setara
II : $y\leq 4x$ atau setara
III : $y-x\geq 10$ atau setara

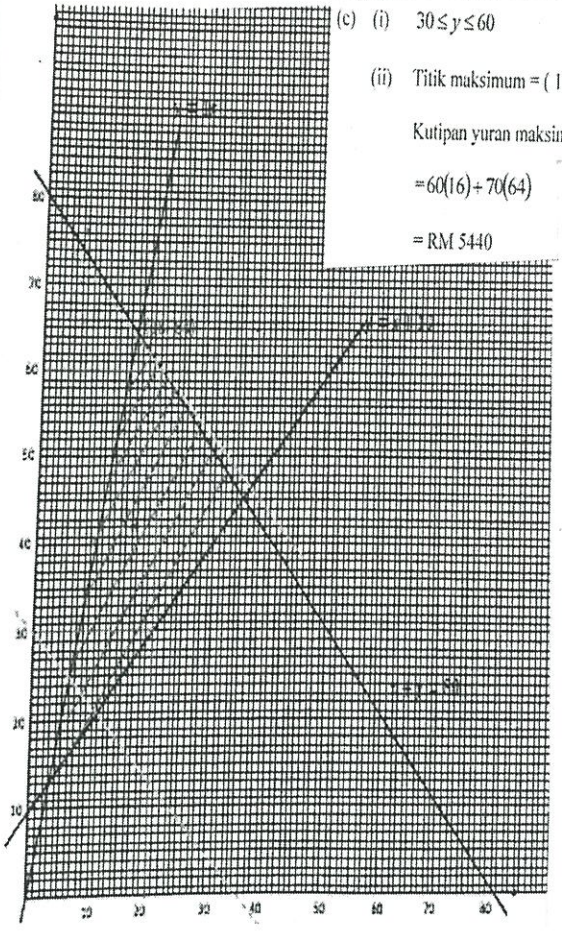
(c) (i) $30\leq y\leq 60$

(ii) Titik maksimum = (16, 64)

Kutipan yuran maksimum

$=60(16)+70(64)$

$=$ RM 5440



QUESTION 4

(a) $x+y\leq 80$ N1

$x+2y\geq 100$ N1

$2x\leq y$ N1

(b) Sekurang-kurangnya satu persamaan dilukis dengan betul K1

Semua persamaan dilukis dengan betul K1

Rantau R dilorek dengan betul N1

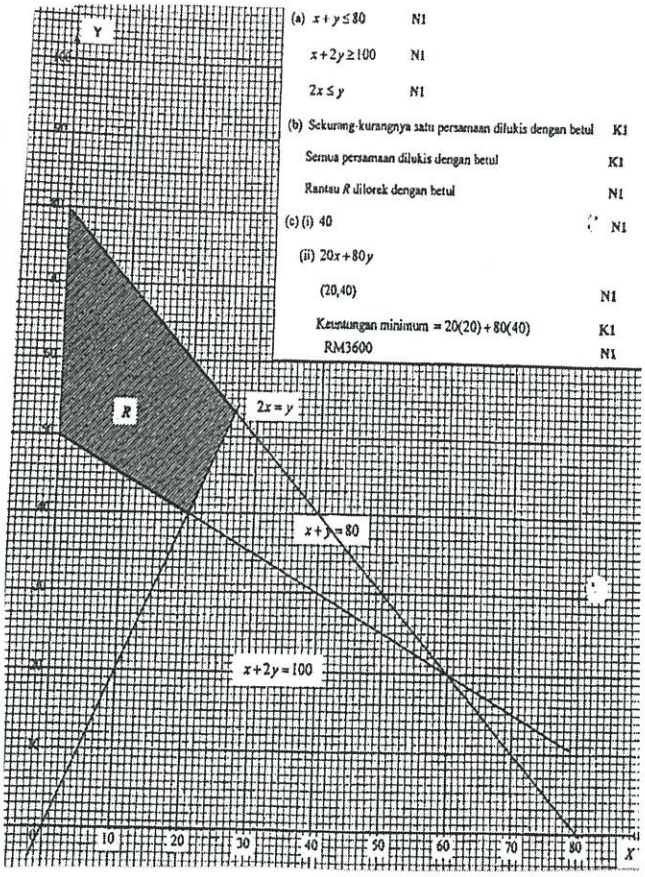
(c) (i) 40 N1

(ii) $20x+80y$

(20,40) N1

Keuntungan minimum = 20(20) + 80(40) K1

RM3600 N1



ANSWER / JAWAPAN

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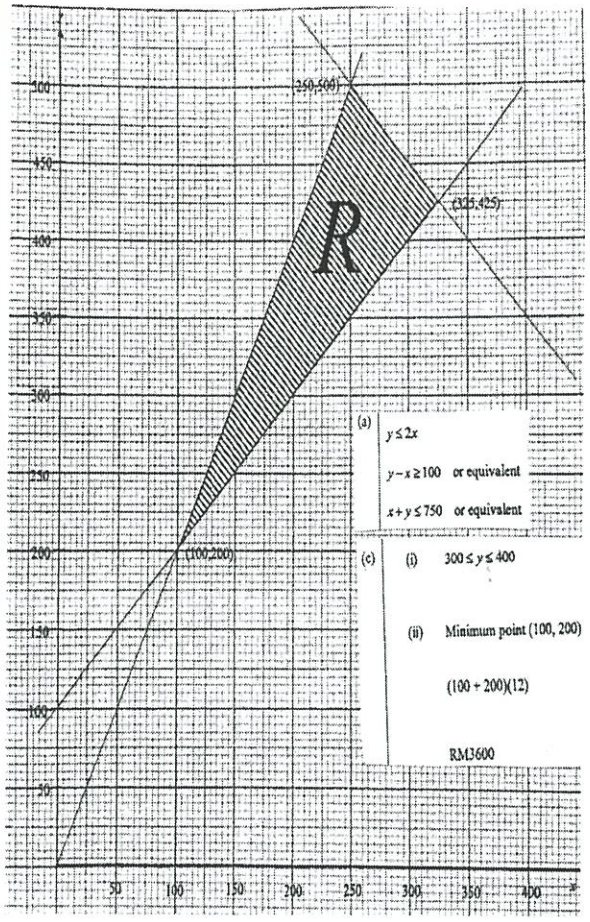
QUESTION 5



