

MODUL PERKEMBANGAN PEMBELAJARAN 2

1449/1

MATEMATIK SPM

Kertas 1

Mei 2020

$1\frac{1}{4}$ jam

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*
3. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

MATHEMATICAL FORMULAE RUMUS MATEMATIK

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.

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

RELATIONS PERKAITAN

1 $a^m \times a^n = a^{m+n}$

2 $a^m \div a^n = a^{m-n}$

3 $(a^m)^n = a^{mn}$

4 $A^{-1} = \frac{1}{ad-bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$

5 Distance / Jarak

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

6 Midpoint / Titik tengah

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

7 Average speed = $\frac{\text{distance travelled}}{\text{time taken}}$

$$\text{Purata laju} = \frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}$$

8 Mean = $\frac{\text{sum of data}}{\text{number of data}}$

$$\text{Min} = \frac{\text{hasil tambah nilai data}}{\text{bilangan data}}$$

9 Mean = $\frac{\text{sum of (classmark} \times \text{frequency)}}{\text{sum of frequencies}}$

$$\text{Min} = \frac{\text{hasil tambah (nilai titik tengah kelas} \times \text{kekerapan)}}{\text{hasil tambah kekerapan}}$$

10 Pythagoras Theorem
Teorem Pithagoras
 $c^2 = a^2 + b^2$

11 $P(A) = \frac{n(A)}{n(S)}$

12 $P(A') = 1 - P(A)$

13 $m = \frac{y_2 - y_1}{x_2 - x_1}$

14 $m = -\frac{y\text{-intercept}}{x\text{-intercept}}$

$$m = -\frac{\text{pintasan } y}{\text{pintasan } x}$$

SHAPES AND SPACE
BENTUK DAN RUANG

- 1 Area of trapezium = $\frac{1}{2} \times \text{sum of parallel sides} \times \text{height}$
Luas trapezium = $\frac{1}{2} \times \text{hasil tambah dua sisi selari} \times \text{tinggi}$
- 2 Circumference of circle = $\pi d = 2\pi r$
Lilitan bulatan = $\pi d = 2\pi j$
- 3 Area of circle = πr^2
Luas bulatan = πj^2
- 4 Curved surface area of cylinder = $2\pi rh$
Luas permukaan melengkung silinder = $2\pi jt$
- 5 Surface area of sphere = $4\pi r^2$
Luas permukaan sfera = $4\pi j^2$
- 6 Volume of right prism = cross sectional area \times length
Isipadu prisma tegak = luas keratan rentas \times panjang
- 7 Volume of cylinder = $\pi r^2 h$
Isipadu silinder = $\pi j^2 t$
- 8 Volume of cone = $\frac{1}{3} \pi r^2 h$
Isipadu kon = $\frac{1}{3} \pi j^2 t$
- 9 Volume of sphere = $\frac{4}{3} \pi r^3$
Isipadu sfera = $\frac{4}{3} \pi j^3$
- 10 Volume of right pyramid = $\frac{1}{3} \times \text{base area} \times \text{height}$
Isipadu piramid tegak = $\frac{1}{3} \times \text{luas tapak} \times \text{tinggi}$
- 11 Sum of interior angles of a polygon
Hasil tambah sudut pedalaman poligon
 $= (n - 2) \times 180^\circ$

$$12 \quad \frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$

$$\frac{\text{panjang lengkung}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$$

$$13 \quad \frac{\text{area of sector}}{\text{area of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$

$$\frac{\text{luas sektor}}{\text{luas bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$$

$$14 \quad \text{Scale factor, } k = \frac{PA'}{PA}$$

$$\text{Faktor skala, } k = \frac{PA'}{PA}$$

$$15 \quad \text{Area of image} = k^2 \times \text{area of object}$$
$$\text{Luas imej} = k^2 \times \text{luas objek}$$

Bahagian AAnswer **all** questions*Jawab semua soalan*

1 Round off 899530 correct to three significant figures.

Bundarkan 899530 betul kepada tiga angka bererti.

- A 900
- B 800000
- C 899000
- D 900000

2 $0.0095 - 8 \times 10^{-4} =$

- A 8.7×10^{-3}
- B 8.7×10^{-4}
- C 1.5×10^{-3}
- D 1.5×10^{-4}

3 A supplier packs 85 kg of curry powder into small packets. Each small packet is of mass 25 g. Calculate the total number of small packets .

Seorang pembekal membungkus semula 85 kg serbuk kari kepada bungkusan kecil. Setiap bungkusan kecil itu berjisim 25 g. Hitung jumlah bilangan bungkusan kecil .

- A 2.9×10^2
- B 2.9×10^3
- C 3.4×10^3
- D 3.4×10^4

4 Diberi $1 \times 5^4 + 2 \times 5^3 + 4 = y_5$, cari nilai y .

Given $1 \times 5^4 + 2 \times 5^3 + 4 = y_5$, find the value of y .

A 12002

B 12004

C 12008

D 12014

5 Diberi $T + 1010_2 = 111000_2$, cari nilai T

Given $T + 1010_2 = 111000_2$, find the value of T .

A 100110_2

B 101110_2

C 110010_2

D 111010_2

- 6 In Diagram 1, $PQRV$ is a parallelogram and $RSTUV$ is a regular pentagon.
Dalam Rajah 1, $PQRV$ ialah segi empat selari dan $RSTUV$ ialah pentagon sekata.

