

1449/1
 MATEMATIK
 TING.5
 2022
 KERTAS 1
 1½ JAM



SEKOLAH MENENGAH KEBANGSAAN SULTAN ABDUL AZIZ, TELUK INTAN

PEPERIKSAAN PERCUBAAN SPM TAHUN 2022
 TINGKATAN LIMA

MATEMATIK / MATHEMATICS

KERTAS 2 / PAPER 2

SATU JAM TIGA PULUH MINIT / ONE HOUR THIRTY MINUTES

JANGAN BUKA KERTAS SOALAN SEHINGGA DI BERITAHU
 DO NOT OPEN THE QUESTION PAPER UNTIL TOLD

MAKLUMAT UNTUK CALON
 INFORMATION FOR CANDIDATES

1. Kertas soalan ini mengandungi **40** soalan.
*This question paper consists of **40** questions.*
2. Jawab **semua** soalan.
*Answer **all** the questions.*
3. Setiap soalan diikuti dengan empat pilihan jawapan, A, B, C dan D. Bagi setiap soalan, pilih **satu** jawapan sahaja.
*Each question is followed by four answer options, A, B, C and D. For each question, choose only **one** answer.*
4. Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
The diagrams provided in the questions are not drawn to scale unless stated.
5. Anda dibenarkan menggunakan kalkulator saintifik.
You may use a scientific calculator.

Disediakan Oleh:

Disemak Oleh:

Disahkan Oleh:

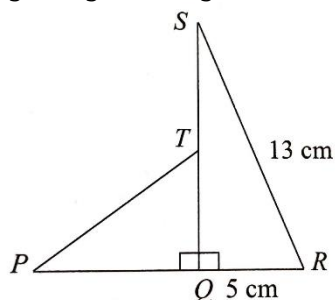
(PUAN AZNI HAIDA KHAIRUDDIN)
 GURU MP MATEMATIK
 SMK SULTAN ABDUL AZIZ

(PN. YUHANIS BINTI ABDUL WAHAB)
 KETUA PANITIA SAINS & MATEMATIK
 SMK SULTAN ABDUL AZIZ

(PN. CUT FARHAH BINTI ABDUL RAHMAN)
 G.K BIDANG SAINS & MATEMATIK
 SMK SULTAN ABDUL AZIZ

Kertas soalan ini mengandungi **14** halaman bercetak termasuk muka hadapan

1. Rajah 1 menunjukkan dua buah segi tiga bersudut tegak, PQT dan SQR.
Diagram 1 shows two right-angled triangles, PQT and SQR.



Rajah 1/ Diagram 1

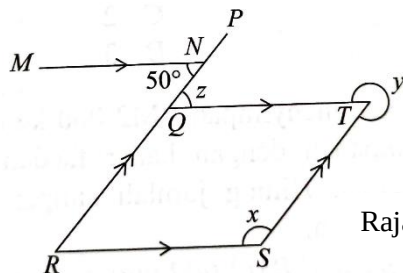
Diberi bahawa T ialah titik tengah bagi SQ dan PQ adalah 3 cm lebih panjang daripada QR. Cari nisbah PT kepada QT.

It is given that T is the midpoint of SQ and PQ is 3 cm longer than QR. Find the ratio of PT and QT.

- A 5 : 3
B 5 : 4

- C 5 : 8
D 13 : 10

2. Dalam Rajah 2, QRST ialah sebuah segi empat selari. PQR ialah satu garis lurus dan MN adalah selari dengan QT dan RS.
In Diagram 2, QRST is a parallelogram. PQR is a straight line and MN is parallel to QT and RS.



Rajah 2/ Diagram 2

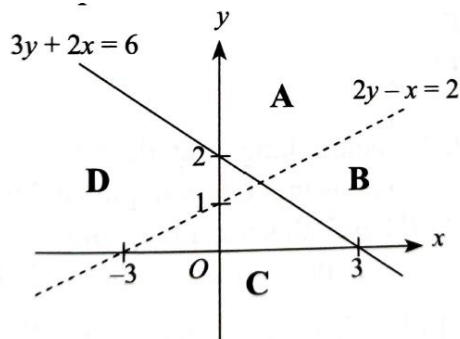
Cari nilai $z + y - x$.

Find the value of $z + y - x$.

- A 130°
B 230°

- C 390°
D 490°

3. Rajah 3 menunjukkan dua ketaksamaan linear dilukis pada suatu satah Cartes.
Diagram 3 shows two linear inequalities drawn on a Cartesian plane.



Rajah 3/ Diagram 3

Antara rantau A, B, C dan D, yang manakah memuaskan ketaksamaan linear $3y + 2x \geq 6$ dan $2y - x < 2$?

Which region A, B, C dan D, satisfies the linear inequalities, $3y + 2x \geq 6$ dan $2y - x < 2$?

4. $3(m - n)^2 + 2(m^2 - 3n) =$

A $5m^2 - 3n^2 - 6mn - 6n$
 B $5m^2 + 3n^2 - 6mn - 6n$

C $5m^2 + 3n^2 - 6mn + 6n$
 D $m^2 + 3n^2 - 6mn - 6n$

5. 1 kg labu diperlukan untuk memasak 15 mangkuk sup labu. Berapakah Yee Ling perlu bayar untuk memasak 50 mangkuk sup labu jika harga bagi 1 kg labu ialah RM6.33?

1 kg of pumpkin is needed to cook 15 bowls of pumpkin soup. How much does Yee Ling need to pay for cooking 50 bowls of pumpkin soup if the price of 1 kg pumpkin is RM6.33?

A RM316.50
 B 94.95

C RM21.10
 D RM18.89

6. Lengkapkan setiap jujukan nombor berikut : [... , 64, -32, 16, -8].
Complete each sequence of numbers below : [... , 64, -32, 16, -8].

A 128
 B 96

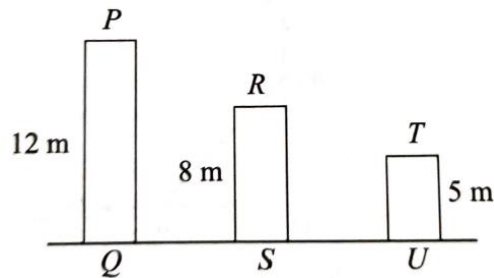
C -128
 D -96

7. Cari punca-punca bagi persamaan kuadratik $2m - 1 = \frac{11}{m+4}$.
Find the roots of the quadratic equations $2m - 1 = \frac{11}{m+4}$.

A $m = \frac{3}{2}, m = -5$
 B $m = \frac{-3}{2}, m = 5$

C $m = \frac{5}{2}, m = -3$
 D $m = \frac{-5}{2}, m = 3$

8. Rajah 4 menunjukkan tiga batang tegak, PQ, RS dan TU pada suatu tanah mengufuk.
Diagram 4 shows three vertical poles, PQ, RS and TU on a horizontal ground.



Rajah 4/ Diagram 4

Diberi bahawa sudut dongakan P dari R ialah 30° dan $QS = SU$. Hitung sudut tunduk Q dari T.
It is given that the angle of elevation of P from R is 30° and $QS = SU$. Calculate the angle of depression of Q from T.

A 36.21°
 B 19.84°

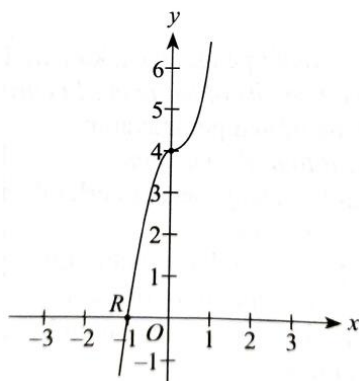
C 13.53°
 D 6.87°

9. Diberi bahawa $pq + 1 = p^2 + q$. Ungkapkan q dalam sebutan p.
It is given that $pq + 1 = p^2 + q$. Express q in terms of p.

A $p + 1$
 B $p - 1$

C $(p - 1)^2$
 D $(p - 1)(p + 1)$

10. Rajah 5 menunjukkan graf suatu fungsi kubik yang menyalang paksi-x di R.
 Diagram 5 shows the graph of a cubic function that intercepts the x-axis at point R.



Rajah 5/ Diagram 5

Cari koordinat bagi titik R.

Find the coordinates of point R.

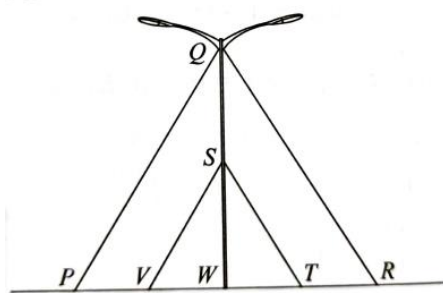
A (-1, 0)

C (0, 4)

B (0, -1)

D (4, 0)

11. Rajah 6 menunjukkan empat utas tali yang diikat untuk menyokong sebatang tiang lampu. Tali QR adalah selari dengan tali ST dan tali QP adalah selari dengan tali SV.
 Diagram 6 shows four ropes are tied to support a lamp post. String QR is parallel to string ST and string QP is parallel to string SV.



Rajah 6/ Diagram 6

Kecerunan QR ialah -2. Diberi jarak mengufuk WR dan WT masing-masing ialah 4m dan 2m. Hitung jarak, dalam m, bagi QS.

The gradient of QR is -2. Given the horizontal distances of WR and WT are 4m and 2m respectively. Calculate the distance, in m, of QS.

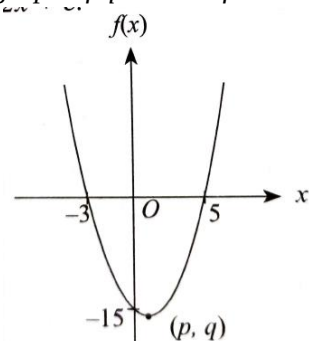
A 2

C 4

B 3

D 5

12. Rajah 7 menunjukkan sebuah graf fungsi kuadratik $f(x) = ax^2 - 2x + c$.
 Diagram 7 shows a graph of quadratic function $f(x) = ax^2 - 2x + c$.



Rajah 7/ Diagram 7

Hitung nilai bagi $\frac{ac}{pq}$.

Calculate the value of $\frac{ac}{pq}$.

A -1

C $\frac{15}{16}$

B $\frac{-15}{16}$

D 1

13. Cari nilai minimum bagi x jika median bagi set 11, 11, 13, 14, 15, 16, 17, x dan 19 ialah 15.
Find the minimum value of x if the median of the set 11, 11, 13, 14, 15, 16, 17, x and 19 is 15.

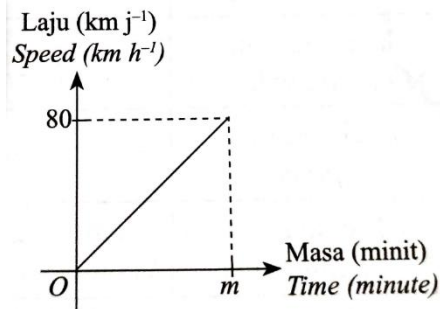
A 14

C 16

B 15

D 17

14. Rajah 8 menunjukkan sebuah graf laju-masa bagi pergerakan suatu zarah.
Diagram 8 shows a speed-time graph for the movement of a particle.



Rajah 8/ Diagram 8

Diberi kadar perubahan laju bagi zarah itu ialah 40 km j^{-2} . Cari nilai bagi m .

It is given the rate of change of speed for the particle is 40 km h^{-2} . Find the value of m .

A 20

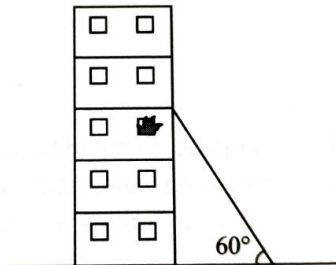
C 200

B 120

D 1200

15. Rajah 9 menunjukkan kebakaran di salah satu unit rumah pada tingkat tiga dan sudut tangga dari tanah yang disandarkan oleh ahli bomba untuk memasuki unit itu.

Diagram 9 shows a fire occurred in one of the house unit on the third floor and the angle of ladder set up by the firefighters to gain access to that unit.



Rajah 9/ Diagram 9

Diberi bahawa tinggi setiap tingkat ialah 2m , hitung panjang, dalam m , tangga yang digunakan oleh ahli bomba.

Given that the height of each floor is 2m , calculate the length, in m , of the ladder used by the firefighters.

A 5.196

C 10.39

B 6.928

D 12

16. $\frac{\sqrt{m^2 n^4}}{m^{-1}n} =$

A $m^2 n$

B mn^2

C $\frac{m^2}{n}$

D $\frac{n}{n^2 m}$

17. Amelia telah menyimpan RM2000 ke dalam satu akaun simpanan dengan kadar faedah sebanyak 1.8% setahun. Hitung jumlah simpanan Amelia selepas 30 bulan.

Amelia deposited RM2000 into a savings account with an interest rate 1.8% per annum. Calculate her total savings after 30 months.

A RM11500

B RM1575

C RM920.83

D RM638.89

18. Plot batang-dan-daun dalam Rajah 10 menunjukkan jisim buah-buahan yang dijual di sebuah gerai.

The stem-and-leaf in plot in Diagram 10 shows the mass of fruits sold at a stall.

Batang Stem	Daun Leaf			
1	3	4	4	5
2	1	2	6	8 9
3	0	0	0	

Kekunci: 1 | 3 bermaksud 1.3 kg

Key: 1 | 3 means 1.3 kg

Rajah 10/ Diagram 10

Apakah julat bagi jualan buah-buahan di gerai tersebut?

What is the range of sales of fruits at the stall?

A 1.7 kg

B 4.7 kg

C 17 kg

D 47 kg

19. Kebarangkalian bahawa Kenny lulus dalam ujian Kimia, Biologi dan Fizik masing-masing ialah $\frac{4}{5}$, $\frac{2}{3}$ dan $\frac{5}{6}$. Hitung kebarangkalian bahawa Kenny lulus sekurang-kurangnya salah satu subjek.

The probabilities that Kenny passes the Chemistry, Biology and Physics test are $\frac{4}{5}$, $\frac{2}{3}$ and $\frac{5}{6}$ respectively. Calculate the probability that Kenny passes at least one of the subjects.

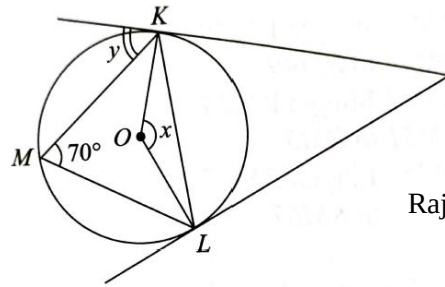
A $\frac{89}{90}$

B $\frac{11}{90}$

C $\frac{2}{45}$

D $\frac{1}{45}$

22. Rajah 13 menunjukkan dua tangen kepada sebuah bulatan dengan pusat O pada K dan L.
 Diagram 13 shows two tangents to a circle with centre O at K and L.



Rajah 13/ Diagram 13

Diberi $MK = ML$, cari nilai x dan nilai y .
 Given $MK = ML$, find the values of x and y .

A $x = 140^\circ, y = 35^\circ$

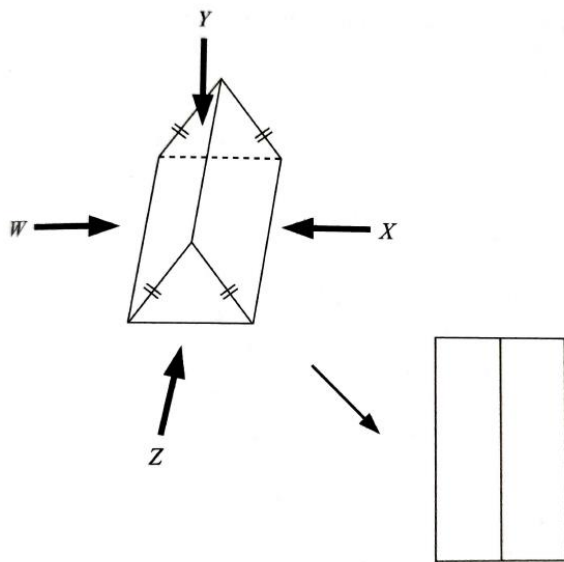
B $x = 130^\circ, y = 35^\circ$

C $x = 140^\circ, y = 55^\circ$

D $x = 130^\circ, y = 55^\circ$

23. Rajah 14 menunjukkan unjuran ortogon daripada sebuah prisma. Antara arah pandangan berikut, yang manakah membentuk unjuran ortogon tersebut?

Diagram 14 shows the orthogonal projection from a prism. Which of the following viewing directions forms the orthogonal projection?



Unjuran ortogon
 Orthogonal projection

Rajah 14/ Diagram 14

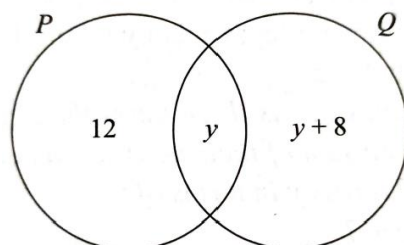
A W

B X

C Y

D Z

24. Rajah 15 menunjukkan sebuah gambar rajah Venn dengan set semesta, $\varepsilon = P \cup Q$.
Diagram 15 shows a Venn diagram with universal set, $\varepsilon = P \cup Q$.



Rajah 15/ Diagram 15

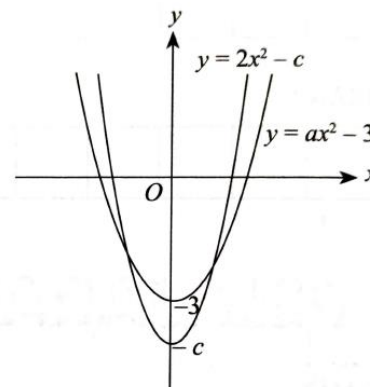
Diberi bilangan murid yang menggemari permainan Q sahaja ialah 15 orang dan bilangan murid yang menggemari permainan P sahaja ialah 12 orang. Cari nilai y .

Given the number of students who likes game Q only is 15 and the number of students who like game P only is 12. Find the value of y .

- A 3
B 4

- C 7
D 14

25. Rajah 16 menunjukkan dua graf fungsi kuadratik.
Diagram 16 shows two graphs of quadratic function.



Rajah 16/ Diagram 16

Apakah nilai yang mungkin bagi a dan c ?

What are the possible values of a and c ?

- A $a = 1, c = 4$
B $a = 1, c = -2$

- C $a = 1, c = -4$
D $a = 3, c = 4$

26. Jadual 1 menunjukkan markah yang diperoleh empat orang murid dalam peperiksaan Matematik pada penggal pertama persekolahan.
Table 1 shows the marks obtained by four students in a Mathematics examination in the first school term.

Murid Student	Markah Marks
Arif	224_5
Joo Seng	111100_2
Kamarul	78
Siti	154_6

Jadual 1/ Table 1

Hitung purata markah bagi empat murid itu.

Calculate average marks of the four students.

- A 65
B 68

- C 72
D 75

27. Antara pernyataan berikut, yang manakah ialah kontrapositif bagi “Jika $2x - 5 = 5$, maka $x = 5$.”?
Which of the following statements is the contrapositive of “If $2x - 5 = 5$, then $x = 5$.”?

- A Jika $x \neq 5$, maka $2x - 5 \neq 5$
If $x \neq 5$, then $2x - 5 \neq 5$
- B Jika $2x - 5 \neq 5$, maka $x \neq 5$
If $2x - 5 \neq 5$, then $x \neq 5$
- C Jika $x = 5$, maka $2x - 5 = 5$
If $x = 5$, then $2x - 5 = 5$
- D Jika $2x - 5 \neq 5$, maka $x = 5$
If $2x - 5 \neq 5$, then $x = 5$

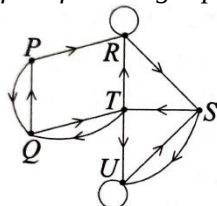
28. Jadual 2 menunjukkan bilangan darjah bucu pada suatu graf terarah.
Table 2 shows the degree of vertices on a directed graph.

Bucu Vertex	Bilangan darjah Sum of degree	
	d_{in}	d_{out}
P	1	2
Q	2	2
R	3	2
S	2	2
T	2	3
U	3	2

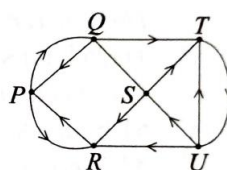
Jadual 2/ Table 2

Antara berikut, yang manakah mewakili graf tersebut?
Which of the following represents the graph?

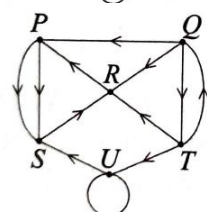
A



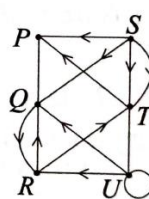
C



B



D



29. Harga sebatang pen ialah RM5 manakala harga sebatang pensel ialah RM3. Nora hendak membeli x batang pen dan y batang pensel dengan RM150 dan bakinya selebih-lebihnya RM45. Diberi bahawa bilangan pen yang hendak dibeli adalah lebih daripada bilangan pensel dan bilangan pensel hendaklah tidak kurang daripada 8 batang. Antara sistem ketaksamaan linear berikut, yang manakah memuaskan situasi Nora?

The price of a pen is RM5 while the price of a pencil is RM3. Nora wants to buy x pens and y pencils using RM150 with a balance at most at RM45. It is given that the number of pens to be bought is more than the number of pencils and the number of pencils should not be less than 8.
Which are the following linear inequality systems satisfies Nora's situation?

- A $x > y, y \geq 8, 5x + 3y \leq 105$
- B $y > x, x \geq 8, 5x + 3y \leq 105$
- C $x > y, y \leq 8, 3x + 5y \geq 105$
- D $y > x, y \leq 8, 3x + 5y \geq 105$

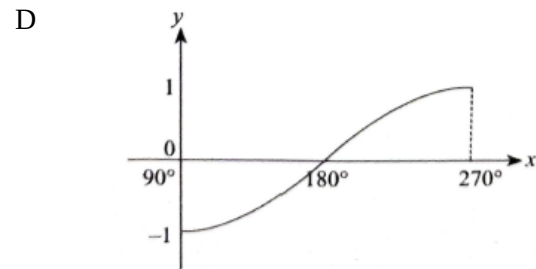
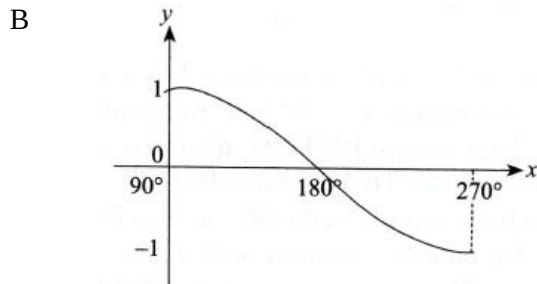
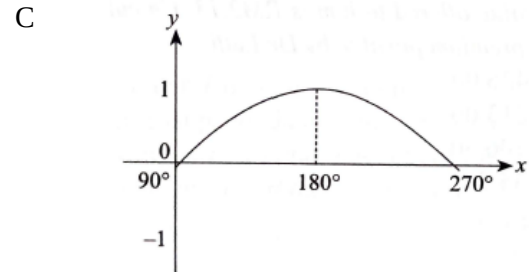
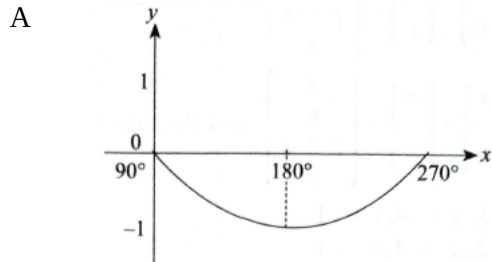
30. Antara berikut, yang manakah bukan satu komponen penting dalam permodelan matematik?
Which are the following is not an important componen in mathematical reasoning?
- A Mengenalpasti dan mendefinasikan masalah
Identifying and defining the problem
 - B Memerhati perubahan dan mencatatkan keputusan
Observing changes and recording the results
 - C Membuat andaian dan mengenalpasti pembolehubah
Making assumptions and identifying variables
 - D Menentusahkan dan mentafsir penyelesaian dalam konteks masalah berkenaan
Verifying and interpreting solutions in the context of the problem
31. Suatu tinjauan tentang perbelanjaan dijalankan kepada 100 orang pekerja dan didapati $\sum x^2 = 952\,409$ dan $\sigma = 17.9$ daripada data itu. Hitung min bagi data itu.
A survey about expenses is performed on 100 workers and found that $\sum x^2 = 952\,409$ and $\sigma = 17.9$. Calculate the mean of the data.
- A 95.94
 - B 97.5
 - C 9503.68
 - D 9524.09
32. Simpanan Sam, S , berubah secara langsung dengan pendapatannya, I . Diberi bahawa Sam telah menyimpan sebanyak RM200 apabila pendapatannya ialah RM2200. Ungkapkan I dalam sebutan S .
Sam's savings, S , varies directly with his income, I . It is given that Sam saved RM200 when his income was RM2200. Express I in terms of S .
- A $I = 11S$
 - B $I = 22S$
 - C $11I = S$
 - D $200I = 2200S$
33. Shamila hendak membeli sebuah kereta yang berharga RM60000 dengan bayaran pendahuluan sebanyak 10%. Diberi pendapatan bulananannya ialah RM3500 dan perbelanjaan tetap dan perbelanjaan tidak tetap masing-masing adalah RM600 dan RM400. Jika Shamila menyimpan suatu jumlah tetap setiap bulan selama dua tahun untuk menyediakan bayaran wang pendahuluan itu, berapakah baki pendapatan bulanan Shamila yang masih tinggal?
Shamila wants to buy a car at the price of RM60000 with a down payment of 10%. Given her monthly income is RM3500 and the fixed expenses and variable expenses are RM600 and RM400 respectively. If Shamila saves a fixed amount every month for two years to prepare for the down payment, how much balance of Shamila's monthly income will be left?
- A Tiada baki / no balance
 - B RM2250
 - C RM2500
 - D RM3450
34. Diberi bahawa $\begin{pmatrix} 3 & -x \\ -2 & 1 \end{pmatrix} \begin{pmatrix} 2 \\ 3 \end{pmatrix} = \begin{pmatrix} 9 \\ -1 \end{pmatrix}$. Hitung nilai x .
Given that $\begin{pmatrix} 3 & -x \\ -2 & 1 \end{pmatrix} \begin{pmatrix} 2 \\ 3 \end{pmatrix} = \begin{pmatrix} 9 \\ -1 \end{pmatrix}$. Calculate the value of x .
- A -2
 - B -1
 - C 1
 - D 2

35. Amirah telah membeli suatu insurans harta dengan peruntukan deduktibel sebanyak RM999. Dia mengalami kerosakan harta bernilai RM1356 dalam tempoh insurans tersebut. Berapakah bayaran pampasan dapat dituntut oleh Amirah?

Amirah bought a property insurance with a deductible provision of RM999. She suffered property damage worth of RM1356 during the insurance coverage period. How much compensation can be claimed by Amirah?

- | | | | |
|---|-------|---|--------|
| A | RM0 | C | RM1356 |
| B | RM357 | D | RM2355 |

36. Antara berikut yang manakah mewakili graf $y = \cos x$, dengan keadaan $90^\circ \leq x \leq 270^\circ$?
Which of the following represents graph $y = \cos x$ such that $90^\circ \leq x \leq 270^\circ$?



37. Encik Lee mempunyai pendapatan tahunan sebanyak RM51500 pada tahun 2020. Dia mendermakan RM200 kepada suatu kebajikan. Dia juga menderma RM1000 kepada sebuah perpustakaan. Jadual 3 menunjukkan pelepasan cukai yang dituntut oleh Encik Lee dan Jadual 4 menunjukkan kadar cukai pendapatan individu untuk tahun taksiran 2020.

Mr. Lee has annual income of RM51500 in year 2020. He donated RM200 to a charity. He also donated RM1000 to a library. Table 3 shows the tax reliefs claimed by Mr. Lee and Table 4 shows the individual income tax rates for assessment year of 2020.

Pelepasan cukai <i>Tax relief</i>	Amaun (RM) <i>Amount (RM)</i>
Individu <i>Individual</i>	9 000
Insurans hayat dan KWSP <i>Life insurance and EPF</i>	5 200
Insurans perubatan <i>Medical insurances</i>	1 600

Jadual 3/ Table 3

Pendapatan bercukai <i>Chargeable income (RM)</i>	Pengiraan <i>Calculations (RM)</i>	Kadar <i>Rate (%)</i>	Cukai <i>Tax (%)</i>
20 001 – 35 000	20 000 pertama <i>First 20 000</i>		150
	15 000 berikutnya <i>Next 15 000</i>	3	450
35 001 – 50 000	35 000 pertama <i>First 35 000</i>		600
	15 000 berikutnya <i>Next 15 000</i>	8	1 200
50 001 – 70 000	50 000 pertama <i>First 50 000</i>		1 800
	15 000 berikutnya <i>Next 15 000</i>	14	2 800

Jadual 4/ Table 4

Hitung cukai pendapatan yang perlu dibayar oleh Encik Lee bagi tahun ini.

Calculate Mr. Lee's income tax payable for this year.

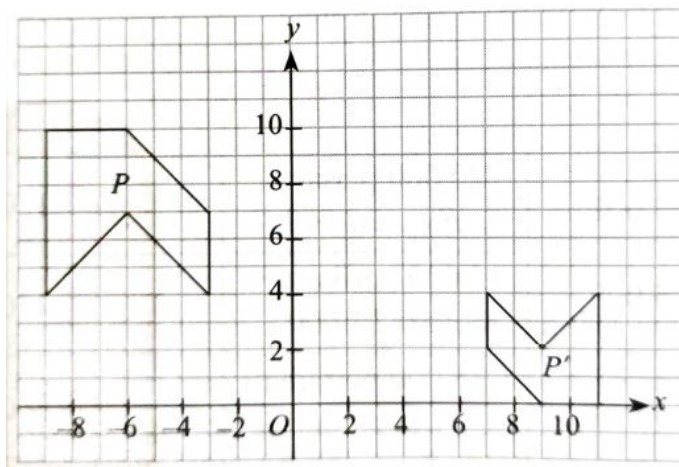
- | | | | |
|---|-------|---|-------|
| A | RM600 | C | RM400 |
| B | RM585 | D | RM185 |

38. Nyatakan 68 999 321 dalam bentuk piawai.

State 68 999 321 in standard form.

- | | | | |
|---|--------------------|---|--------------------|
| A | 6.9×10^7 | C | 6.9×10^6 |
| B | 6.89×10^7 | D | 6.89×10^6 |

39. Dalam Rajah 17, bentuk P' ialah imej bagi bentuk P di bawah suatu pembesaran.
In Diagram 17, shape P' is the image of shape P under an enlargement.

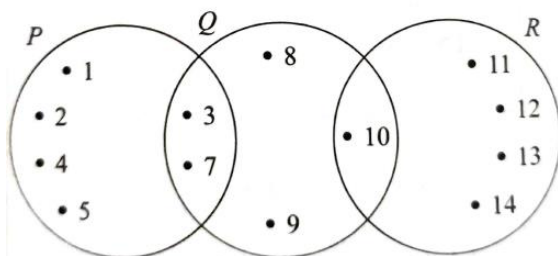


Rajah 17 / Diagram 17

Diberi bahawa luas P ialah 54 m^2 . Hitung luas, dalam m^2 , bagi P' .
Given that the area of P is 54 m^2 . Calculate the area, in m^2 , of P' .

- | | | | |
|---|-------|---|----|
| A | 121.5 | C | 36 |
| B | 81 | D | 24 |

40. Rajah 18 menunjukkan unsur dalam set P , set Q dan set R .
Diagram 18 shows the elements in sets P , Q and R .



Rajah 18 / Diagram 18

Diberi set semesta, $\varepsilon = P \cup Q \cup R$. Senaraikan semua unsur bagi set $(P \cup Q)'$.
Given universal set, $\varepsilon = P \cup Q \cup R$. List all the elements of set $(P \cup Q)'$.

- | | | | |
|---|------------|---|------------------|
| A | {8, 9} | C | {3, 7, 8, 9, 10} |
| B | {3, 7, 10} | D | {11, 12, 13, 14} |

KERTAS SOALAN TAMAT
END OF QUESTION