(a) $y \leq 2x$

$y - x \geq 100$ or equivalent

$x + y \leq 750$ or equivalent

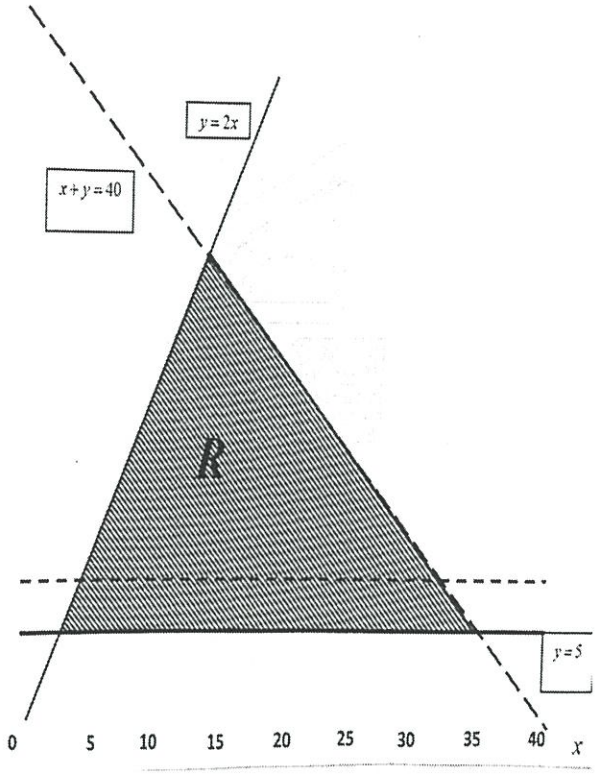
(c) (i) $300 \leq y \leq 400$

(ii) Minimum point (100, 200)

$(100 + 200)(12)$

RM3600

QUESTION 6



ANSWER / JAWAPAN

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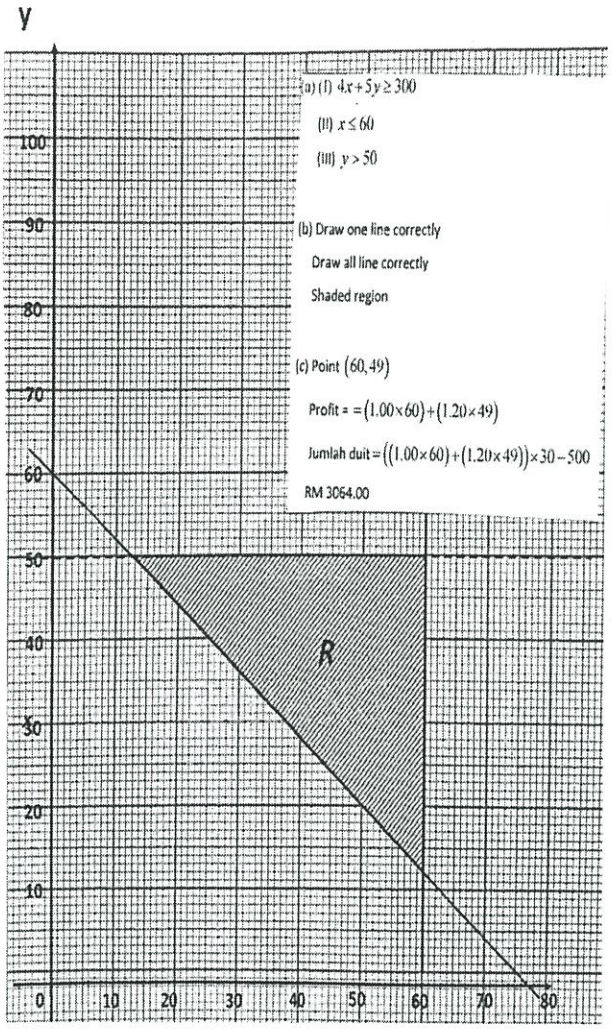
QUESTION 7



(a) (i) $4x+5y \geq 300$

(ii) $x \leq 60$

(iii) $y > 50$

(b) Draw one line correctly

Draw all line correctly

Shaded region

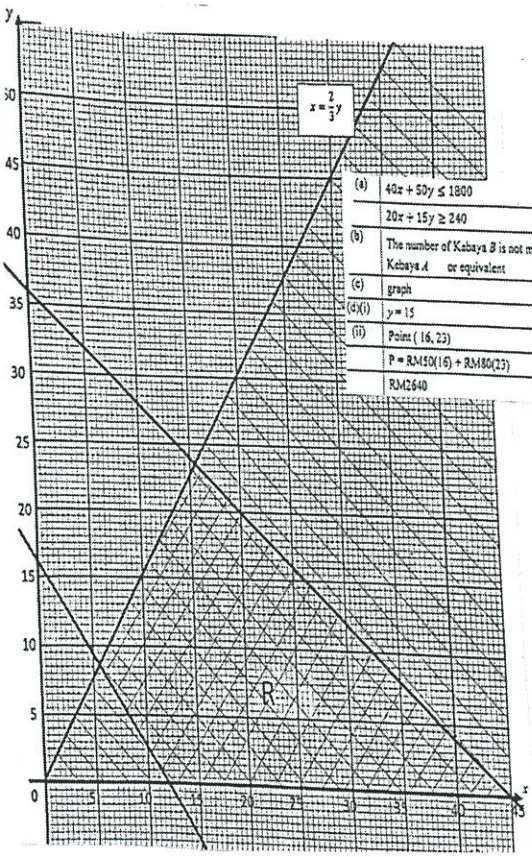
(c) Point $(60, 49)$

Profit = $=(1.00\times 60)+(1.20\times 49)$

Jumlah duit = $((1.00\times 60)+(1.20\times 49))\times 30-500$

RM 3064.00

QUESTION 8



(a)	$40x + 50y \leq 1800$
	$20x + 15y \geq 240$
(b)	The number of Kebaya B is not more than $\frac{2}{3}$ times the number of Kebaya A or equivalent
(c)	graph
(d)(i)	$y = 15$
(ii)	Point (16, 23)
	P = RM50(16) + RM80(23)
	RM2640

ANSWER / JAWAPAN

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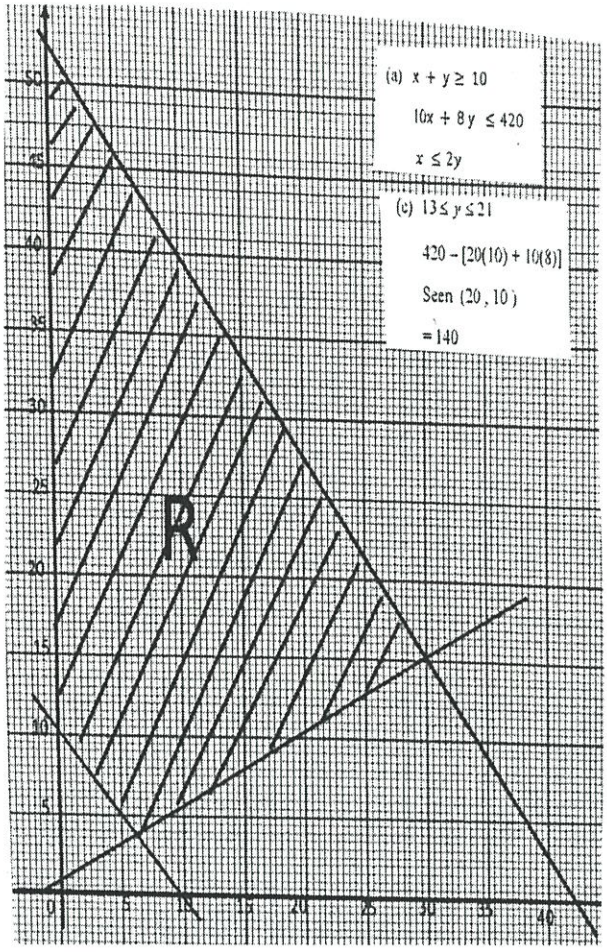
QUESTION 9