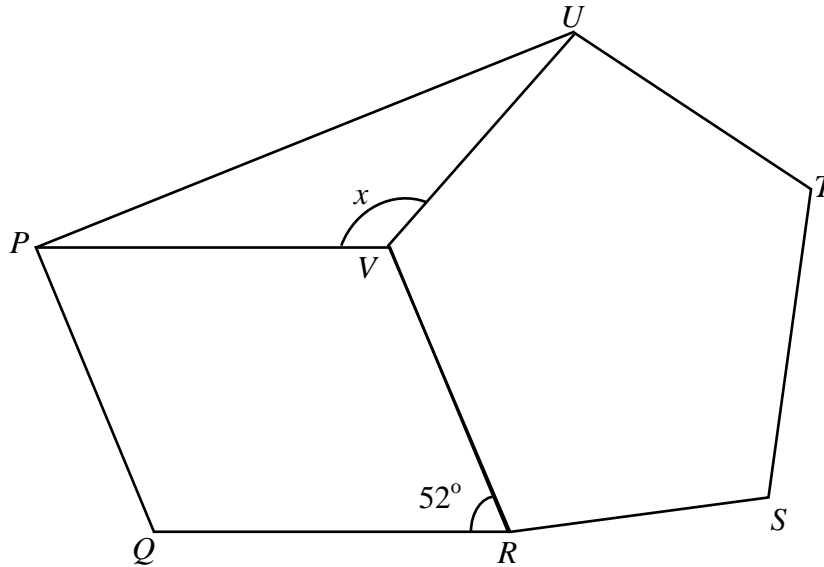


Diagram 1

Rajah 1

Find the value of x

Cari nilai x

- A 114°
- B 118°
- C 124°
- D 134°

7 Diagram 2 shows a hexagon $PQRSTU$ and TUV is a straight line.

Rajah 2 menunjukkan sebuah heksagon $PQRSTU$ dan TUV ialah garis lurus.

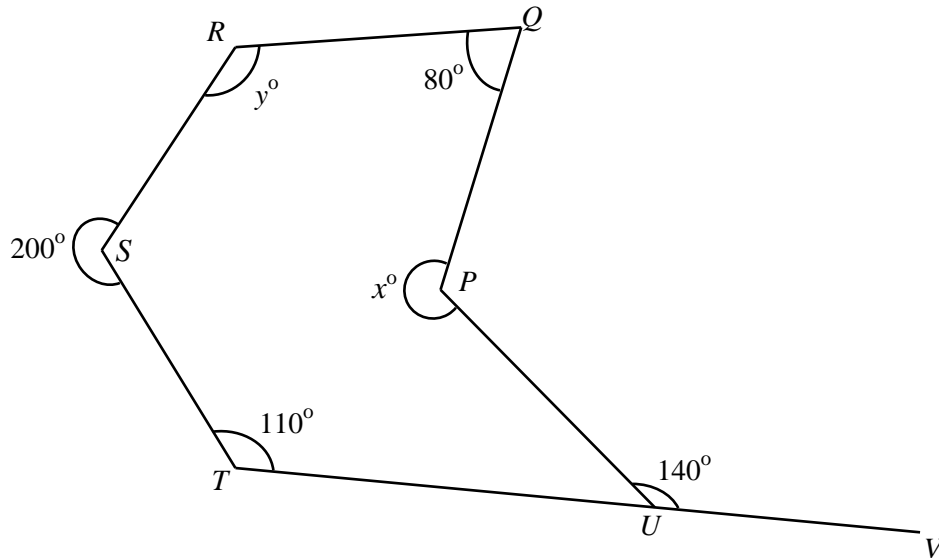


Diagram 2

Rajah 2

Calculate the value of $x + y$.

Hitung nilai $x + y$.

- A 390°
- B 360°
- C 330°
- D 290°

- 8 In Diagram 3, ABC and ADE are tangent to the circle BDF .
 Dalam Rajah 3, ABC dan ADE ialah tangent kepada bulatan BDF .

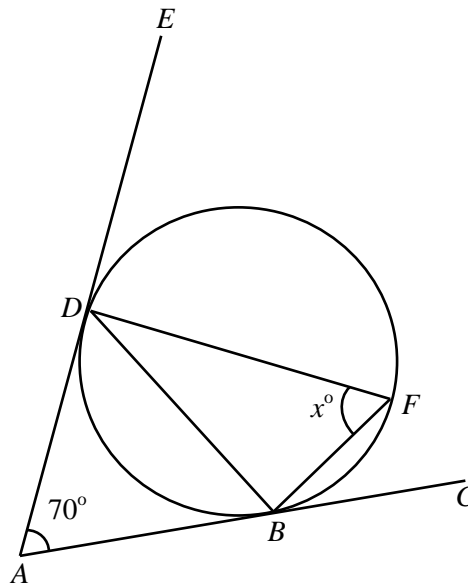


Diagram 3

Rajah 3

Find the value of x .

Cari nilai x .

- A 50
- B 55
- C 60
- D 65

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SULIT

9 Diagram 4 shows five triangles on square grids .

Rajah 4 menunjukkan lima segi tiga pada grid segi empat sama .

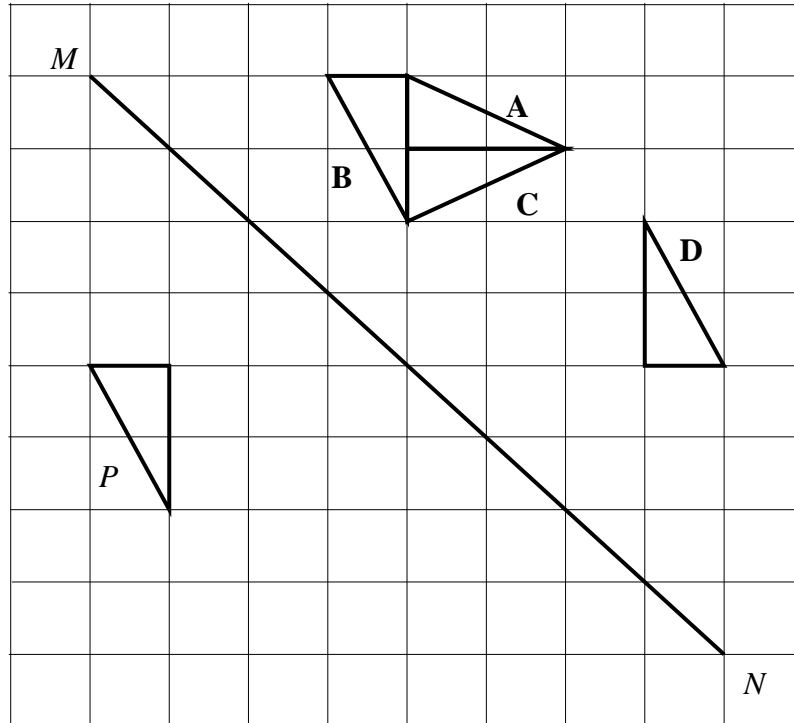


Diagram 4

Rajah 4

Which of the triangles, **A**, **B**, **C** and **D**, is the image of *P* under a reflection in the line *MN*?

