

**PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH
NEGERI KEDAH DARUL AMAN**

PEPERIKSAAN PERCUBAAN SPM 2009

1449/1

MATHEMATICS

Kertas 1

10 Sept 2009

$1\frac{1}{4}$ 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 soalan ini.*

Kertas soalan ini mengandungi **32** halaman bercetak .

[Lihat sebelah

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 untuk menjawab soalan. Simbol-simbol yang diberi adalah 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 = $\frac{\text{distance travelled}}{\text{time taken}}$
Purata laju = $\frac{\text{jarak yang dilalui}}{\text{masa yang diambil}}$

8. Mean = $\frac{\text{sum of data}}{\text{number of data}}$
Min = $\frac{\text{hasil tambah nilai data}}{\text{bilangan data}}$

9. Mean = $\frac{\text{sum of (class mark} \times \text{frequency)}}{\text{sum of frequencies}}$
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 = $(n - 2) \times 180^\circ$
Hasil tambah sudut pedalaman poligon = $(n - 2) \times 180^\circ$
12. $\frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$
 $\frac{\text{panjang lengkung}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$

[Lihat sebelah

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

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

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

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

$$15. \text{Area of image} = k^2 \times \text{area of object}$$

$$\text{Luas imej} = k^2 \times \text{luas objek}$$

- 1 Round off 0.023456 correct to three significant figures.

Bundarkan 0.023456 kepada tiga angka bererti.

- A 0.023
- B 0.0230
- C 0.0234
- D 0.0235

2 $5.3 \times 10^{-11} - 3.2 \times 10^{-12} =$

- A 2.10×10^{-12}
- B 4.98×10^{-12}
- C 2.10×10^{-11}
- D 4.98×10^{-11}

3 $\frac{0.00284}{(2 \times 10^{-5})^2} =$

- A 7.1×10^{-7}
- B 7.1×10^{-6}
- C 7.1×10^6
- D 7.1×10^7

- 4 Express 243_5 as a number in base eight.

Ungkapkan 243_5 sebagai nombor dalam asas lapan.

- A 111_8
- B 363_8
- C 411_8
- D 741_8

[Lihat sebelah

5 Given that $11011_2 - b_2 = 1101_2$, then $b =$

Diberi $11011_2 - b_2 = 1101_2$, maka $b =$

- A 1001
- B 1101
- C 1110
- D 1111

6 In Diagram 6, $ABCDEF$ is a regular hexagon. ABJ , JCD , DEG , AFG , BHE and JHG are straight lines.

Dalam Rajah 6, $ABCDEF$ ialah sebuah heksagon sekata. ABJ , JCD , DEG , AFG , BHE dan JHG adalah garis lurus.

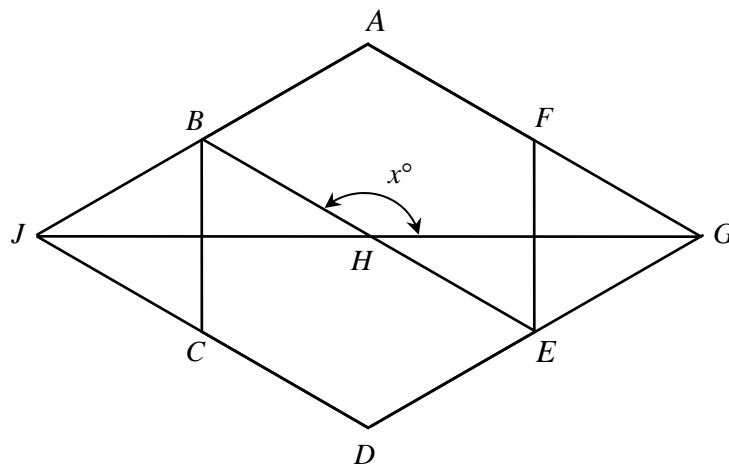


Diagram 6
Rajah 6

Find the value of x .

Cari nilai x .

- A 120
- B 130
- C 140
- D 150

- 7 In Diagram 7, QRS is an equilateral triangle. PQR and RST are straight lines.
 Dalam Rajah 7, QRS ialah sebuah segitiga sama. PQR dan RST adalah garis lurus.

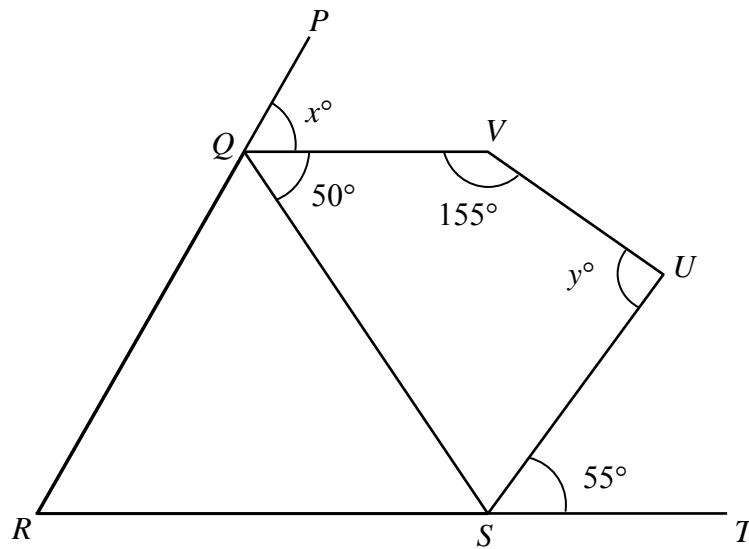


Diagram 7
Rajah 7

Calculate the value of $x + y$.

Hitung nilai $x + y$.

- A 205
- B 165
- C 160
- D 130

- 8 Diagram 8 shows a circle KMN , with centre O . JKL is a tangent to the circle at K . KNP is a straight line. MON is the diameter of the circle.