QUESTION 10



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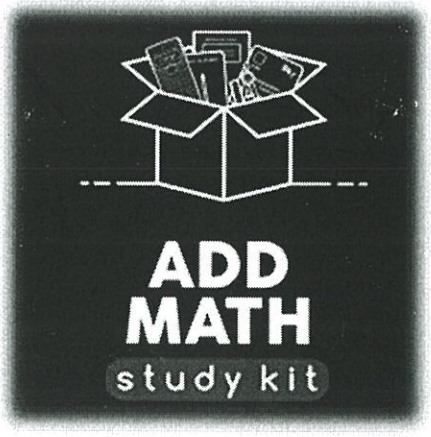

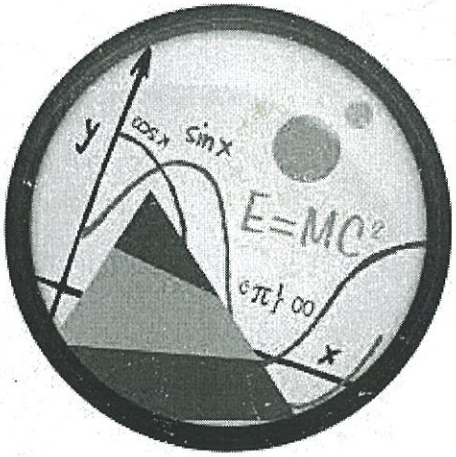

QUESTION 1/ SOALAN 1

Table 13 shows the price indices in the year 2030 based on the year 2020, of four different materials P, Q, R and S in the production of a type of a soap. It also includes the proportions of the materials used in the production of the soap.

Jadual 13 menunjukkan indeks harga pada tahun 2030 berasaskan tahun 2020 bagi empat bahan berbeza P, Q, R dan S dalam pengeluaran sejenis sabun.

Material ***Bahan***	**Price index in the year 2030 based on the year 2020** ***Indeks harga pada tahun 2030 berasaskan tahun 2020***	**Weightage** ***Pemberat***
P	125	k
Q	120	3
R	80	k + 1
S	150	6

Table/ *Jadual* 13

(a) If the price of material P is RM3.00 in the year 2030, calculate its price in 2020.
Jika bahan P berharga RM3.00 pada tahun 2030, hitung harganya pada tahun 2020.

[2 marks/ markah]

(b) If the composite index in the year 2030 based on the year 2020 is 120, find the value of k.
Jika indeks gubahan pada tahun 2030 berasaskan tahun 2020 ialah 120, cari nilai k.

[2 marks/ markah]

(c) Find the price of the soap in the year 2030 if its price in 2020 was RM28.00.
Cari harga sabun pada tahun 2030, jika harganya pada tahun2020 ialah RM28.00.

[2 marks/ markah]

(d) Given the price of material Q is estimated to decrease by 10% from the year 2030 to 2029, while the others remain unchanged. Calculate the composite index of the soap in the year 2029, based on the year 2020.
Diberi bahawa harga bahan Q dianggarkan menurun 10% dari tahun 2030 hingga 2029, manakala selainnya tidak berubah. Hitung indeks gubahan bagi sabun pada tahun 2029 berasaskan tahun 2020.

[4 marks/ *markah*]

QUESTION 2/ SOALAN 2

(a) Table 3 shows the price indices for the year 2014 based on the year 2013 and the percentages of usage of four ingredients in the making a type of cake.
Jadual 3 menunjukkan indeks harga tahun 2014 berasaskan tahun 2013 dan peratus penggunaan empat jenis bahan yang digunakan dalam pembuatan sejenis kek.

Ingredient *Bahan*	**Price Index** *Indeks Harga*	**Percentage (%)** *Peratus (%)*
J	*84*	5
K	154	40
M	189	10
N	*h*	45

Table 3
Jadual 3

Find
Cari

(i) the price of *M* in the year 2013 if its price in the year 2014 is RM2.00.
harga M pada tahun 2013 jika harganya pada tahun 2014 ialah RM2.00

(ii) the price index of *J* in the year 2014 based on the year 2012 if its price index in the year 2013 based on the year 2012 is 184.
indeks harga bagi J pada tahun 2014 berasaskan tahun 2012 jika indeks harganya pada tahun 2013 berasaskan tahun 2012 ialah 184.

[5 marks]
[5 *markah*]

QUESTION 2/ SOALAN 2

(b) The composite index for the cost of the cake in the year 2014 based on the year 2013 is 154.
Indeks gubahan untuk kos kek itu pada tahun 2014 *berasaskan tahun* 2013 *ialah* 154.

Calculate
Kirakan

(i) the value of h,
nilai h,

(ii) the corresponding price of the cake in the year 2013 if the price of a cake in the year 2014 is RM27.10.
harga sepadan bagi kek itu pada tahun 2013 *jika harga kek itu pada tahun* 2014 *ialah* RM27.10

[5 marks]
[5 *markah*]

QUESTION 3/ SOALAN 3

Table 3 shows the price indices of four main components *P*, *Q*, *R* and *S*, used to produce a table in the year 2018 based on the year 2016 and their respective weightages.

Jadual 3 *menunjukkan indeks harga bagi empat komponen utama, P, Q, R dan S, yang digunakan untuk menghasilkan sebuah meja pada tahun* 2018 *berasaskan tahun* 2016 *serta pemberat masing masing.*

Component ***Komponen***	**Price index for the year 2018 based on the year 2016** ***Indeks harga pada tahun 2018 berasaskan tahun tahun 2016***	**Weightage** **Pemberat**
P	*x*	2
Q	140	4
R	120	3
S	110	5

Jadual 3
Table 3

(*a*) Calculate
Hitung

(i) the price of component *R* in the year 2018 if the price in the year 2016 is RM 30. [2 marks]
harga komponen R pada tahun 2018 *jika harganya pada tahun* 2016 *ialah* RM 30. [2 *markah*]

(ii) the price index of component *Q* in the year 2018 based on the year 2010 if its price index in the year 2016 based on the year 2010 is 125.
[3 marks]
indeks harga bagi komponen Q pada tahun 2018 *berasaskan tahun* 2010 *jika indeks harganya pada tahun* 2016 *berasaskan tahun* 2010 *ialah* 125.
[3 *markah*]

QUESTION 3/ SOALAN 3

(*b*) The composite index for the production cost of the tables in the year 2018 based on the year 2016 is 120.