*Antara segi tiga **A**, **B**, **C**, dan **D**, yang manakah imej bagi *P* di bawah pantulan pada garis *MN* ?.*

10 Diagram 5 shows five triangles drawn on Cartesian plane.

Rajah 5 menunjukkan lima segitiga dilukis pada satah Cartes.

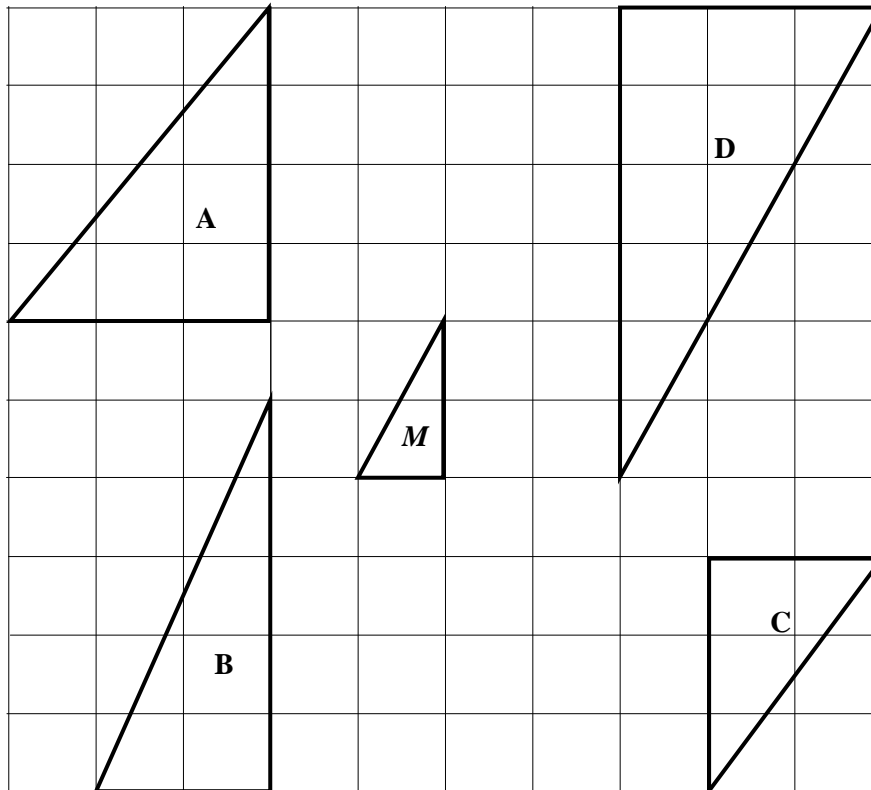


Diagram 5

Rajah 5

Triangles **A**, **B**, **C** and **D** are the images of triangle **M** under an enlargement.

Which triangles **A**, **B**, **C** or **D**, is the **correct** image?

*Segi tiga **A**, **B**, **C** dan segi tiga **D** adalah imej bagi segi tiga **M** dibawah suatu pembesaran*

*Antara segi tiga **A**, **B**, **C** dan **D**, yang manakah imej yang **betul**?*

- 11 In Diagram 6, $KLMN$ is a straight line.
Dalam Rajah 6, $KLMN$ ialah garis lurus.

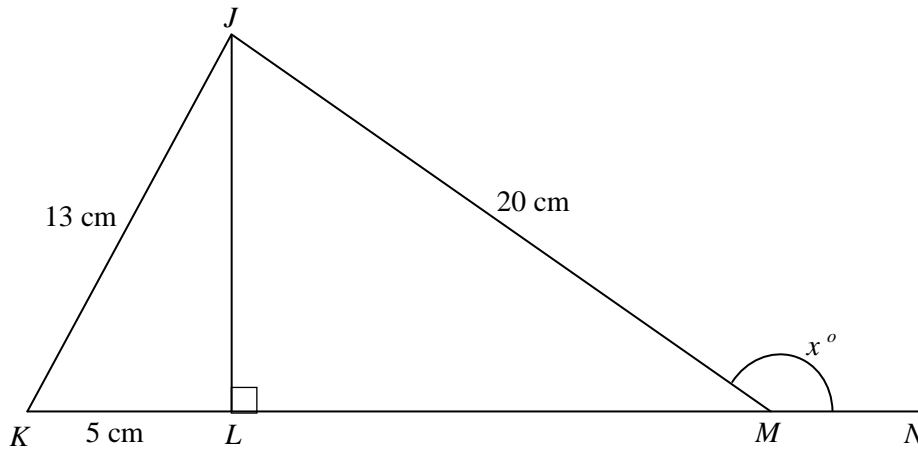


Diagram 6

Rajah 6

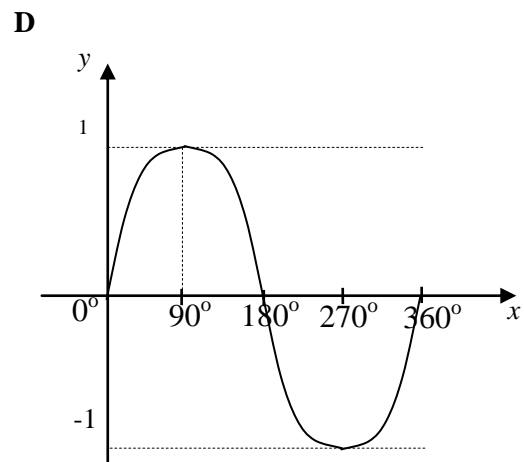
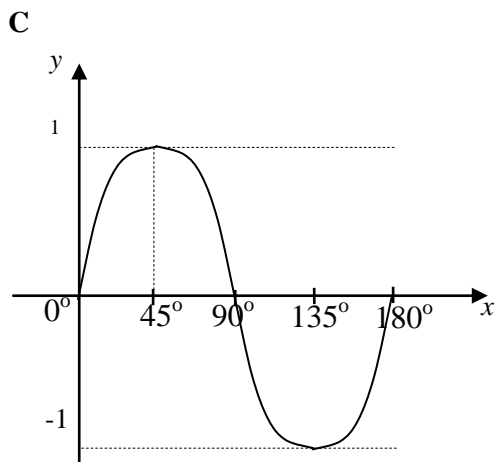
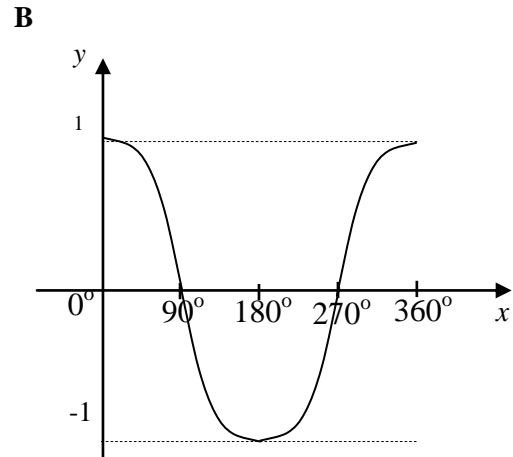
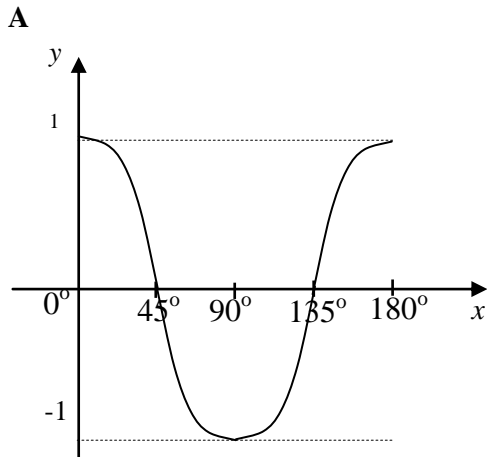
Find the value of $\cos x^\circ$.