Rajah 8 menunjukkan sebuah bulatan KMN , berpusat O . JKL ialah tangen kepada bulatan itu di K . KNP ialah garis lurus. MON ialah diameter bulatan.

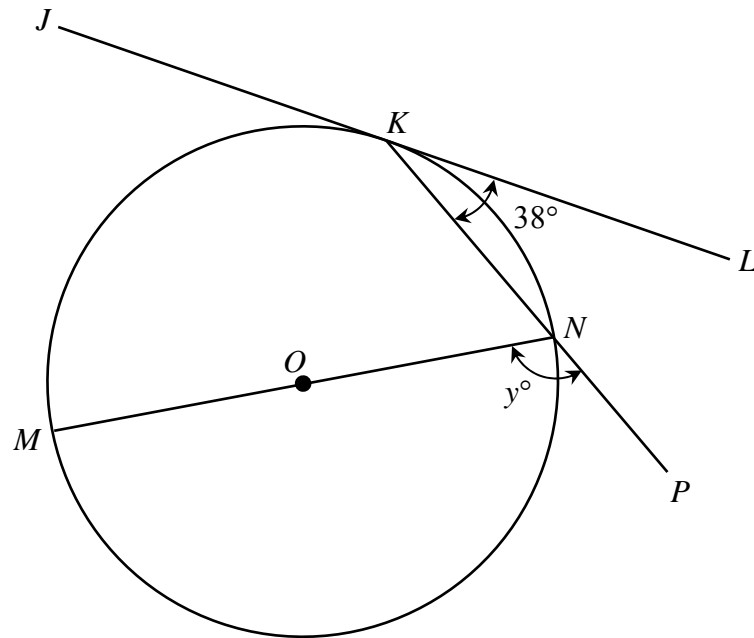


Diagram 8
Rajah 8

Find the value of y .

Carikan nilai y .

- A 142
- B 128
- C 116
- D 102

9 Diagram 9 shows five triangles, *P*, *I*, *II*, *III* and *IV*, are drawn on the square grids.

Rajah 9 menunjukkan lima segitiga, P, I, II, III dan IV, dilukis pada grid segiempat sama.

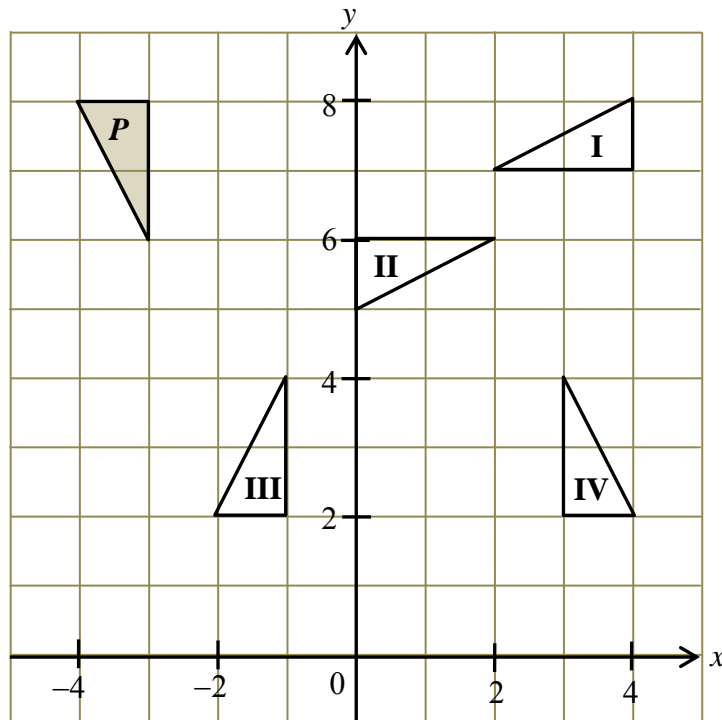


Diagram 9
Rajah 9

Which of the following is the image of triangle *P* ?

Antara berikut, yang manakah merupakan imej segitiga P ?

	Triangle Segitiga	Angle of Rotation Sudut Putaran	Direction of Rotation Arah Putaran	Centre of Rotation Pusat Putaran
A	I	90°	Clockwise <i>Arah jam</i>	(0, 7)
B	II	90°	Anti-clockwise <i>Arah lawan jam</i>	(-2, 7)
C	III	180°	Clockwise <i>Arah jam</i>	(-2, 5)
D	IV	180°	Anti-clockwise <i>Arah lawan jam</i>	(0, 5)

- 10 In Diagram 10, pentagon $PQRST$ is the image of pentagon $UVWXY$ under an enlargement with scale factor k .

Dalam Rajah 10, pentagon $PQRST$ ialah imej kepada pentagon $UVWXY$ di bawah suatu pembesaran dengan faktor skala k .