Indeks gubahan bagi kos penghasilan meja itu pada tahun 2018 *berasaskan tahun* 2016 *ialah* 120.

(i) Find the value of x,

Cari nilai x,

(ii) The rate of increase in production cost of the tables from the year 2018 to the year 2020 is expected to be the same as that from the year 2016 to the year 2018. Calculate the composite index in the year 2020 based on the year 2016.

Kadar kenaikan kos penghasilan meja itu dari tahun 2018 *ke tahun* 2020 *dijangka akan sama dengan kadar perubahan daripada tahun* 2016 *kepada tahun* 2018. *Hitung indeks gubahan pada tahun* 2020 *berasaskan tahun* 2016.

[5 *marks*]

[5 *markah*]

QUESTION 4/ SOALAN 4

15 Diagram 9 shows a bar chart on the average monthly number of pairs of tennis, badminton, football and golf shoes sold in the year 2015.

Rajah 9 menunjukkan carta palang purata bulanan bilangan pasang kasut tenis, badminton, bola sepak dan golf yang dijual pada tahun 2015.

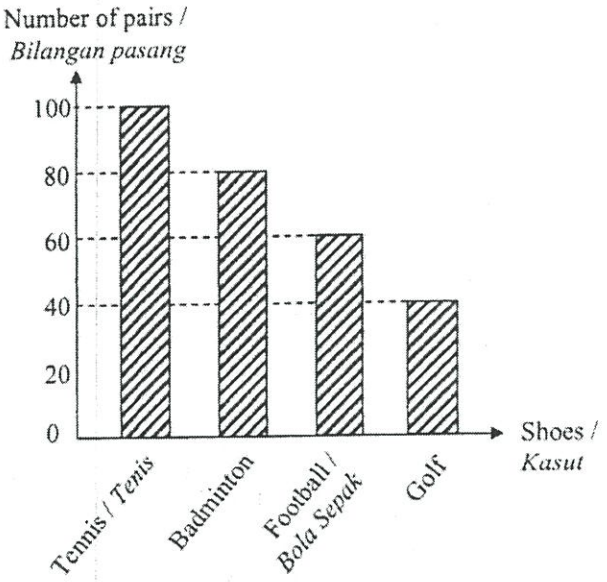

Diagram 9
Rajah 9

Table 2 shows the prices and price indices of each pair of tennis, badminton, football and golf shoes in the year 2017 based on 2015.

Jadual 2 menunjukkan harga dan indeks harga bagi setiap pasang kasut tenis, badminton, bola sepak dan golf pada tahun 2017 *berasaskan* 2015.

Types of shoes *Jenis-jenis kasut*	**Price per pair (RM)** *Harga untuk satu pasang (RM)*		**Price index in 2017 based on 2015** *Index harga pada* 2017 *berasaskan* 2015
	Year 2015 *Tahun* 2015	**Year 2017** *Tahun* 2017	
Tennis / *Tenis*	r	220.00	110
Badminton	150.00	187.50	s
Football / *Bola sepak*	180.00	189.00	105
Golf	400.00	t	130

Table 2
Jadual 2

QUESTION 4/ SOALAN 4

(*a*) Find the value of r, s and t. [3 *marks*]

Cari nilai r, s *dan* t. [3 *markah*]

(*b*) Using the data in Diagram 9 as the weightage, calculate the composite index of the four types of shoes in the year 2017 based on 2015. [2 *marks*]

Dengan menggunakan data dalam Rajah 9 *sebagai pemberat, hitung indeks gubahan bagi keempat-empat jenis kasut pada tahun* 2017 *berasaskan* 2015. [2 *markah*]

(*c*) If the total monthly sales for these four types of shoes in January 2015 is RM75 000, find the corresponding total monthly sales in January 2017.
Hence, calculate the average daily sales for that month. [3 *marks*]

Jika jumlah jualan bulanan bagi empat jenis kasut itu pada Januari 2015 *ialah* RM75 000, *cari jumlah jualan bulanan yang sepadan pada Januari* 2017.
Seterusnya, kira purata jualan harian bagi bulan tersebut. [3 *markah*]

(*d*) The average prices of the shoes are expected to rise by 40% from the year 2015 to the year 2019.
Calculate the composite index of the year 2019 based on 2017. [2 *marks*]

Harga purata kasut-kasut dijangkakan akan naik sebanyak 40% *dari tahun* 2015 *ke tahun* 2019.
Hitung indeks gubahan tahun 2019 *berasaskan* 2017. [2 *markah*]

QUESTION 5/ SOALAN 5

14. Table 3 shows the price indices and weightages of four items J, K, L and M, used in making a type of shoe.
Jadual 3 menunjukkan indeks harga dan pemberat bagi empat bahan J, K, L dan M, dalam pembuatan sejenis kasut.

Item *Bahan*	Price index for the year 2018 (2017=100) *Indeks harga* tahun 2018 (2017=100)	Price index for the year 2019 (2017 =100) *Indeks harga* tahun 2019 (2017=100)	Percentage *Peratus*
J	110	125	$2p$
K	130	$\frac{750}{x}$	$30+p$
L	$\frac{625}{x}$	140	28
M	105	$20y$	24

Table 3
Jadual 3

Given that the composite indices for the prices of the items in year 2018 and the year 2019 based on the year 2017 are 128.95 and 145.7 respectively.
Diberi bahawa indeks gubahan bagi harga item-item tersebut pada tahun 2018 *dan* 2019 *berasaskan tahun* 2017 *masing-masing ialah* 128.95 *dan* 145.7.

(a) (i) Find the value of p.
Cari nilai bagi p.
[1 *mark*]
[1 *markah*]

(ii) If the price of item J in the year 2018 is RM5.00, find its price in the year 2017.
[2 marks]
Jika harga bahan J pada tahun 2018 *ialah* RM5.00, *cari harganya pada tahun* 2017.
[2 *markah*]

(b) The price of each item has increased by 45% from the year 2017 to the year 2020.
Harga setiap item telah meningkat sebanyak 45% *dari tahun* 2017 *ke tahun* 2020.

(i) Calculate the composite index for the year 2020 based on the year 2018.
Hitungkan indeks gubahan bagi tahun 2020 *berasaskan tahun* 2018.

(ii) The total price of all the items in the year 2017 is RM 270. Calculate the corresponding total price of all the items in the year 2020.
Jumlah harga semua item tersebut dalam tahun 2017 *ialah* RM 270. *Hitung jumlah harga yang sepadan bagi semua item tersebut pada tahun* 2020.
[4 *marks*]
[4 *markah*]

(c) Find the value of of x and of y.
Cari nilai bagi x dan y.
[3 *marks*]
[3 *markah*]

QUESTION 6/ SOALAN 6

A particular kind of cakes is made using three ingredients, P, Q and R. Table 3 shows the price indices for the year 2018 based on the year 2014 and the weightage of the ingredients.