Cari nilai kos x° .

- A $\frac{4}{5}$
- B $-\frac{4}{5}$
- C $-\frac{5}{13}$
- D $-\frac{12}{13}$

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- 12 Which graph represent the graph $y = \sin x$?
 Graf manakah yang mewakili graf $y = \sin x$?



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SULIT

- 13 Diagram 7 shows a cuboid with a horizontal base $ABCD$. E is the midpoint CD .
Rajah 7 menunjukkan sebuah kuboid dengan tapak mengufuk $ABCD$. E ialah titik tengah CD .

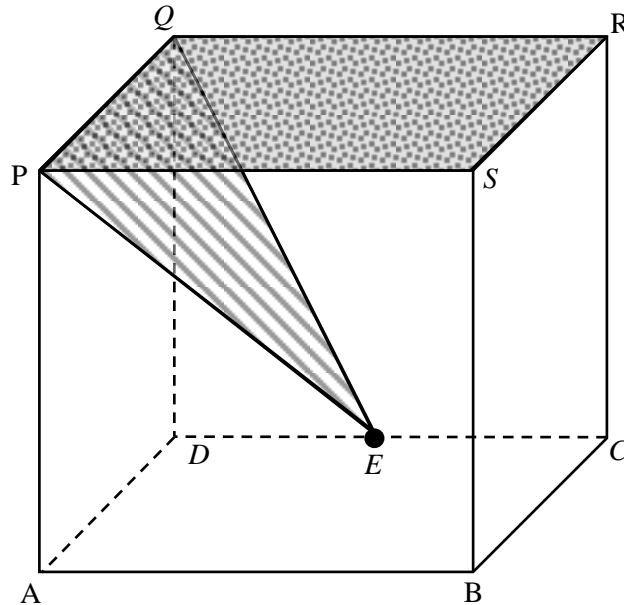


Diagram 7

Rajah 7

Name the angle between the plane PQE and the plane $PQRS$.

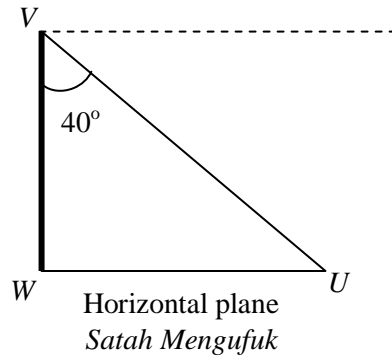
Namakan sudut di antara satah PQE dan satah $PQRS$.

- A $\angle EQR$
- B $\angle EQS$
- C $\angle EPS$
- D $\angle EPD$

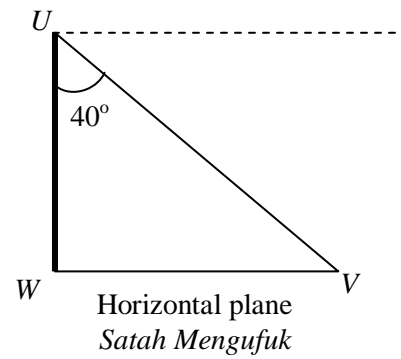
- 14 Given that the angle of depression of U from V is 40° . Which of the following diagrams represents the situation ?

Diberi bahawa sudut tunduk U dari V ialah 40° . Antara rajah berikut yang manakah mewakili situasi tersebut ?

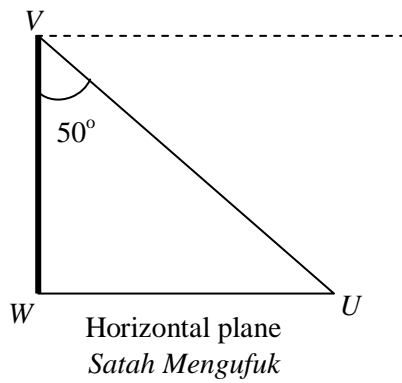
A



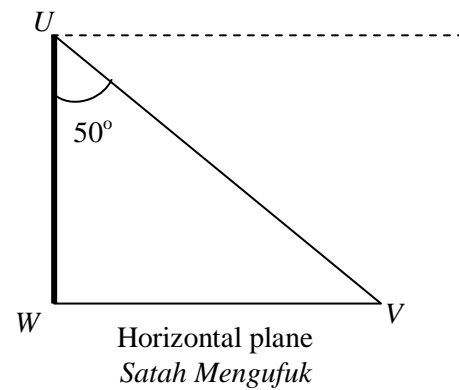
B



C



D



- 15 Diagram 8 shows a tower with the height of 80 m.
Rajah 8 menunjukkan satu menara yang mempunyai ketinggian 80 m.