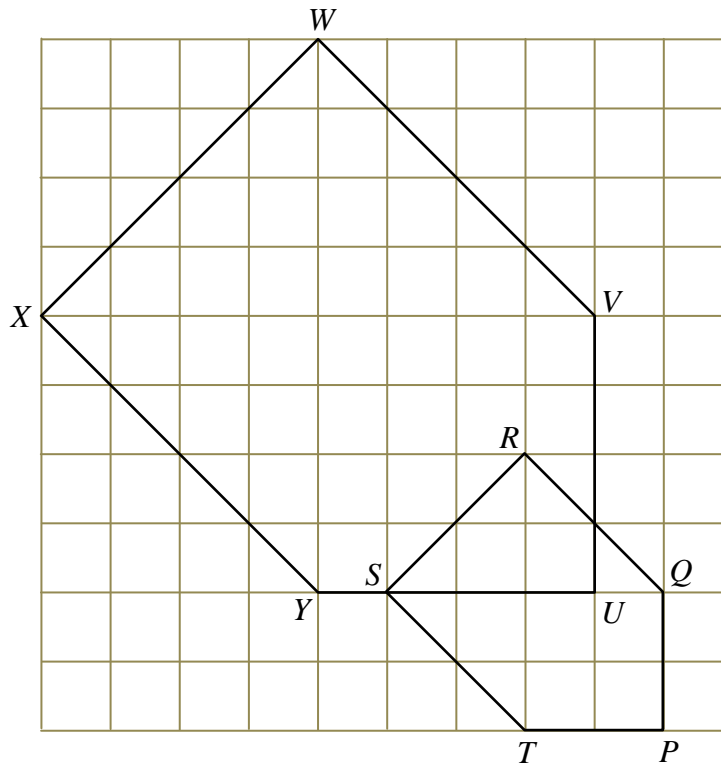


Diagram 10
Rajah 10

State the value of k .

Nyatakan nilai k .

- A $\frac{1}{3}$
 B $\frac{1}{2}$
 C 2
 D 3

11 In Diagram 11, $PQRS$ is a straight line.

Dalam Rajah 11, $PQRS$ ialah garis lurus.

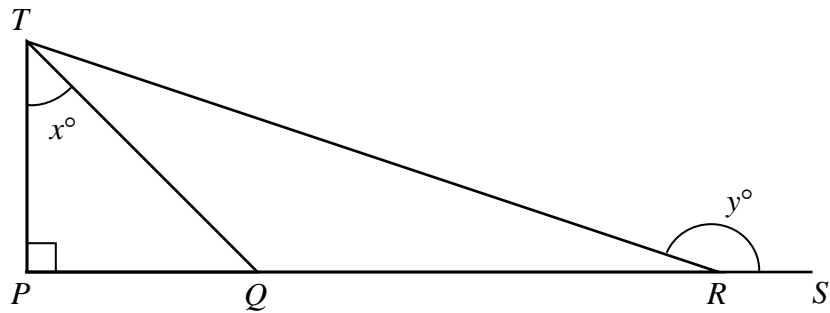


Diagram 11
Rajah 11

It is given that $\cos x^\circ = \frac{1}{\sqrt{2}}$ and $PQ : QR = 1 : 2$.

Find the value of $\tan y^\circ$.

Diberi bahawa $\cos x^\circ = \frac{1}{\sqrt{2}}$ dan $PQ : QR = 1 : 2$.

Cari nilai $\tan y^\circ$.

A -3

B $-\frac{1}{3}$

C $\frac{1}{3}$

D 3

[Lihat sebelah

12 Diagram 12 shows a circle with centre origin O , drawn on a Cartesian plane.

Rajah 12 menunjukkan bulatan berpusat asalan O , dilukis pada suatu satah Cartesian.