Sejenis kek dibuat daripada tiga jenis bahan, P, Q dan R. Jadual 3 menunjukkan indeks harga bagi tahun 2018 berbanding tahun 2014 dan pemberat bagi bahan – bahan tersebut.

Ingredients *Bahan*	Price index for year 2018 based on the year 2014 *Indeks harga pada tahun 2018 dengan tahun 2014 berbanding tahun 2014*	Weightage *Pemberat*
P	98	$y+2$
Q	123	$y+4$
R	x	5

Table 3
Jadual 3

(a) State the percentage of the decrease of the ingredient P from year 2014 to Year 2018. [1 *mark*]

Nyatakan peratus pengurangan bagi bahan P dari tahun 2014 ke tahun 2018.
[1 *markah*]

(b) The price of ingredient Q in the year 2018 if the price of the year 2014 is RM 10.50. [2 *marks*]

Harga bagi bahan Q pada tahun 2018 jika harga pada tahun 2014 ialah RM 10.50. [2 *markah*]

(c) The price index of ingredient R for 2018 is based on the year 2016 is 125 and for 2016 is based on the year 2014 is 92.
Find the value of x. [3 *marks*]

Indeks harga bagi bahan R bagi tahun 2018 berbanding tahun 2016 ialah 125 dan pada tahun 2016 berbanding 2014 ialah 92.
Cari nilai bagi x. [3 *markah*]

(d) The cost of making this type of cake in year 2014 is RM 55.00 and it has increased to RM 62.15 in year 2018.
Find the value of y. [4 *marks*]

Kos untuk membuat kek tersebut pada tahun 2014 ialah RM 55.00 *dan meningkat kepada* RM 62.15 *pada tahun 2018.*
Cari nilai bagi y. [4 *markah*]

QUESTION 7/ SOALAN 7

A kind of herbal drink is produced by using four ingredients *A*, *B*, *C* and *D*. Table 5 shows the prices of the ingredients.

Sejenis minuman herba dihasilkan menggunakan bahan A, B, C dan D. Jadual 5 menunjukkan harga bahan tersebut.

Ingredient *Bahan*	Price per kilogram (RM) *Harga per kilogram* (RM)	
	Year 2018 *Tahun* 2018	Year 2019 *Tahun* 2019
A	*p*	6.00
B	2.50	4.00
C	*q*	*r*
D	4.00	4.40

Table 5
Jadual 5

(a) The index number of ingredient *A* in the year 2019 based on the year 2018 is 120. Calculate the value of *p*. [2 *marks*]

Nombor indeks bagi bahan A dalam tahun 2019 *berasaskan tahun* 2018 *ialah* 120. *Hitung nilai p.* [2 *markah*]

(b) The index number of ingredient *C* in the year 2019 based on the year 2018 is 125. The price per kilogram of ingredient *C* in the year 2019 is RM2.00 more than its corresponding price in the year 2018.

Calculate the value of *q* and of *r*. [3 *marks*]

Nombor indeks bagi bahan C pada tahun 2019 *berasaskan tahun* 2018 *ialah* 125. *Harga sekilogram bahan C dalam tahun* 2019 *adalah* RM2.00, *lebih mahal daripada harganya yang sepadan dalam tahun* 2018.

Hitung nilai q dan nilai r. [3 *markah*]

QUESTION 7/ SOALAN 7

(c) The composite index for the cost of making the herbal juice in the year 2019 based on the year 2018 is 127.5. Calculate

Indeks gubahan bagi membuat minuman herba pada tahun 2019 *berasaskan tahun* 2018 *ialah* 127.5. *Hitungkan*

(i) the price of the herbal juice in the year 2018 if its corresponding price in the year 2019 is RM30.60,

harga minuman herba pada tahun 2018 *jika harga yang sepadan pada tahun* 2019 *ialah* RM30.60,

(ii) the value of t if the quantities of ingredients A, B, C and D used are in the ratio of $7 : 3 : t : 2$.

nilai t jika kuantiti kandungan adalah mengikut nisbah $7 : 3 : t : 2$.

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

QUESTION 8/ SOALAN 8

Table 2 shows the price indices and change in price indices of four raw materials *A*, *B*, *C* and *D*, used in the production of a type of biscuit.
Jadual 2 menunjukkan indeks harga dan perubahan indeks harga bagi empat bahan mentah A, B, C dan D yang digunakan dalam pembuatan sejenis biskut.

Raw material *Bahan mentah*	Price index in 2016 based on 2013 *Indeks harga pada 2016 berasaskan 2013*	Change in price index from 2016 to 2019 *Perubahan indeks harga dari 2016 ke 2019*
A	120	5% decrease *Menyusut 5%*
B	110	Unchange *Tidak berubah*
C	150	10% increase *Menokok 10%*
D	120	20% increase *Menokok 20%*

Table 2 / *Jadual* 2

Diagram 7 shows a pie chart which represents the mass of the raw materials used to make the biscuits in the year 2013.
Rajah 7 menunjukkan carta pai yang mewakili jisim bahan mentah yang digunakan untuk membuat biskut itu pada tahun 2013.

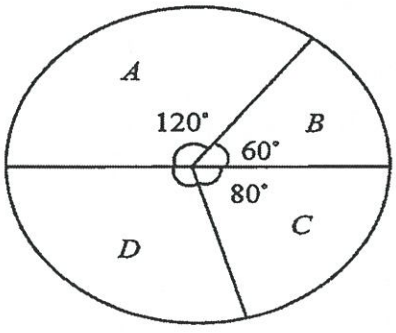

Diagram 7 / *Rajah* 7

QUESTION 8/ SOALAN 8

(a) The price of raw material *A* in the year 2016 is RM99. Find the corresponding price in the year 2013. [2 *marks*]
Harga bahan mentah A pada tahun 2016 *ialah* RM99. *Cari harga yang sepadan pada tahun* 2013. [2 *markah*]

(b) Find the price indices of all the raw materials in the year 2019 based on the year 2013. [3 *marks*]
Cari indeks harga bagi kesemua empat bahan mentah pada tahun 2019 *berasaskan tahun* 2013. [3 *markah*]

(c) (i) Calculate the composite index for the cost of producing the biscuits in the year 2019 based on the year 2013.
Hitung indeks gubahan bagi kos penghasilan biskut itu pada tahun 2019 *berasaskan tahun* 2013.

(ii) Hence, find the cost of producing the biscuits in the year 2013 if the corresponding cost in the year 2019 is RM425.00
Seterusnya, cari kos penghasilan biskut itu pada tahun 2013 *jika kos yang sepadan pada tahun* 2019 *ialah* RM425.00.

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

QUESTION 9/ SOALAN 9

Table 15 shows the prices of four materials, P, Q, R and S used in the production of a type of shoes.