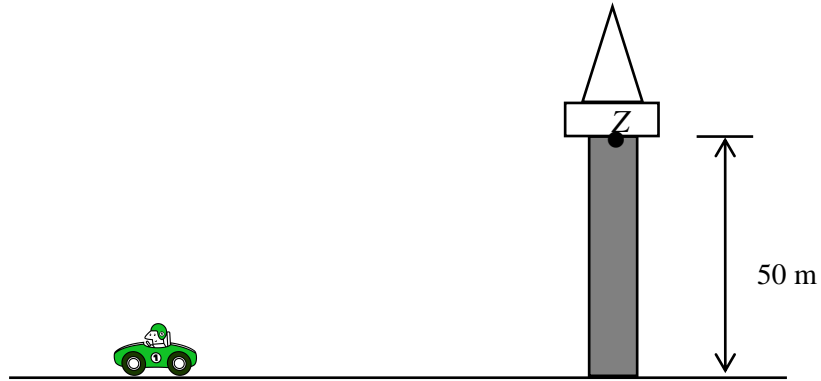


Diagram 8

Rajah 8

The angle of depression of Kamal's car from the peak of the tower is 55° . Calculate the angle of elevation of point Z from Kamal's car.

Sudut tunduk kereta Kamal dari puncak menara ialah 55° . Hitung sudut dongakan titik Z dari kereta Kamal.

- A 26.77°
- B 41.75°
- C 48.24°
- D 63.23°

- 16 Diagram 9 shows three points S , T and U , on a horizontal plane.
Rajah 9 menunjukkan tiga titik S , T dan U , pada satah mengufuk.

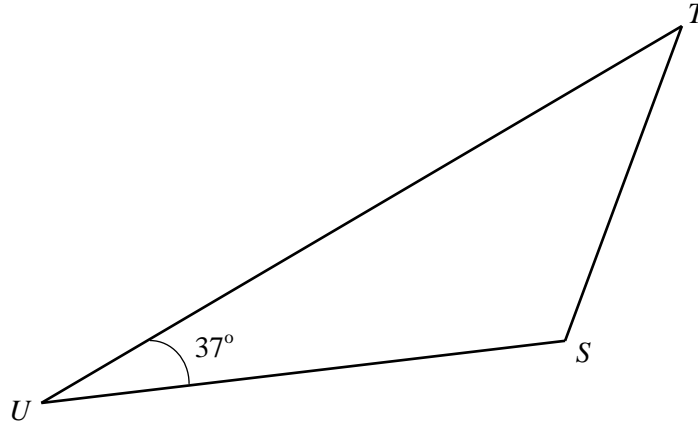


Diagram 9

Rajah 9

It is given that T is due North of S and the bearing of T from U is 024° .
Find the bearing of U from S .

*Diberi bahawa T berada ke utara S dan bearing T dari U ialah 024° .
Cari bearing U dari S .*

- A 061°
- B 119°
- C 241°
- D 270°

- 17 In Diagram 10, N is the North Pole, S is the South Pole and NOS is the axis of earth.
 Dalam Rajah 10, U ialah Kutub Utara, S ialah Kutub Selatan dan UOS adalah paksi bumi.

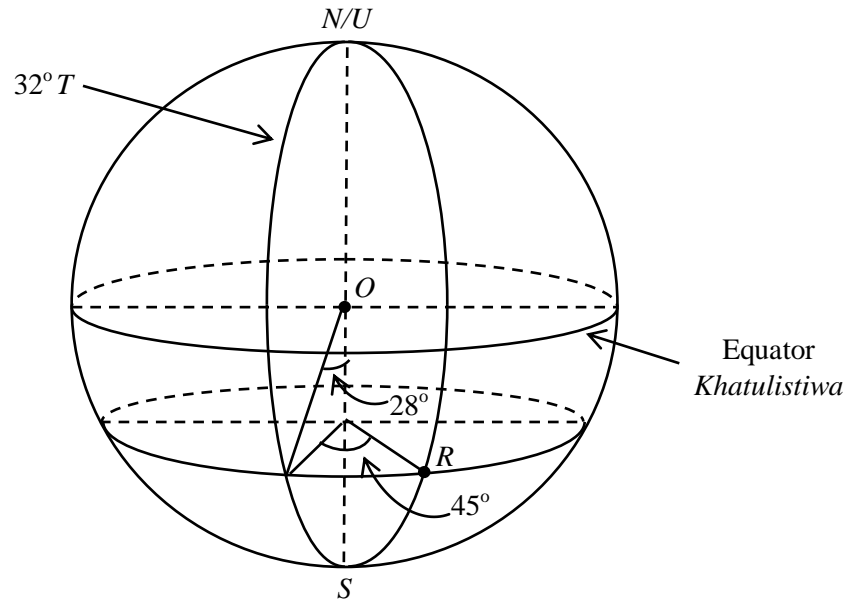


Diagram 10

Rajah 10

Find the location of R .
 Cari kedudukan titik R .

- A** ($28^{\circ}S, 13^{\circ}E$)
 ($28^{\circ}S, 13^{\circ}T$)
- B** ($28^{\circ}S, 77^{\circ}E$)
 ($28^{\circ}S, 77^{\circ}E$)
- C** ($62^{\circ}S, 13^{\circ}E$)
 ($62^{\circ}S, 13^{\circ}T$)
- D** ($62^{\circ}S, 77^{\circ}E$)
 ($62^{\circ}S, 77^{\circ}T$)

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SULIT

18 Express $\frac{2y}{y^2 - 4} \div \frac{4 - 2y}{y + 2}$ as a single fraction in its simplest form.

Ungkapkan $\frac{2y}{y^2 - 4} \div \frac{4 - 2y}{y + 2}$ sebagai satu pecahan tunggal dalam bentuk termudah.

A $\frac{y}{(y - 2)^2}$

B $\frac{y}{(2 - y)^2}$

C $\frac{y}{(y - 2)(2 - y)}$

D $\frac{y}{(y - 2)(y + 2)}$

19 Given $W = 8 + 3(k - 1)$, express k in terms of W .

Diberi $W = 8 + 3(k - 1)$, ungkapkan k dalam sebutan W .

A $k = \frac{W + 5}{3}$

B $k = \frac{W - 5}{3}$

C $k = \frac{W + 11}{3}$

D $k = \frac{W - 11}{3}$

- 20 Diagram 11 shows the entry ticket price for the Rainbow Theme Park.
Rajah 11 menunjukkan harga tiket masuk bagi Rainbow Theme Park.