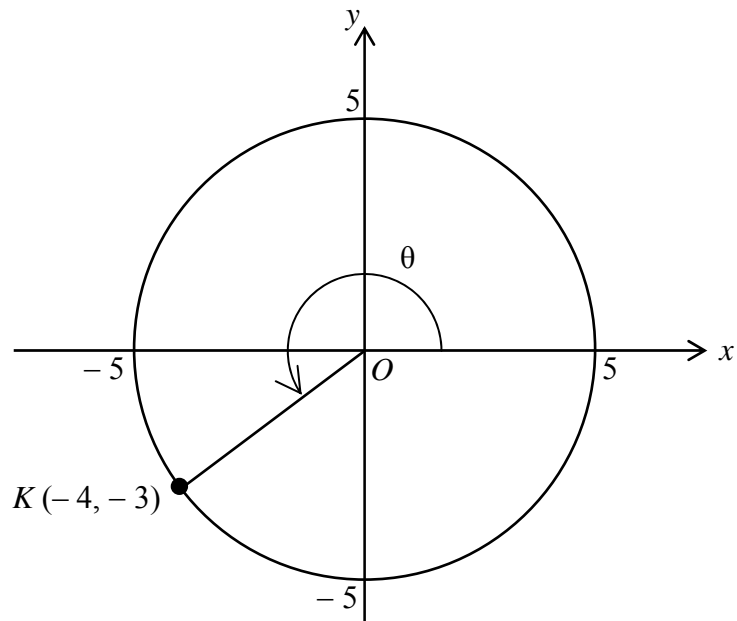


Diagram 12
Rajah 12

The value of $\cos \theta$ is

Nilai kos θ ialah

A $-\frac{4}{5}$

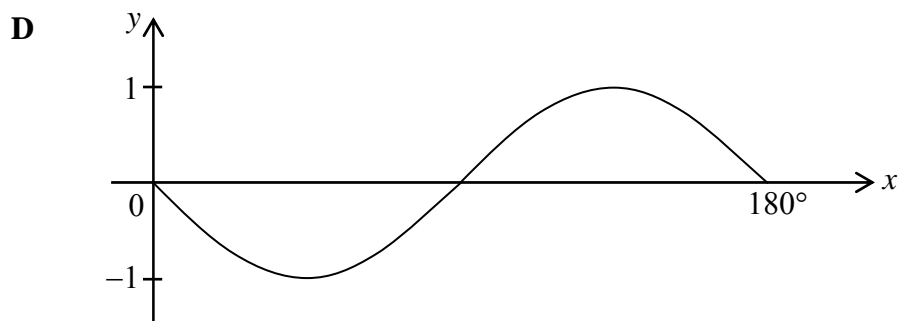
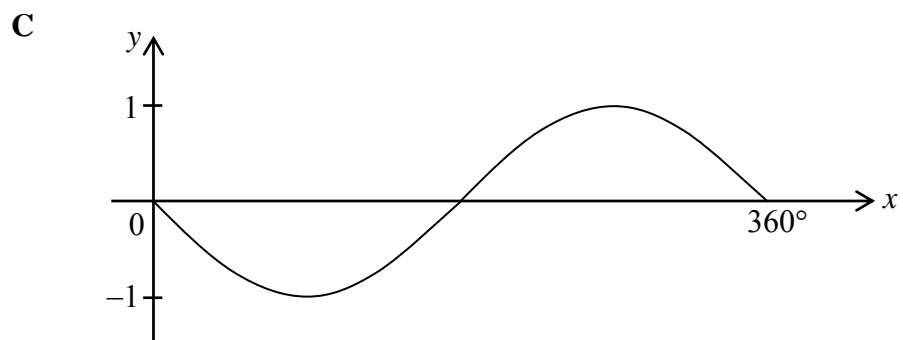
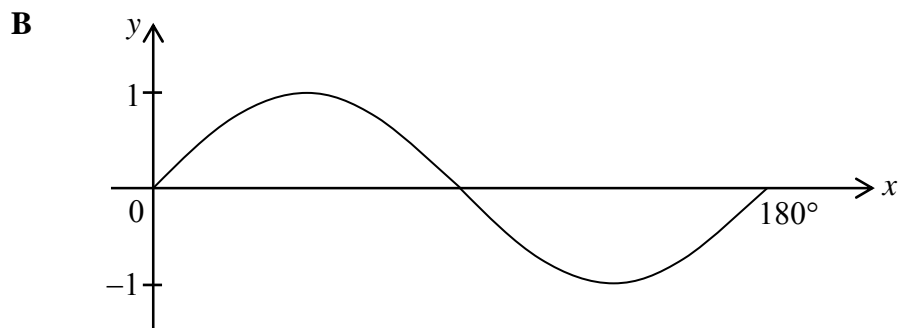
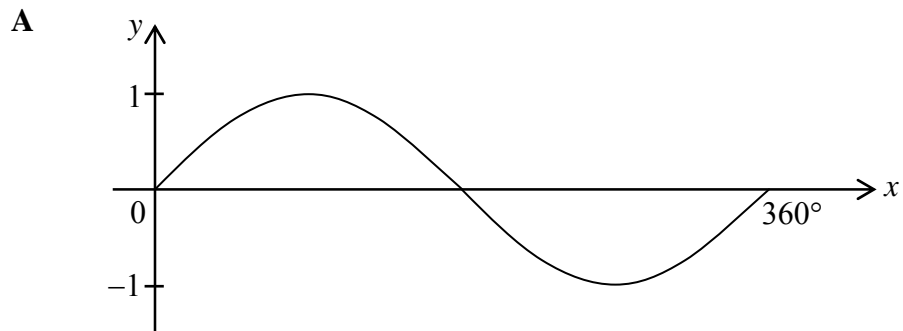
B $-\frac{3}{5}$

C $\frac{3}{5}$

D $\frac{4}{5}$

13 Which of the following represents the graph of $y = \sin x$?

Antara berikut, yang manakah mewakili graf $y = \sin x$?



[Lihat sebelah

- 14 Diagram 14 shows a cuboid with a rectangular base $PQRS$. X and Y are the midpoints of TW and PS respectively.

Rajah 14 menunjukkan sebuah kuboid dengan tapak segiempat tepat $PQRS$. X dan Y masing-masing adalah titik tengah TW dan PS .

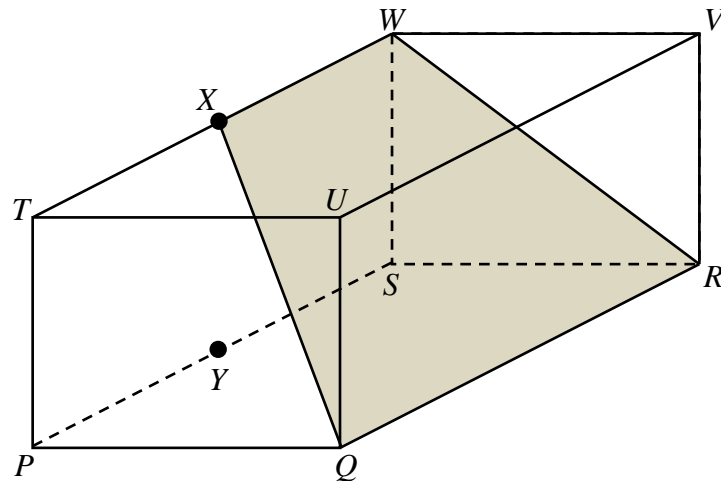


Diagram 14
Rajah 14

Name the angle between the plane $QRWX$ and the plane $TUVW$.

Namakan sudut di antara satah $QRWX$ dengan satah $TUVW$.

- A $\angle QXU$
- B $\angle QXV$
- C $\angle RWV$
- D $\angle RWU$

- 15 Diagram 15 shows two vertical poles on a horizontal plane. P , Q , R and S are four points on the poles such that $PQ = RS$.

Rajah 15 menunjukkan dua batang tiang tegak pada satah mengufuk. P , Q , R dan S adalah empat titik pada tiang-tiang itu dengan keadaan $PQ = RS$.

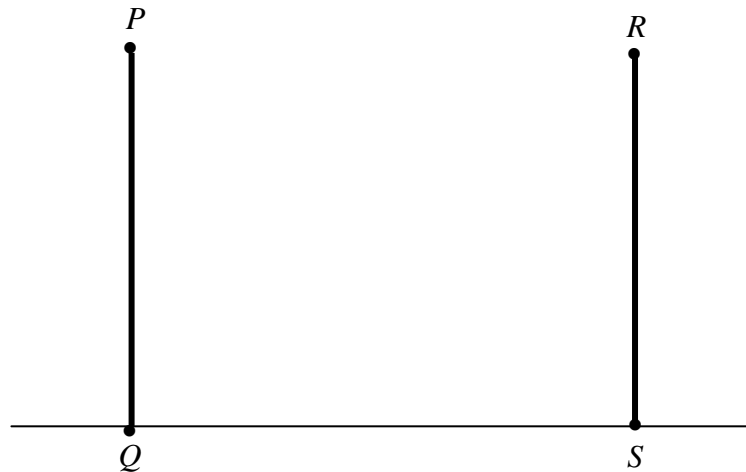


Diagram 15
Rajah 15

Name the angle of depression of point S from point P .