Jadual 15 menunjukkan harga bagi empat jenis bahan P, Q, R dan S yang digunakan untuk membuat sejenis kasut.

Material Bahan	Price per unit (RM) Harga seunit (RM)	
	Year/ Tahun 2017	Year / Tahun 2018
P	7.00	w
Q	5.50	7.15
R	x	y
S	6.00	6.60

Table 15/Jadual 15

(a) The index number of material P in year 2018 based on the year 2017 is 125.

Calculate the value of w.

Nombor indeks bagi bahan P dalam tahun 2018 berasaskan tahun 2017 ialah 125.

Hitung nilai bagi w. (2 marks)

(2 markah)

(b) The index number of material R in the year 2018 based on the year 2017 is 135. The price per unit of material R in the year 2018 is RM 1.40 more than its corresponding price in the year 2017. Calculate the values of x and y.

Nombor indeks bagi bahan R dalam tahun 2018 berdasarkan tahun 2017 ialah 135. Harga seunit bagi bahan R dalam tahun 2018 ialah RM 1.40 lebih daripada harga sepadannya dalan tahun 2017. Hitung nilai x dan y. (3 marks)

(3 markah)

QUESTION 9/ SOALAN 9

(c) The composite index for the for the cost of making the shoes in the year of 2018 based on the year 2017 is 126.25. Calculate

Indeks gabungan bagi kos membuat kasut itu dalam tahun 2018 berasaskan tahun 2017 ialah 126.25. Hitung

(i) the price of a pair shoes in theyear 2017 its corresponding price in the year 2018 is RM65.65

Harga bagi sepasang kasut dalam tahun 2017 jika harga sepadan dalam tahun 2018 ialah RM 65.65

(ii) the value of of k if the quantities of the materials P, Q , R and S used in the ratio of 8 : 4 : k : 3

(5 marks)

(5 markah)

QUESTION 10/ SOALAN 10

Table 13 shows the prices and the price indices of four ingredients P, Q, R and S to make a particular kind of sweet snack.

Jadual 13 *menunjukkan harga-harga dan indeks harga bagi empat jenis bahan P, Q, R dan S bagi membuat sejenis makanan ringan yang manis.*

Ingredient *Bahan*	Price (RM) *Harga* (RM)		Price index in the year 2014 based on the year 2012 *Indeks harga pada tahun* 2014 *berasaskan tahun* 2012
	2012	2014	
P	2.50	3.00	120
Q	3.50	x	125
R	y	6.00	110
S	4.00	5.50	z

Table 13
Jadual 13

Diagram 13 shows a note that had been jotted down by Alvin which represent the relative quantity of components used.

Rajah 13 *menunjukkan nota yang telah disalin oleh Alvin yang mewakili kuantiti relatif bagi kompenan yang digunakan.*

Ingredient / Bahan

P = 5 cups, 5 cawan | Q = 3 cups, 3 cawan | R = 4 cups, 4 cawan | S = 1 cup, 1 cawan

Diagram 13
Rajah 13

(*a*) Calculate the values of x, y and z.
Hitung nilai bagi x, y dan z.
[4 *marks*]
[4 *markah*]

(*b*) Calculate the composite index for the cost of making the snacks in the year 2014 based on the year 2012.
[3 *marks*]
Hitung indeks gubahan bagi kos penghasilan makanan ringan pada tahun 2014 *berasaskan tahun* 2012.
[3 *markah*]

(*c*) The price of each ingredient increases by 15% from the year 2014 to the year 2016.
Given that the cost of making the snacks in the year 2012 is RM40, calculate the corresponding cost in the year 2016.
[3 *marks*]
Harga setiap bahan meningkat sebanyak 15% *dari tahun* 2014 *ke tahun* 2016.
Diberi bahawa kos penghasilan makanan ringan itu pada tahun 2012 *adalah* RM40, *hitung kos sepadan dalam tahun* 2016.
[3 *markah*]

QUESTION 11/ SOALAN 11

Table 13 shows the price, price indices and percentage expenditure of four items P, Q, R and S that been used in the production of a type of bag.

Jadual 13 *menunjukkan harga, indeks harga dan peratus perbelanjaan bagi empat barang* P, Q, R *dan* S *yang digunakan dalam pengeluaran suatu jenis beg.*

Ingredient ***Bahan***	**Price (RM)** ***Harga* (RM)**		**Price index in the year 2007 based on the year 2005** ***Indeks harga pada tahun 2007 berasaskan tahun 2005***	**Percentage expenditure (%)** ***Peratus perbelanjaan* (%)**
	2005	**2007**		
P	2.80	x	80	15
Q	4.00	4.80	120	14
R	y	2.60	130	45
S	5.00	5.85	z	26

Table 13
Jadual 13

(*a*) Find the values of x, y and z. [3 *marks*]
Cari nilai x, y *dan* z. [3 *markah*]

(*b*) Calculate the composite index for the cost of making the bag in the year 2007 based on the year 2005. [3 *marks*]
Hitung indeks gubahan bagi kos membuat beg itu pada tahun 2007 *berasaskan tahun* 2005. [3 *markah*]

(*c*) The cost of making a bag in the year 2005 was RM35.00.
Calculate the corresponding cost in the year 2007. [2 *marks*]
Kos untuk membuat satu beg pada tahun 2005 *ialah* RM35.00.
Hitung kos yang sepadan pada tahun 2007. [2 *markah*]

(*d*) The cost of all the item increases by 14% from the year 2007 to the year 2009.
Find the composite index for the year 2009 based on the year 2005. [2 *marks*]
Kos bagi semua barang itu meningkat sebanyak 14% *dari tahun* 2007 *hingga tahun* 2009.
Cari indeks gubahan bagi tahun 2009 *berasaskan tahun* 2005. [2 *markah*]

QUESTION 12/ SOALAN 12

Table 3 shows the price indices, changes in price indices and weightages of four ingredients, *R*, *S*, *T* and *U*, used in the making of a kind of food.
Jadual 3 menunjukkan indeks harga, perubahan indeks harga dan pemberat bagi empat bahan R, S, T and U untuk membuat sejenis makanan.

Ingredient *Bahan*	**Price Index for the year 2018 based on the year 2016** *Indeks harga pada tahun 2018 berasaskan tahun 2016*	**Change in price index from the year 2018 to the year 2019** *Perubahan indeks harga dari tahun 2018 ke tahun 2019*	**Weightage** *Pemberat*
R	180	10% increase *Menokok 10%*	5
S	116	5% decrease *Menyusut 5%*	4
T	*p*	No change *Tidak berubah*	2
U	125	No change *Tidak berubah*	1

Table 3
Jadual 3

(*a*) Calculate
Hitung

(i) the price of ingredient *S* in the year 2016 if its price in the year 2018 is RM13.50,
harga bahan S pada tahun 2016 jika harganya pada tahun 2018 ialah RM13.50,

(ii) the value of *p* when the composite index for the cost of making a kind of food in the year 2018 based on the year 2016 is 146.
nilai p apabila indeks gubahan bagi kos membuat sejenis makanan pada tahun 2018 berasaskan tahun 2016 ialah 146.