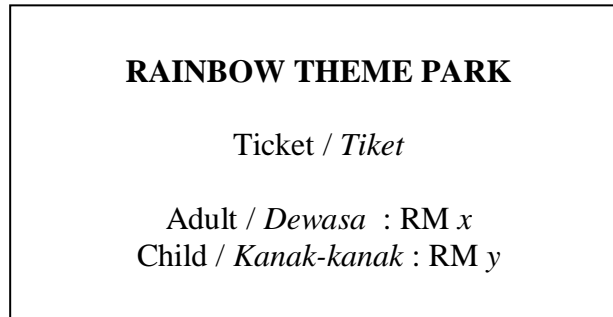


Diagram 11

Rajah 11

The ticket price for 3 adults and 2 children is RM65. Write an equation for the ticket price of an adult in terms of ticket price of a child.

Harga tiket untuk 3 orang dewasa dan 2 orang kanak-kanak ialah RM65. Tulis satu persamaan bagi harga tiket untuk seorang dewasa dalam sebutan harga tiket kanak-kanak.

A $y = \frac{65 - 3x}{2}$

B $y = \frac{65 - 2x}{3}$

C $x = \frac{65 - 2y}{3}$

D $x = \frac{65 - 3y}{2}$

- 21** Amir bought three pens and one note book. The price of three pens are equal to one note book. If Amir paid RM8 and received a balance of 80 cents , find the price of a pen.

Amir membeli tiga batang pen dan sebuah buku nota. Harga tiga batang pen adalah sama dengan harga sebuah buku nota. Jika Amir membayar RM8 dan mendapat baki 80 sen, cari harga sebatang pen.

- A** RM 1.10
B RM 1.20
C RM 1.50
D RM 1.60

- 22** Simplify / Permudahkan

$$\left(n^8 t^{-4}\right)^{\frac{1}{2}} \times n^{-5} t^3$$

- A** $n^9 t^{-5}$
B $n^3 t^2$
C $n^{-3} t^{-1}$
D $n^{-1} t$

- 23** The solution for $\frac{p}{3} + 1 \geq 3p - 15$ is

Penyelesaian bagi $\frac{p}{3} + 1 \geq 3p - 15$ ialah

- A** $p \leq 6$
B $p \geq 6$
C $p \leq -6$
D $p \geq -6$



- 24** Given that $5 \leq x \leq 10$ and $3 - y < 5$, where x and y are integers. Find the maximum value of $x - y$

Diberi bahawa $5 \leq x \leq 10$ dan $3 - y < 5$, dengan keadaan x dan y ialah integer. Cari nilai maksimum bagi $x - y$

- A** 9
B 10
C 11
D 12

- 25** Diagram 12 is a pictograph which shows the number of fruits sold at a fruit stall. The ratio of mango to watermelon is 3 : 4. Find the total number of fruits sold altogether.

Rajah 12 ialah piktograf yang menunjukkan bilangan buah – buahan yang dijual di sebuah gerai. Nisbah bilangan mangga kepada tembikai ialah 3 : 4. Cari jumlah bilangan buah – buahan yang telah dijual.

Papaya / Betik	
Mango / Mangga	
Watermelon / Tembikai	


 Represents 15 fruits
 Mewakili 15 biji buah

Diagram 12

Rajah 12

- A** 210
B 270
C 300
D 360

[Lihat halaman sebelah

SULIT

- 26 Diagram 13 is a pie chart which shows the combined results of a test taken by two groups of students. Table 1 shows the results of the groups, but is incomplete.

Rajah 13 ialah carta pai yang menunjukkan gabungan keputusan suatu ujian bagi dua kumpulan murid. Jadual 1 menunjukkan keputusan ujian itu mengikut kumpulan, tetapi belum dilengkapkan.

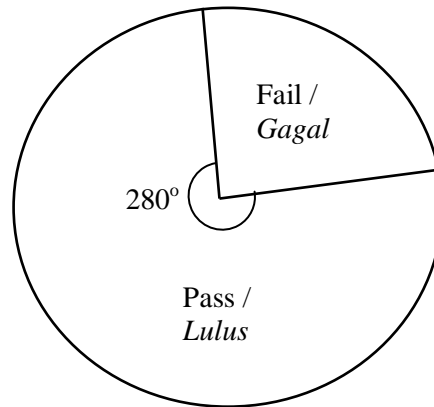


Diagram 13

Rajah 13

Group / Kumpulan	Results / Keputusan	
	Number of passes <i>Bilangan lulus</i>	Number of failures <i>Bilangan gagal</i>
Arif	160	70
Bestari		
Total / Jumlah	420	

Table 1

Jadual 1

Calculate the number of students in the Bestari Group

Hitungkan bilangan murid dalam Kumpulan Bestari

- A 300
- B 310
- C 340
- D 380

[Lihat halaman sebelah

SULIT

- 27** Table 2 shows the number of books borrowed from the school library by a group of students in a month

Jadual 2 menunjukkan bilangan buku yang dipinjam daripada perpustakaan sekolah oleh sekumpulan murid dalam sebulan

Number of books <i>Bilangan buku</i>	4	5	6	7
Frequency <i>Kekerapan</i>	5	p	$3p$	3