Namakan sudut tunduk titik S dari titik P .

- A $\angle RSP$
- B $\angle RPS$
- C $\angle QSP$
- D $\angle QPS$

[Lihat sebelah

- 16 Diagram 16 shows a vertical pole MV . The points L , M and N lie on a horizontal plane.

Rajah 16 menunjukkan sebuah tiang tegak MV . Titik L , M dan N terletak di atas satah mengufuk.

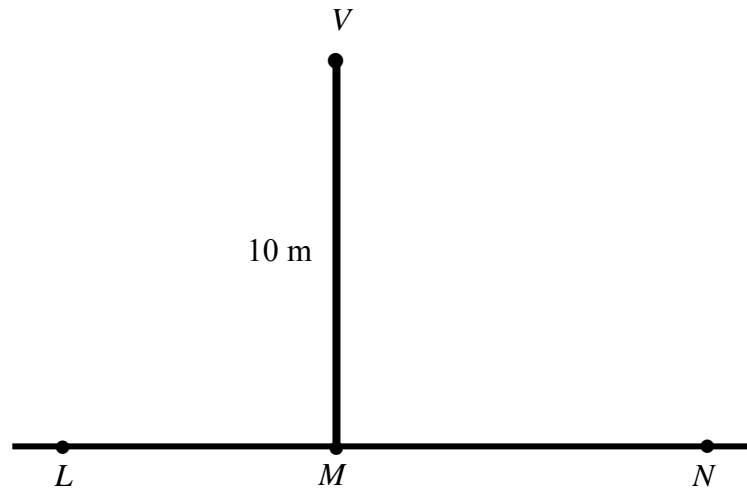


Diagram 16
Rajah 16

The angle of elevation of V from N is 45° and the angle of depression of L from V is 60° .

Calculate the distance, in metre, of LN .

Sudut dongak puncak V dari N ialah 45° dan sudut tunduk L dari V ialah 60° . Hitungkan, dalam meter, jarak LN .

- A 15.77
- B 17.32
- C 18.66
- D 27.03

17 Diagram 17 show three points P , Q and R , on a horizontal plane.

Rajah 17 menunjukkan tiga titik P , Q dan R , yang terletak pada suatu satah mengufuk.

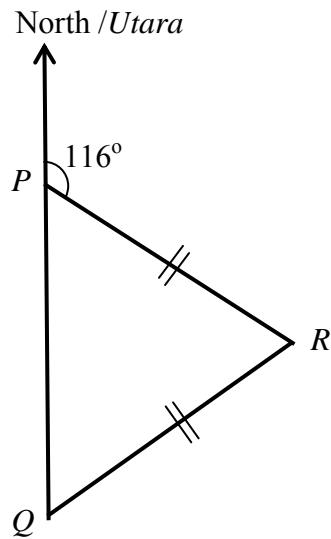


Diagram 17
Rajah 17

Find the bearing of Q from R .

Cari bearing Q dari R .

- A 212°
- B 232°
- C 238°
- D 244°

[Lihat sebelah

18 In Diagram 18, N is the North Pole, S is the South Pole and NOS is the axis of the earth.

Dalam Rajah 18, U ialah Kutub Utara, S ialah Kutub Selatan dan UOS ialah paksi bumi.

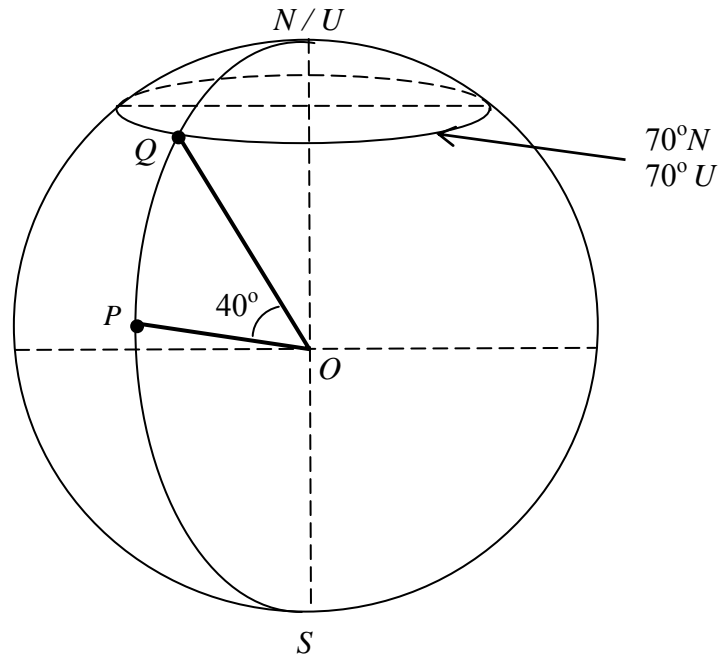


Diagram 18
Rajah 18

Find the latitude of P .

Cari latitud P .

- A $20^\circ N$
 $20^\circ U$
- B $30^\circ N$
 $30^\circ U$
- C $40^\circ N$
 $40^\circ U$
- D $50^\circ N$
 $50^\circ U$

19 $(x-2)^2 - x(x-5) =$

- A $x+4$
 B $x-4$
 C $-x+4$
 D $-x-4$

20 Express $\frac{3}{2h} - \frac{2-h}{h^2}$ as a single fraction in its simplest form.

Ungkapkan $\frac{3}{2h} - \frac{2-h}{h^2}$ sebagai satu pecahan tunggal dalam bentuk termudah.