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

(*b*) (i) Find the composite index for the cost of making a kind of food in the year 2019 based on 2016.

Cari indeks gubahan bagi kos membuat sejenis makanan itu pada tahun 2019 berasaskan tahun 2016.

(ii) Hence, calculate the cost of making a kind of food in the year 2019 if the corresponding cost in the year 2016 is RM18.

Seterusnya, hitung kos membuat sejenis makanan pada tahun 2019 jika kos sepadan pada tahun 2016 ialah RM18.

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

QUESTION 13/ SOALAN 13

Table 13 shows the price indices and weightage of four items *P, Q, R* and *S*
Jadual 13 menunjukkan indeks harga dan pemberat bagi empat bahan P, Q, R dan *S*

Item *Bahan*	**Price index for the year 2013 base on the year 2011** *Indeks harga pada tahun 2013 berasaskan tahun 2011*	**Price index for the year 2015 base on the year 2011** *Indeks harga pada tahun2015 berasaskan tahun 2011*	**Weightage** *Pemberat*
P	105	10 % increase *Menokok 10 %*	5
Q	120	No change Tidak berubah	*k*
R	160	No change Tidak berubah	5
S	130	5% decrease Menyusut 5%	1

Table 13/ Jadual 13

Calculate
Hitung

(a) (i) the price of item *P* in the year 2013 if its price in the year 2011 is RM10.20
Harga bahan P pada tahun 2013 jika harganya pada tahun 2011 ialah RM10.20

(ii) the price of item *S* in the year 2011 if its price in the year 2013 is RM8.60
harga bahan S pada tahun 2011 jika harganya pada tahun 2013 ialah RM 8.60

[3 marks]
[3 markah]

(b) The composit index for the four items in year 2013 based on the year 2011 is 129. Calculate the value of *k*

[3 marks]

Indeks gubahan bagi empat bahan tersebut pada tahun 2013 berasaskan tahun 2011 ialah 129. Hitung nilai k

[3 markah]

(c) If the price of the four items, *P,Q, R* and *S* is RM20.80 in the year 2011, calculate the price of the four items in the year 2015.

[4 marks]

Jika harga keempat-empat bahan P, Q, R dan S ialah RM20.80 pada tahun 2011, hitung harga keempat-empat bahan papa tahun 2015

QUESTION 14/ SOALAN 14

. Table 3 shows the price indices and the weightages of five types of food sold in a market in the year 2018 based on the year 2017.

Jadual 3 menunjukkan indeks harga dan pemberat lima jenis makanan yang dijual di sebuah pasar pada tahun 2018 berasaskan tahun 2017.

Food *Makanan*	Price Index *Indeks harga*	Weightage *Pemberat*
Meat *Daging*	130	5
Fish *Ikan*	120	2
Chicken *Ayam*	*x*	y
Prawn *Udang*	105	3
Crab *Ketam*	125	4

Table 3

Jadual 3

Given that the composite index of all the five types of food sold is 118.25, the price of chicken in the year 2017 and 2018 were RM7.50 and RM8.25 respectively, calculate

Diberi indeks gubahan bagi kelima-lima jenis makanan yang dijual ialah 118.25, harga ayam pada tahun 2017 dan tahun 2018 ialah RM7.50 dan RM8.25 masing-masing, hitung

(a) the values of *x* and *y*. [4 marks]

nilai x dan y. [4 *markah*]

(b) the price of prawn sold in the 2018 if it costs RM16 in 2017. [2 marks]

harga udang yang dijual pada tahun 2018 jika harganya pada tahun 2017 ialah RM16. [2 *markah*]

(c) the total cost of all the foods sold in 2018 if the total cost was RM540 in 2017. [2 marks]

jumlah kos semua makanan yang dijual pada tahun 2018 jika jumlah kos ialah RM540 pada tahun 2017. [2 *markah*]

(d) the price of crab in 2019 if there is an increase of 15% in price from the year 2018 to 2019 and it costs RM26 in 2017. [2 marks]

harga ketam pada tahun 2019 jika terdapat peningkatan harga sebanyak 15% dari tahun 2018 kepada tahun 2019 dan ia berharga RM26 pada tahun 2017. [2 *markah*]

QUESTION 15/ SOALAN 15

The table 15 shows the price and price index of four ingredients, *P*, *Q*, *R* and *S* used to make a kind of pudding.

Jadual 15 *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 *Harga (RM) per kg*		Price index in the year 2017 based on the year 2016 *Indeks harga dalam tahun 2017 berasaskan tahun 2016*	Weightage *Pemberat*
	2016	2017		
P	2.40	3.12	*x*	5
Q	4.50	5.40	120	*n*
R	5.00	*y*	145	1
S	3.00	4.50	150	2*n*

Table 15
Jadual 15

(a) Find the value of
Cari nilai

(i) *x*,

(ii) *y*.

[3 marks]
[3 *markah*]

(b) Given the composite index for the cost of making the pudding in the year 2017 based on the year 2016 is 137. Find the value of *n*. [3 marks]
Diberi indeks gubahan bagi kos membuat puding itu dalam tahun 2017 *berasaskan tahun* 2016 *ialah* 137. *Cari nilai bagi n.* [3 *mark*ah]

(c) Calculate the price of pudding in the year 2016 if the corresponding price in 2017 is RM9.25. [2 marks]
Hitung harga puding pada tahun 2016 *jika harganya yang sepadan pada tahun* 2017 *ialah* RM9.25. [2 *mark*ah]

(d) The cost of making the pudding is expected to increase by 55% from 2016 to the year 2018. Compute the composition index in 2018 based on the year 2017.
[2 marks]
Kos membuat puding itu dijangka meningkat sebanyak 55% *dari tahun* 2016 *ke tahun* 2018. *Hitung indeks gubahan dalam tahun* 2018 *berasaskan tahun* 2017.
[2 *mark*ah]

ANSWER / JAWAPAN

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QUESTION 1

QUESTION 2

(a) (i) $\frac{2}{P_{2013}} \times 100 = 189$ K1

$P_{2013} = RM1.06$ (mesti 2 titik perpuluhan)

(ii) $\frac{184 \times 84}{100}$ K1K1

$= 154.56$ N1

(b) (i) $\frac{(84\times5)+(154\times40)+(189\times10)+(45h)}{100} = 154$

$h = 154$ N1

(iii) $\frac{27.10}{P_{2013}} \times 100 = 154$ K1

$P_{2013} = RM17.60$ (mesti 2 titik perpuluhan)

QUESTION 3

(a) (i) $\frac{P_{2018}}{30.00} \times 100 = 120$

Harga R = RM36.00

(ii) $\frac{I_{2018}}{I_{2010}} = \frac{125\times140}{100}$

$= 175$

(b)(i) $120 = \frac{(2\times x)+(4\times140)+(3\times120)+(5\times110)}{2+4+3+5}$

$120 = \frac{1470+2x}{14}$

$x = 105$

(ii) 120

$I_{2020/2016} = \frac{120\times120}{100}$

$=144$

QUESTION 4

(a) $\frac{220}{r} \times 100 = 110$

$r = 200$

$s = \frac{187.5}{150} \times 100$

$s = 125$

$\frac{t}{400} \times 100 = 130$

$t = 520$

(b) $\frac{(110\times100)+(125\times80)+(105\times60)+(130\times40)}{280}$

116.07

(c) $\frac{U}{75000} \times 100 = 116.07$

$U = 87052.50$

2808.15

(d) $\frac{140}{116.07} \times 100$

120.62

ANSWER / JAWAPAN

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QUESTION 5

(a)(i) $p = 6$

(a)(ii) $\frac{5.00}{Q_{2017}} \times 100 = 110$

RM4.55

(b)(i) $\frac{145 \times 100}{128.95}$

112.4

(ii) $\frac{Q}{270} \times 100 = 145$

RM391.50

(c) $\frac{110(12)+130(36)+\frac{625(28)}{x}+105(24)}{100} = 128.95$ or

$\frac{125(12)+\frac{750(36)}{x}+140(28)+20y(24)}{100} = 145.7$

$x = 4$ and $y = 5$

QUESTION 6

(a) 2%

(b) $123 = \frac{P_{18}}{10.50} \times 100$

RM 12.92

(c) $\frac{92}{100} = \frac{x}{125}$

$x = 115$

(d) $I_{18/14} = \frac{62.15}{55.00} \times 100$

$I_{18/14} = 113$

$\frac{98(y+2)+123(y+4)+115(5)}{y+2+y+4+5} = 113$

$y = 4$

QUESTION 7

a) $\frac{6}{p} \times 100 = 120$

$p = 5$

b) $\frac{r}{q} \times 100 = 125$

$\frac{q+2}{q} \times 100 = 125$

$q = 8$

$r = 10$

c)

(i) $\frac{30.60}{P_{2018}} \times 100 = 127.5$

$P_{2018} = \text{RM}24$

(ii) $127.5 = \frac{(120 \times 7)+(160 \times 3)+125t+(110 \times 2)}{7+3+m+2}$

$2.5m = 10$

$m = 4$

QUESTION 8

(a) $\frac{99}{P_{13}} \times 100 = 120$

82.50

(b) A $\frac{120 \times 95}{100} = 114$

B $\frac{110 \times 100}{100} = 110$

C $\frac{150 \times 110}{100} = 165$

D $\frac{120 \times 120}{100} = 144$

(c) i) $\frac{114(120)+110(60)+165(80)+144(100)}{120+60+80+100}$

$\frac{47880}{360}$

133

ii) $\frac{425}{P_{13}} \times 100 = 133$

319.55

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QUESTION 9

(a) $125 = \frac{w}{7.00} \times 100$ OR $135 = \frac{x+1.40}{x} \times 100$

$w = 8.75$ N1

(b) $y = x + 1.40$ or implied P1

$x = 4.00$ N1

$y = 5.40$ N1

(c)(i) $126.25 = \frac{65.65}{\text{Tahun } 2017} \times 100$ K1

Tahun 2017 = RM52.00 N1

(ii) $I_Q = 130$ or $I_S = 110$ P1

$126.25 = \frac{125(8)+130(4)+135(k)+110(3)}{8+4+k+3}$

$k = 5$ N1

QUESTION 10

(a) $\frac{x}{3.50}$x100 = 125 or $\frac{6}{y}$x100 = 110 or $\frac{5.50}{4.00}$x100 = z

$x = 4.38$

$y = 5.45$

$z = 137.5$

(b) (120x5) + (125x3) + (110x4) + (137.5x1)

$\frac{(120x5) + (125x3) + (110x4) + (137.5x1)}{13}$

119.42

(c) $\frac{119.42x115}{100}$

$\frac{p}{40}$x100 = 137.33

RM 54.93

QUESTION 11

(a) $\frac{x}{2.80} \times 100 = 80$ or $\frac{2.60}{y} \times 100 = 130$ or $\frac{5.85}{5} \times 100 = z$

$x = 2.24, y = 2, z = 117$

Note : All three values correct N2
Any two values correct N1
One or none values correct N0

(b) $(80\times15)+(120\times14)+(130\times45)+(117\times26)$

$\frac{(80\times15)+(120\times14)+(130\times45)+(117\times26)}{100}$

117.72

(c) $\frac{x}{35} \times 100 = 117.72$

RM 41. 20

(d) $\frac{117.72\times114}{100}$

134.2

QUESTION 12

(a) $\frac{RM13.50}{P_{16}} \times 100 = 116$

$P_{16} = RM11.64$

(b) $\frac{180(5) + 116(4) + p(2) + 125(1)}{5+4+2+1} = 146$

$p = 131.5$

(c) see $I_W = 198$ or $I_S = 110.2$

$I = \frac{198(5) + 110.2(4) + 131.5(2) + 125(1)}{5+4+2+1}$

$= 151.57$

(d) $\frac{P_{19}}{RM18} \times 100 = 151.57$

$P_{19} = RM27.28$

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QUESTION 13

(a) $\frac{P_{12}}{10.20} \times 100 = 105$ or $\frac{9.60}{P_{11}} \times 100 = 130$

(i) 10.71
(ii) 6.62

(b)

$$\bar{I} = \frac{105(5) + 120(k) + 160(5) + 130(1)}{5 + k + 5 + 1} = 129$$

$120k + 1455 = 129(11 + k)$
$k = 4$

(c) $\bar{I} = \frac{115.5(5) + 120(4) + 160(5) + 123.5(1)}{5 + 4 + 5 + 1}$

$= 132.07$

$\frac{P_{15}}{20.80} \times 100 = 132.07$

27.47

QUESTION 14

(a) $x = \frac{8.25}{7.50} \times 100$

$x = 110$

$\frac{130(5) + 120(2) + 110(y) + 105(3) + 125(4)}{14 + y} = 118.25$

y = 6

(b) $\frac{16}{100} \times 105$

RM16.80

(c) $\frac{540}{100} \times 118.25$

RM638.25

(d) $\frac{125 \times 115}{100}$ or 143.75

RM37.38

QUESTION 15

(a) (i) $\frac{3.12}{2.40} \times 100$

$x = 130$

(ii) y = RM7.25

(b) $\frac{130(5) + 120(n) + 145(1) + 150(2n)}{5 + n + 1 + 2n} = 137$

$n = 3$

(c) $\frac{9.25}{P_{16}} \times 100 = 137$

P_{16} = RM6.75

(d) $\frac{155}{100} \times \frac{100}{137} \times 100$

113.14