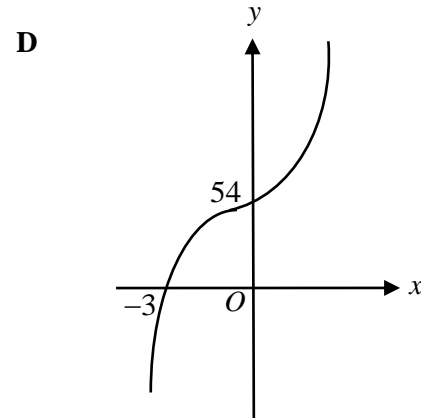
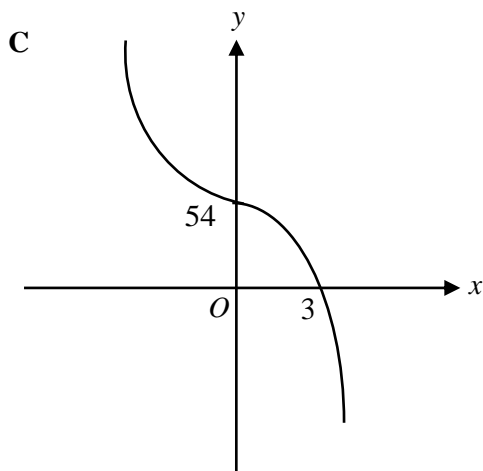
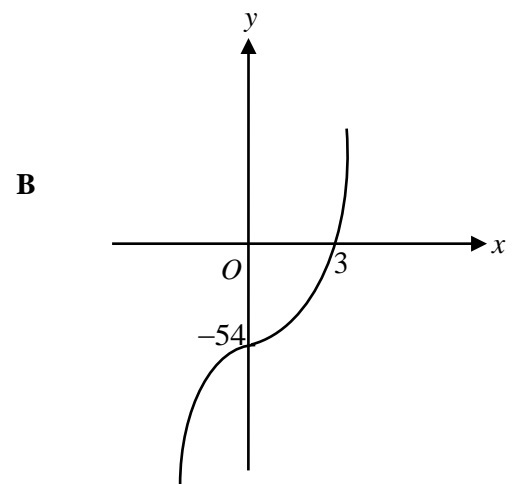
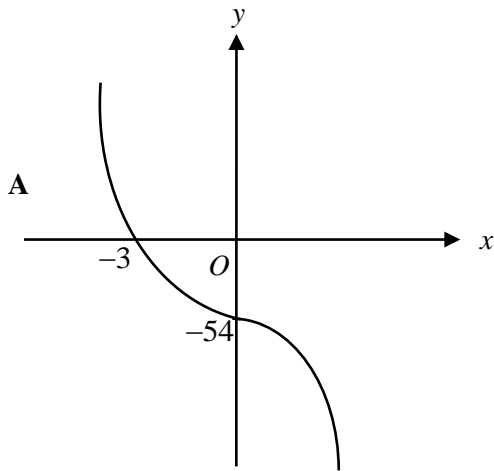
Table 2

Jadual 2

The mean of the number of books borrowed by each of the students is 5.5. Find the value of p .
Min bagi bilangan buku yang dipinjam oleh setiap murid ialah 5.5. Cari nilai p .

- A** 5
- B** 4
- C** 3
- D** 2

- 28 Which graph represents $y = -2x^3 - 54$?
Graf manakah yang mewakili $y = -2x^3 - 54$



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SULIT

29 Diagram 14 is a Venn diagram showing the universal set ξ , set M and set N .

Rajah 14 ialah gambar rajah Venn yang menunjukkan set semesta ξ , set M dan set N .

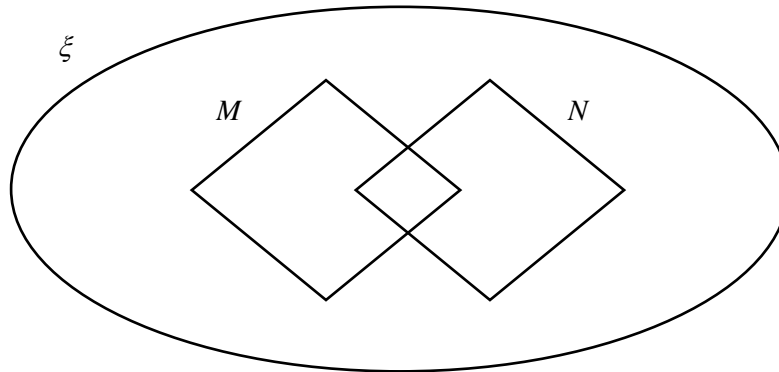


Diagram 14

Rajah 14

The region $(M \cap N)'$ is equivalent to the region

Rantau $(M \cap N)'$ setara dengan rantau

- A $M \cup N'$
- B $M \cap N'$
- C $M' \cup N'$
- D $M' \cap N'$

30 Diagram 15 shows a Venn diagram with universal set $\xi = P \cup Q \cup R$.

Rajah 15 menunjukkan gambar rajah Venn dengan keadaan set semesta $\xi = P \cup Q \cup R$.

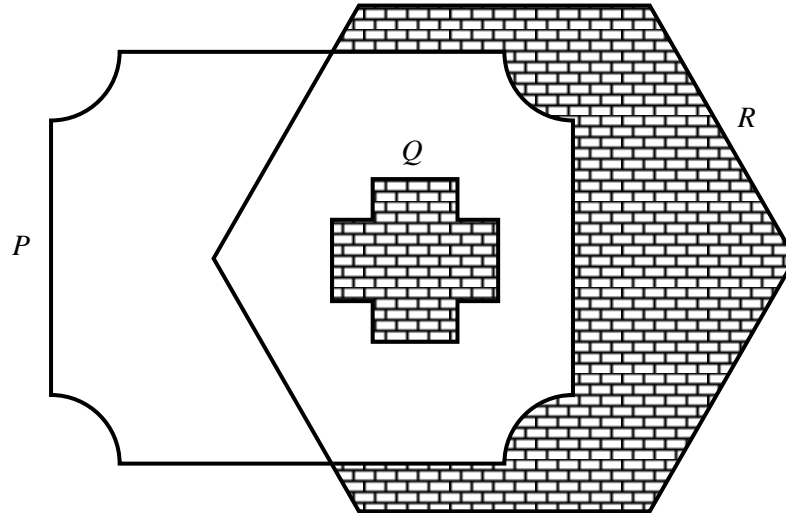


Diagram 15

Rajah 15

Which of the following represents the shaded region?

Antara berikut, yang manakah mewakili rantau berlorek itu ?

- A $P' \cap Q' \cup R$
- B $P' \cup Q \cap R'$
- C $P \cap Q' \cup R$
- D $P' \cap R \cup Q$

- 31 Diagram 16 is a Venn diagram showing the number of elements in set J , set K and set L .

Rajah 16 ialah gambar rajah Venn yang menunjukkan bilangan unsur dalam set J , set K dan set L .

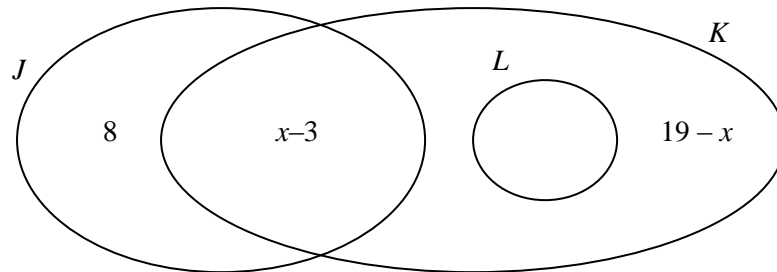


Diagram 16

Rajah 16

Given that set $\xi = J \cup K \cup L$ dan $n(J \cup L)' = n(J)$.