- A $\frac{h-2}{2h^2}$
 B $\frac{2h-4}{2h^2}$
 C $\frac{4h-2}{2h^2}$
 D $\frac{5h-4}{2h^2}$

21 Given that $2T = \sqrt{\frac{T-3M}{M}}$, express M in terms of T .

Diberi $2T = \sqrt{\frac{T-3M}{M}}$, ungkapkan M dalam sebutan T .

- A $M = \frac{T}{2T^2 - 3}$
 B $M = \frac{T}{2T^2 + 3}$
 C $M = \frac{T}{4T^2 - 3}$
 D $M = \frac{T}{4T^2 + 3}$

[Lihat sebelah

- 22 Given that $\frac{3-2p}{4} = \frac{2-5p}{2}$, find the value of p .

Diberi $\frac{3-2p}{4} = \frac{2-5p}{2}$, cari nilai p .

- A $\frac{1}{3}$
B $\frac{1}{7}$
C $\frac{1}{8}$
D $\frac{1}{12}$

- 23 $\left(\frac{8}{x^3}\right)^{-\frac{2}{3}}$ can be written as

$\left(\frac{8}{x^3}\right)^{-\frac{2}{3}}$ boleh ditulis sebagai

- A $4x^2$
B $\frac{x^2}{4}$
C $\frac{x^2}{2}$
D $\frac{2}{x^2}$

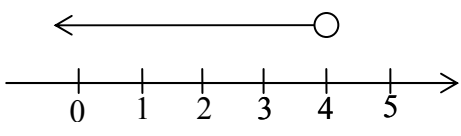
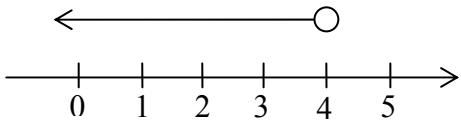
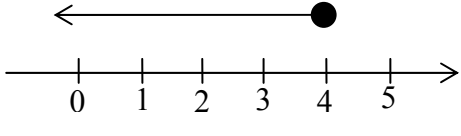
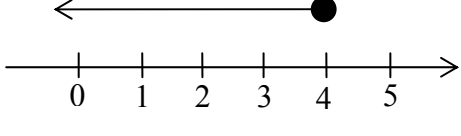
- 24 Simplify :
Ringkaskan :

$$\left(\frac{16}{m^8}\right)^{\frac{1}{4}} \times m^{-3}$$

- A $2m^{-5}$
B $4m^{-5}$
C $2m^5$
D $4m^5$

25 Which number line represents the solution for the given linear inequalities?

Garis nombor manakah mewakili penyelesaian untuk ketaksamaan linear yang diberi?

	Linear inequalities <i>Ketaksamaan linear</i>	Solution <i>Penyelesaian</i>
A	$2x - 3 \leq 5$	
B	$2x - 5 < 4$	
C	$x + 4 \geq 8$	
D	$3 - x \geq -1$	

26 Diagram 26 shows the scores obtained by ten students in a Mathematics quiz.

Rajah 26 menunjukkan skor bagi sepuluh orang pelajar dalam kuiz Matematik.

4 , 2 , 5 , 4 , 1 , 3 , 1 , 5 , 6 , 2

Diagram 26
Rajah 26

Find the median score.

Cari skor median.

- A 2
- B 3
- C 3.5
- D 4.5

- 27 Diagram 27(i) is an incomplete bar chart showing the number of students from three schools, P , Q and R , who participated in the “Program Kem Matematik SPM”.
Diagram 27(ii) is a pie chart showing the number of these students according to schools.

Rajah 27(i) ialah sebahagian carta palang yang menunjukkan bilangan murid dari tiga buah sekolah P , Q dan R , yang menyertai Program Kem Matematik SPM.

Rajah 27(ii) ialah carta pai yang menunjukkan bilangan murid mengikut sekolah.

Number of students
Bilangan murid

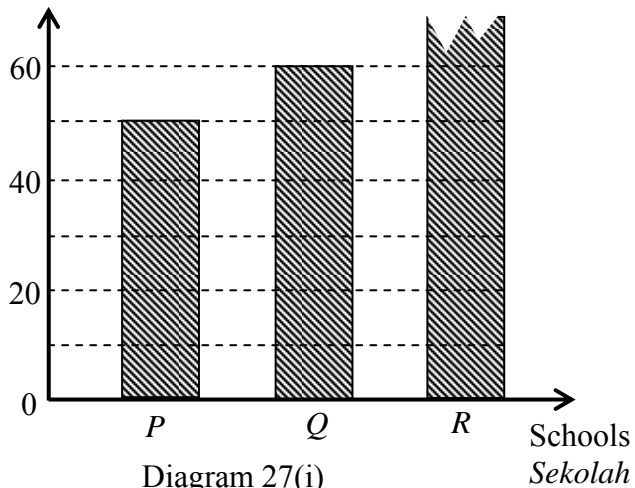


Diagram 27(i)
Rajah 27(i)

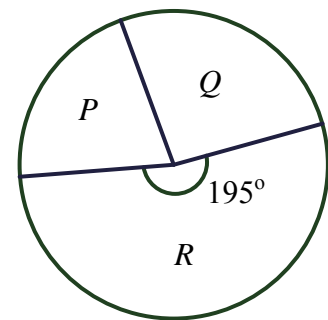


Diagram 27(ii)
Rajah 27(ii)

Calculate the number of students who participated in the “Program Kem Matematik SPM”.

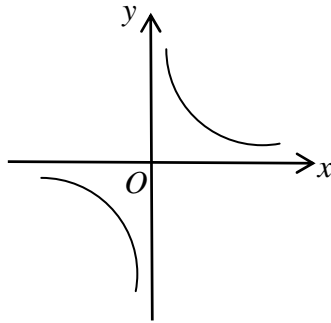
Hitungkan jumlah murid yang menyertai Program Kem Matematik SPM.

- A 165
- B 220
- C 240
- D 305

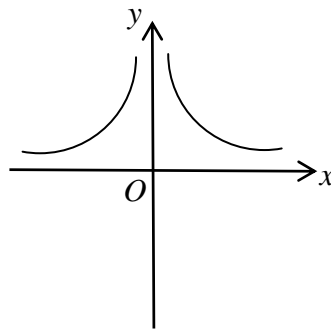
28 Which graph represents $y = \frac{5}{x}$?

Graf manakah yang mewakili $y = \frac{5}{x}$?

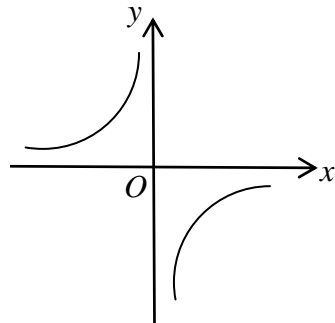
A



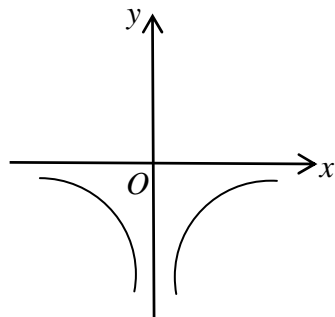
B



C



D



- 29 Diagram 29 is a Venn diagram showing the elements of the set P , set Q , set R , and universal set, $\xi = P \cup Q \cup R$.

Rajah 29 ialah gambar rajah Venn yang menunjukkan unsur-unsur set P , set Q , set R dan set semesta, $\xi = P \cup Q \cup R$.

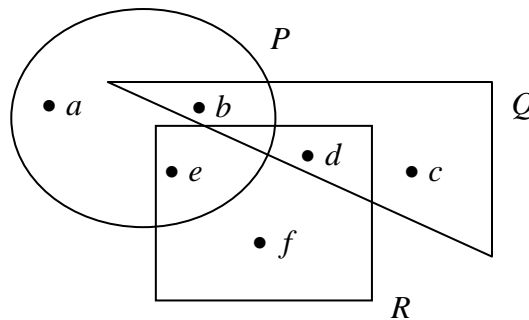


Diagram 29
Rajah 29

List all the elements of set $(P \cup Q) \cap R'$.

Senaraikan semua unsur bagi set $(P \cup Q) \cap R'$.

- A $\{f\}$
 - B $\{a, b, c\}$
 - C $\{a, b, c, d\}$
 - D $\{a, b, c, d, e\}$
- 30 Diagram 30 is a Venn diagram showing the set R , set S and set T .
- Rajah 30 ialah gambar rajah Venn yang menunjukkan set R , set S dan set T

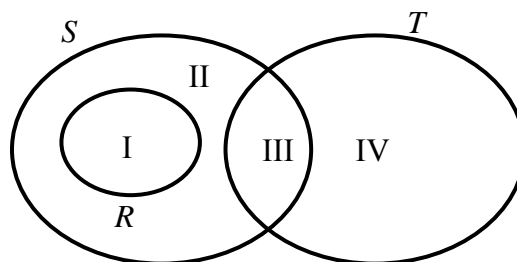


Diagram 30
Rajah 30

Set $(R \cup S') \cap T$ is represented by the region

Set $(R \cup S') \cap T$ diwakili oleh rantau

- A I
- B II
- C III
- D IV

[Lihat sebelah
SULIT

- 31 Diagram 31 is a Venn diagram showing the number of elements of set G , set M and set S .

Rajah 31 ialah gambar rajah Venn yang menunjukkan bilangan unsur bagi set G , set M dan set S .

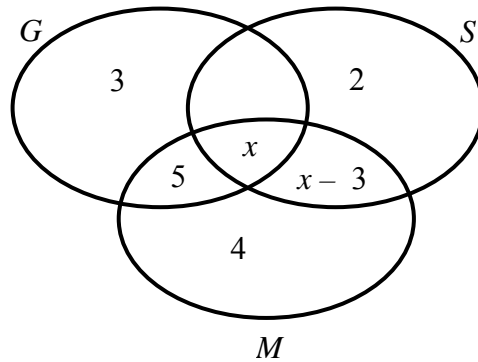


Diagram 31
Rajah 31

It is given that $\xi = G \cup M \cup S$ and $n(M \cap S) = n(G')$.
Find the value of x .

*Diberi bahawa $\xi = G \cup M \cup S$ dan $n(M \cap S) = n(G')$.
Cari nilai x .*

- A 6
- B 7
- C 9
- D 11

- 32 Diagram 32 shows a straight line PQ on a Cartesian plane.

Rajah 32 menunjukkan garis lurus PQ pada suatu satah Cartesan.

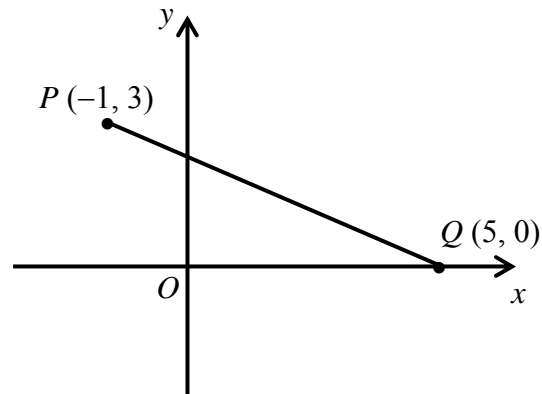


Diagram 32
Rajah 32

Find the gradient of PQ .

Cari kecerunan PQ .

- A $-\frac{5}{2}$
B $-\frac{1}{2}$
C $\frac{1}{2}$
D $\frac{5}{2}$
- 33 State the y -intercept of the straight line $4x - 2y = 20$.

Nyatakan pintasan- y bagi garis lurus $4x - 2y = 20$.

- A -10
B -5
C 5
D 10

34 Diagram 34 shows some labelled cards.

Rajah 34 menunjukkan sebilangan kad berlabel.

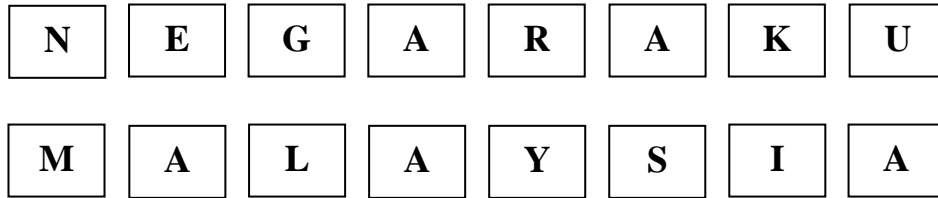


Diagram 34
Rajah 34

A card is picked at random. State the probability that the card labelled with the letter **A** is picked.

*Sekeping kad dipilih secara rawak. Nyatakan kebarangkalian memilih kad berlabel **A***

- A** $\frac{1}{5}$
- B** $\frac{1}{16}$
- C** $\frac{5}{16}$
- D** $\frac{11}{16}$

35 Diagram 35 shows 17 identical glasses, labelled **L**, **M** and **N**.

*Rajah 35 menunjukkan 17 gelas yang serupa, berlabel **L**, **M** dan **N**.*

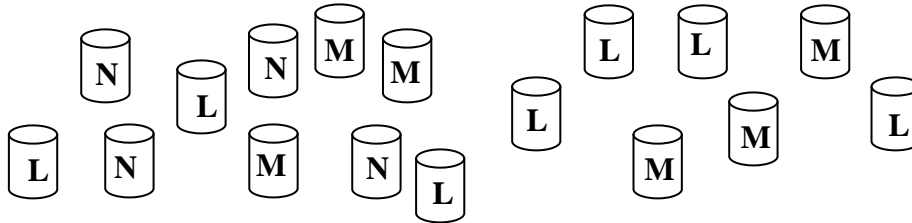


Diagram 35
Rajah 35

5 cracked glasses were taken away. A glass is chosen at random, the probability to get a glass labelled **L** is $\frac{1}{3}$.

State the number of cracked glasses with labelled **L**.

*5 biji gelas yang retak dikeluarkan. Sebiji gelas di pilih secara rawak, kebarangkalian mendapat gelas **L** ialah $\frac{1}{3}$.*

*Nyatakan bilangan gelas berlabel **L** yang retak.*

- A 1
- B 2
- C 3
- D 4

[Lihat sebelah

- 36 Table 36 shows some values of the variables G and H .

Jadual 36 menunjukkan beberapa nilai bagi pembolehubah G dan H .

G	1	2
H	4	y

Table 36
Jadual 36

It is given that G varies directly as H .
Find the value of y .

*Diberi bahawa G berubah secara langsung dengan H .
Cari nilai y .*

- A $\frac{1}{8}$
B $\frac{1}{2}$
C 2
D 8

- 37 Given y varies inversely as x^2 , and $y = 1$ when $x = 2$.
Calculate the value of y when $x = 4$.

*Diberi y berubah secara songang dengan x^2 , dan $y = 1$ apabila $x = 2$.
Hitung nilai y apabila $x = 4$.*

- A $\frac{1}{8}$
B $\frac{1}{4}$
C 16
D 64

- 38 It is given that R varies directly as cube root of S and inversely as T .
Find the relation between R , S and T .

Diberi bahawa R berubah secara langsung dengan punca kuasa tiga S dan secara songsang dengan T .

Cari hubungan antara R , S dan T .

A $R \propto S^3T$

B $R \propto \sqrt[3]{ST}$

C $R \propto \frac{S^3}{T}$

D $R \propto \frac{\sqrt[3]{S}}{T}$

39 $\begin{pmatrix} 2 & 4 \\ 3 & -1 \end{pmatrix} \begin{pmatrix} 1 \\ 2 \end{pmatrix} =$

A $\begin{pmatrix} 10 \\ 1 \end{pmatrix}$

B $\begin{pmatrix} 6 \\ -1 \end{pmatrix}$

C $\begin{pmatrix} 2 & 8 \\ 3 & -2 \end{pmatrix}$

D $\begin{pmatrix} 4 & 4 \\ 3 & 2 \end{pmatrix}$

40 $2(4 \ 1) - (2 \ 3) - 3(-1 \ 2) =$

A $(3 \ -5)$

B $(9 \ -7)$

C $(3 \ 0)$

D $(0 \ 3)$

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **40** questions.
Kertas soalan ini mengandungi 40 soalan.
2. Answer **all** questions.
Jawab semua soalan.
3. Each question is followed by four alternative answers, **A, B, C** or **D**. For each question, choose **one** answer only. Blacken your answer on the objective answer sheet provided.
*Tiap-tiap soalan diikuti oleh empat pilihan jawapan, iaitu **A, B, C** atau **D**. Bagi setiap soalan, pilih **satu** jawapan sahaja. Hitamkan jawapan anda pada kertas jawapan objektif yang disediakan.*
4. If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.
Jika anda hendak menukarkan jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang betul.
5. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.
6. A list of formulae is provided on pages 2 to 4.
Satu senarai rumus disediakan di halaman 2 hingga 4.
7. A booklet of four-figure mathematical tables is provided.
Sebuah buku sifir empat angka disediakan.
8. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh di program.