Find the value of x .

Diberi bahawa set $\xi = J \cup K \cup L$ dan $n(J \cup L)' = n(J)$.

Carikan nilai x .

- A** 7
- B** 8
- C** 11
- D** 12
- 32 Find the y -intercept of the straight line $5y = 3x - 6$.

Cari pintasan- y bagi garis lurus $5y = 3x - 6$.

- A** 6
- B** 3
- C** $-\frac{3}{5}$
- D** $-\frac{6}{5}$

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SULIT

- 33 The gradient of the straight line $x + \frac{3}{2}y = \frac{1}{6}$.

Kecerunan bagi garis lurus $x + \frac{3}{2}y = \frac{1}{6}$.

- A -2
 B $-\frac{2}{3}$
 C $\frac{2}{3}$
 D 2

- 34 In Diagram 17, PQR is a straight line drawn on a Cartesian plane.
Dalam Rajah 17, PQR ialah garis lurus yang dilukis pada satah Cartes.

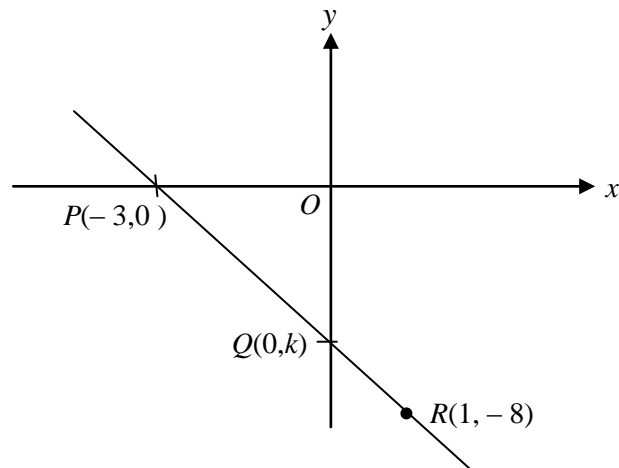


Diagram 17

Rajah 17

The value of k is.

Nilai k ialah.

- A -3
 B -4
 C -5
 D -6

[Lihat halaman sebelah

SULIT

- 35** A basket contains 12 red balls and a number of blue balls. A ball is picked at random from the basket. The probability of picking a red ball is $\frac{3}{5}$. Find the number of blue balls in the basket.

Sebuah bakul mengandungi 12 biji bola merah dan beberapa biji bola biru. Sebiji bola dipilih secara rawak daripada bakul itu. Kebarangkalian mendapat bola merah ialah $\frac{3}{5}$. Cari bilangan bola biru dalam bakul itu.

- A** 8
B 18
C 20
D 30

- 36** Table 3 shows the results of a Mathematics test for a group of students .
Jadual 3 menunjukkan keputusan ujian Matematik bagi sekumpulan murid .

	Pass / <i>Lulus</i>	Fail / <i>Gagal</i>
Boys / <i>Lelaki</i>	8	4
Girls / <i>Perempuan</i>	20	x

Table 3

Jadual 3

A student is chosen at random from the group. The probability of choosing a student who failed the test is $\frac{1}{5}$. Find the value of x .

Seorang murid dipilih secara rawak daripada kumpulan itu. Kebarangkalian memilih seorang murid yang gagal ujian itu ialah $\frac{1}{5}$. Cari nilai x .

- A** 1
B 2
C 3
D 4

[Lihat halaman sebelah

37 x varies directly as the square root of y .

The relation between x and y is

x berubah secara langsung dengan punca kuasa dua y .

Hubungan yang mengaitkan x dan y ialah

A $x \propto y^{\frac{1}{2}}$

B $x \propto y^2$

C $x \propto \frac{1}{y^2}$

D $x \propto \frac{1}{y^2}$

38 Table 4 shows some values of the variables p and q .

Jadual 4 menunjukkan beberapa nilai pembolehubah p dan q

p	2	k
q	$\frac{1}{3}$	3

Jadual 4

Table 4

It is given that q varies inversely as the square of p .

Calculate the value of k .

Diberi bahawa q berubah secara songsang dengan kuasa dua p .

Hitung nilai k .

A 6

B 2

C $\frac{2}{3}$

D $\frac{1}{2}$

[Lihat halaman sebelah

SULIT

39 $4 \begin{pmatrix} 1 \\ -2 \end{pmatrix} - \begin{pmatrix} -1 \\ 4 \end{pmatrix} =$

A $\begin{pmatrix} 5 \\ 12 \end{pmatrix}$

B $\begin{pmatrix} 5 \\ -12 \end{pmatrix}$

C $\begin{pmatrix} -5 \\ 12 \end{pmatrix}$

D $\begin{pmatrix} -5 \\ -12 \end{pmatrix}$

40 Given $(p \ 5) \begin{pmatrix} 3 & 0 \\ -p & 1 \end{pmatrix} = (24 \ 5)$, find the value of p .

Diberi $(p \ 5) \begin{pmatrix} 3 & 0 \\ -p & 1 \end{pmatrix} = (24 \ 5)$, cari nilai p .

A -1

B -12

C 3

D 8

END OF QUESTIONS
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES**MAKLUMAT UNTUK CALON**

1. This question paper consists of **40** questions.
Kertas peperiksaan ini mengandungi 40 soalan
2. Answer **all** questions.
Jawab semua soalan.
3. Answer each question by blackening the correct space on the objective answer sheet.
Jawab semua soalan dengan menghitamkan ruangan yang betul pada kertas jawapan objektif.
4. Blacken only **one** space for each question.
Hitamkan satu ruangan sahaja bagi setiap soalan.
5. If you wish to change your answer, erase the blackened mark that you have done.
Then blacken the space for the new answer.
*Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat.
Kemudian hitamkan jawapan yang baharu.*
6. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan
7. A list of formulae is provided on pages 2 to 4.
Satu senarai rumus disediakan di halaman 2 hingga 4.
8. You may use a scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik.