



**BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH
DAN SEKOLAH KECEMERLANGAN**

**PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2014
PERCUBAAN SIJIL PELAJARAN MALAYSIA**

MATEMATIK
Kertas 1
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.*

Kertas ini mengandungi **30** halaman bercetak

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

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

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

10 $P(A) = \frac{n(A)}{n(S)}$

11 $P(A') = 1 - P(A)$

12 $m = \frac{y_2 - y_1}{x_2 - x_1}$

13 $m = -\frac{\text{y-intercept}}{\text{x-intercept}}$ / $m = -\frac{\text{pintasan - y}}{\text{pintasan - x}}$

14 Pythagoras Theorem / Teorem Pithagoras

$$c^2 = a^2 + b^2$$

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 = $\pi d = 2\pi r$*
- 3 Area of circle = πr^2 / *Luas bulatan = πr^2*
- 4 Curved surface area of cylinder = $2\pi rh$ / *Luas permukaan melengkung silinder = $2\pi r h$*
- 5 Surface area of sphere = $4\pi r^2$ / *Luas permukaan sfera = $4\pi r^2$*
- 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 = $\pi r^2 h$*
- 8 Volume of cone = $\frac{1}{3} \pi r^2 h$ / *Isipadu kon = $\frac{1}{3} \pi r^2 h$*
- 9 Volume of sphere = $\frac{4}{3} \pi r^3$ / *Isipadu sfera = $\frac{4}{3} \pi r^3$*
- 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 $\frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$ / $\frac{\text{panjang lengkok}}{\text{lilitan bulatan}} = \frac{\text{sudut pusat}}{360^\circ}$
- 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 Scale factor, $k = \frac{PA'}{PA}$ / *Faktor skala, $k = \frac{PA'}{PA}$*
- 15 Area of image = $k^2 \times \text{area of object}$ / *Luas imej = $k^2 \times \text{luas objek}$*

This question paper consists of **40** questions. Answer **all** questions.
Kertas soalan ini mengandungi 40 soalan. Jawab semua soalan.

- 1 Round off 2.7489 to three significant figures.

Bundarkan 2.7489 kepada tiga angka bererti.

- A 2.74
- B 2.740
- C 2.75
- D 2.750

- 2 Express 0.0000254 in standard form.

Ungkapkan 0.0000254 dalam bentuk piawai.

- A 2.54×10^5
- B 2.54×10^4
- C 2.54×10^{-5}
- D 2.54×10^{-4}

- 3 $6.1 \times 10^{12} - 2.3 \times 10^{11} =$

- A 3.8×10^{12}
- B 5.87×10^{12}
- C 5.87×10^{11}
- D 3.8×10^{11}

- 4 A tank contains 440 litres of water. 30% of the water is poured out. The remainder of the water is then divided into 4 equal containers. Find the volume of water in each container, in ml.

Sebuah tangki mengandungi 440 liter air. Kemudian, sebanyak 30% air telah dikeluarkan. Baki air telah dituang ke dalam 4 bekas yang sama besar. Cari isipadu air setiap bekas tersebut dalam ml.

- A 3.3×10^1
- B 3.3×10^4
- C 7.7×10^1
- D 7.7×10^4

- 5 Express 352_8 as a number in base five.

Ungkapkan 352_8 sebagai satu nombor dalam asas lima.

- A 234_5
- B 1414_5
- C 4141_5
- D 432_5

- 6 $11011_2 + 111110_2 =$

- A 1011001_2
- B 1010101_2
- C 1100101_2
- D 1101100_2

- 7 In Diagram 1, $ABCDE$ and BJD are regular polygons.

Dalam Rajah 1, $ABCDE$ dan BJD ialah poligon sekata.

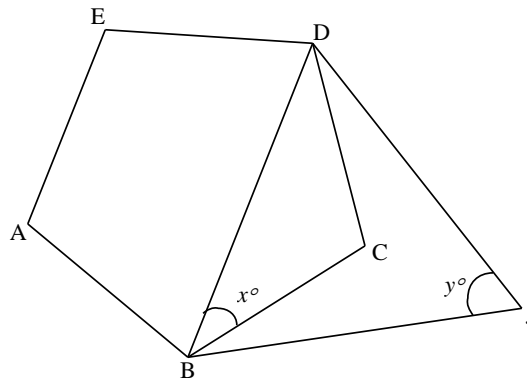


Diagram 1
Rajah 1

Find the value of $x + y$.

Cari nilai $x + y$.

- A 36°
- B 63°
- C 90°
- D 96°

8 Diagram 2 shows an irregular hexagon $FGHIJK$.

Rajah 2 menunjukkan heksagon tidak sekata $FGHIJK$.

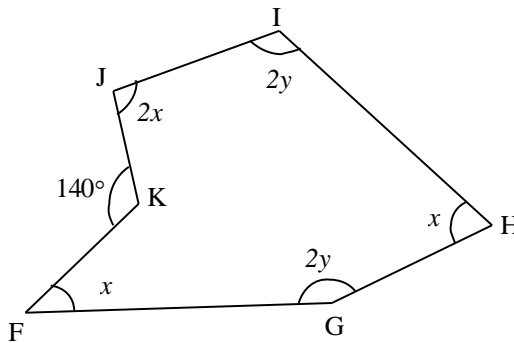


Diagram 2
Rajah 2

Find the value of $x + y$.

Cari nilai $x + y$.

- A 40°
- B 55°
- C 125°
- D 220°

- 9 In Diagram 3, PQR is a tangent for the circle $MJLQ$ at point Q . JOK is a diameter for the circle JKL .

Dalam Rajah 3, PQR ialah tangent kepada bulatan $MJLQ$ di titik Q . JOK ialah diameter kepada bulatan JKL .

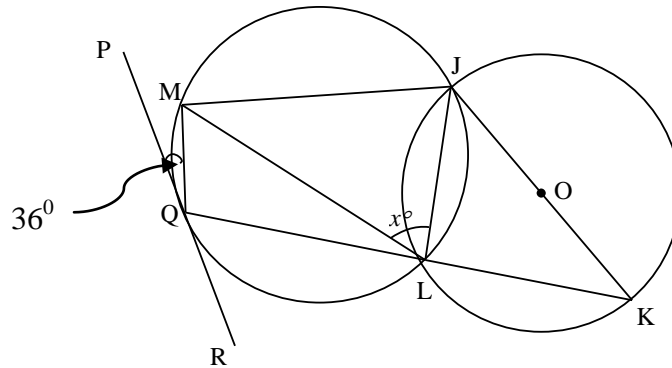


Diagram 3
Rajah 3

Find the value of x .

Cari nilai x .

- A 36°
- B 45°
- C 54°
- D 63°

- 10 Diagram 4 shows 5 triangles, **K**, **A**, **B**, **C**, and **D**, drawn on square grids.

Rajah 4 menunjukkan 5 segi tiga, K, A, B, C, dan D yang dilukis pada grid segi empat sama.

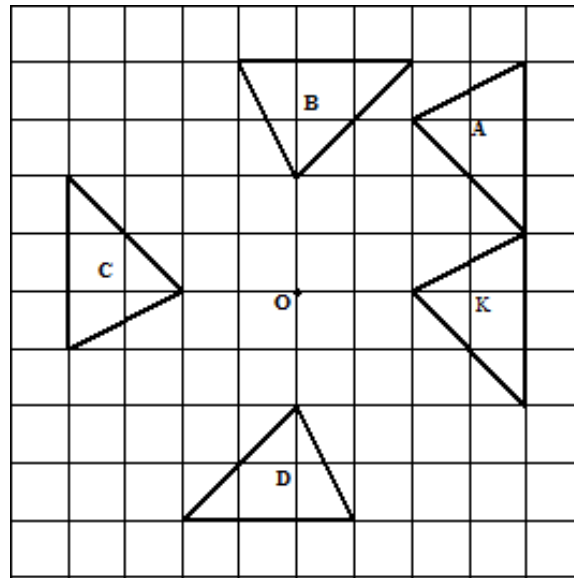


Diagram 4
Rajah 4

Which of the triangles, **A**, **B**, **C**, or **D** is the image of triangle **K** under a rotation 90° anticlockwise at centre **O**?

Antara segi tiga A, B, C, atau D yang manakah ialah imej untuk segi tiga K di bawah putaran 90° arah lawan jam pada pusat O?

- 11 Under an enlargement, the area of an object is 180 cm^2 and the scale factor of enlargement is $\frac{1}{3}$. Find the area of its image.

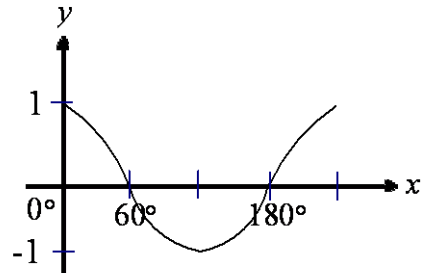
Di bawah satu pembesaran, luas suatu objek ialah 180 cm^2 dan faktor skala pembesaran itu ialah $\frac{1}{3}$. Cari luas imejnya.

- A 20 cm^2
- B 60 cm^2
- C 540 cm^2
- D 1620 cm^2

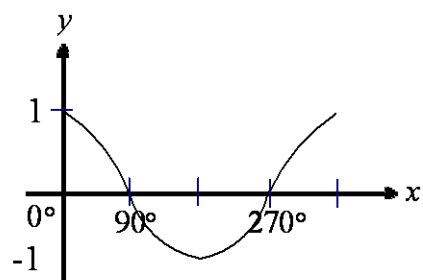
12 Which graph represents graph of $y = \cos x^\circ$?

Graf manakah yang mewakili $y = \cos x^\circ$?

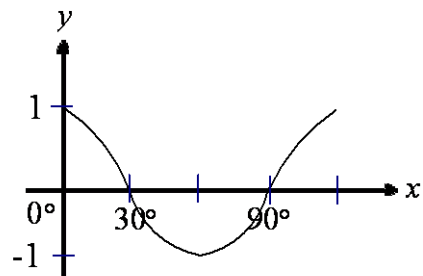
A



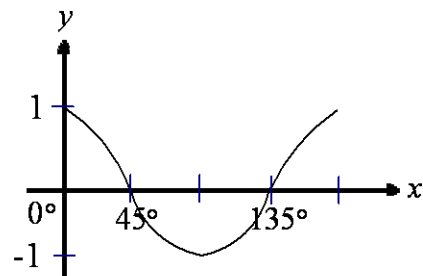
B



C



D



- 13 Diagram 5 shows two right-angled triangles, JKM and IJN . JKL is a straight line and $MN = NJ$.

Rajah 5 menunjukkan dua segi tiga bersudut tegak, JKM dan IJN . JKL ialah garis lurus dan $MN = NJ$.

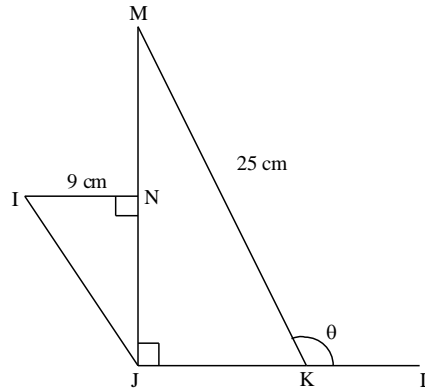


Diagram 5
Rajah 5

Given that $\sin \angle NJI = \frac{3}{5}$, find the value of $\cos \theta$.

Diberi bahawa $\sin \angle NJI = \frac{3}{5}$, cari nilai bagi kos θ .

- A $\frac{24}{25}$
- B $-\frac{24}{25}$
- C $\frac{7}{25}$
- D $-\frac{7}{25}$

14 In Diagram 6, point J and point K lie on the arc of a unit circle with centre O .

Dalam Rajah 6, titik J dan titik K terletak di atas lengkok suatu bulatan unit berpusat O .

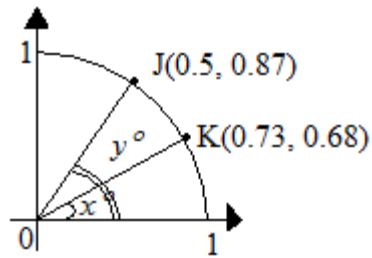


Diagram 6
Rajah 6

Find the value of $\tan x^\circ + \cos y^\circ$.

Cari nilai $\tan x^\circ + \cos y^\circ$.

- A 0.93
- B 1.23
- C 1.43
- D 1.55

- 15 Diagram 7 shows three points J , K and L , on a horizontal plane. K lies due north of L and the bearing of J from K is 221° .

Rajah 7 menunjukkan tiga titik J , K , dan L , yang terletak pada suatu satah mengufuk. K berada ke utara L dan bearing J dari K ialah 221° .

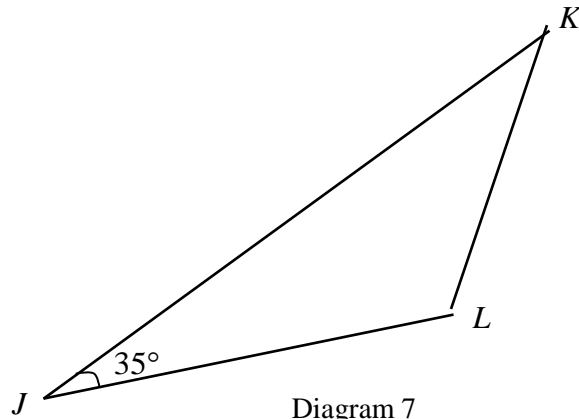


Diagram 7
Rajah 7

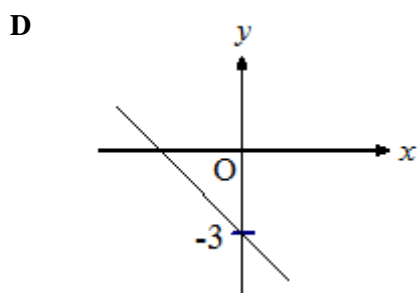
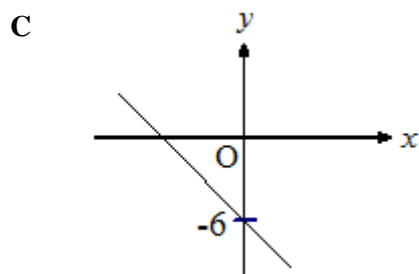
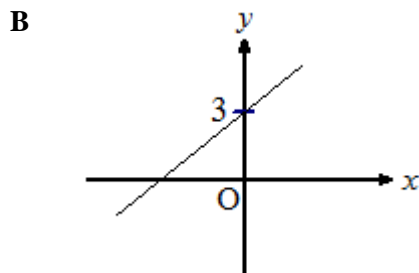
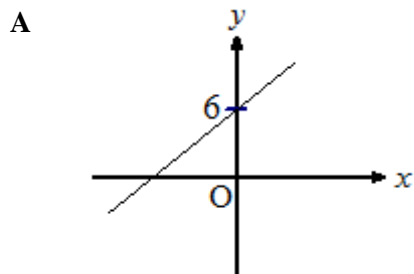
Find the bearing of L from J .

Cari bearing L dari J .

- A 041°
- B 076°
- C 256°
- D 265°

16 Which of the following graph represents $2y + x + 6 = 0$?

Antara graf berikut, yang manakah mewakili $2y + x + 6 = 0$?



- 17 Diagram 8 shows a cuboid. Name the angle between the line XW and the plane $QRWV$.

Rajah 8 menunjukkan sebuah kuboid. Namakan sudut di antara garis XW dengan satah $QRWV$.

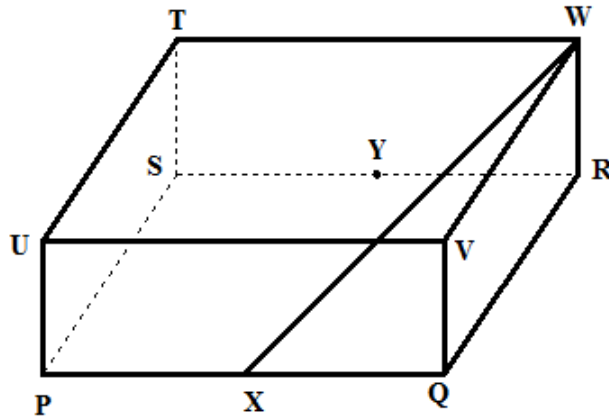


Diagram 8

Rajah 8

- A $\angle QWX$
- B $\angle WQR$
- C $\angle WXV$
- D $\angle YXW$

- 18 In Diagram 9, PR and TS are two vertical poles on a horizontal plane. Q is a point on PR such that $QR=TS$.

Dalam rajah 9, PR dan TS ialah tiang tegak pada satu satah mengufuk. Q ialah satu titik pada PR dengan keadaan $QR=TS$.

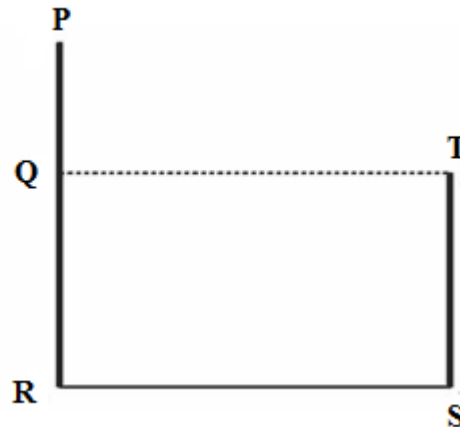


Diagram 9
Rajah 9

Name the angle of depression of T from P .

Namakan sudut tunduk T dari P .

- A $\angle PTQ$
- B $\angle PSQ$
- C $\angle TPQ$
- D $\angle SPQ$

- 19 Diagram 10 shows a tower JK . The points K and L lie on a horizontal plane.

Rajah 10 menunjukkan sebuah menara JK . Titik K dan L terletak di atas satah mengufuk.

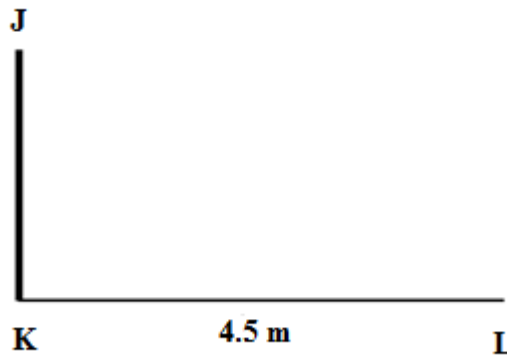


Diagram 10

Rajah 10

The angle of elevation of J from L is 27° . Calculate height of the tower in m .
Sudut dongakan J dari L ialah 27° . Hitungkan tinggi menara itu dalam m .

- A 2.04
- B 2.29
- C 4.01
- D 2.19

- 20 Diagram 11 shows a mountain with vertical height of AB , 1 200 m above sea level. The distance B from C is 1 800 m.

Rajah 11 menunjukkan sebuah bukit dengan ketinggian AB , 1 200 m dari aras laut. Jarak B dari C ialah 1 800 m.

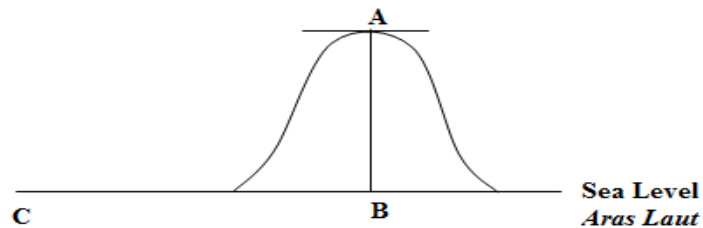


Diagram 11
Rajah 11

The angle of elevation of A from C is

Sudut dongakan A dari C ialah

- A 33.69°
 B 41.81°
 C 48.19°
 D 56.30°
- 21 $6p(p+2q)-(3p-q)^2 =$
- A $-3p^2+6pq+q^2$
 B $-3p^2+12pq+q^2$
 C $-3p^2+12pq-q^2$
 D $-3p^2+18pq-q^2$

22 Given $h = \frac{2k+1}{k-5}$, express k in terms of h .

Diberi $h = \frac{2k+1}{k-5}$, ungkapkan k dalam sebutan h .

A $k = \frac{1+5h}{h-2}$

B $k = \frac{1-5h}{h+2}$

C $k = \frac{1+h}{h-2}$

D $k = \frac{1+h}{h+2}$

23 Given that $\frac{5m-2}{3} = 8-(m-2)$, find the value of m .

Diberi bahawa $\frac{5m-2}{3} = 8-(m-2)$, cari nilai m .

A 2

B 4

C 8

D 16

24 $\frac{1}{\sqrt[3]{5^2}} =$

A $5^{-\frac{3}{2}}$

B $5^{-\frac{2}{3}}$

C $5^{\frac{2}{3}}$

D $5^{\frac{3}{2}}$

25

Simplify $\frac{h^2 \times (4k^6)^{\frac{1}{2}}}{(hk^{-2})^3}$

Ringkaskan $\frac{h^2 \times (4k^6)^{\frac{1}{2}}}{(hk^{-2})^3}$

A $4h^{-1}k^3$

B $4hk^9$

C $2h^{-1}k^9$

D $2h^5k^3$

26

List all the integers x which satisfy both the simultaneous linear inequalities $3 < 13 - 2x$ and

$$3 + \frac{x}{2} \geq 4.$$

Senaraikan semua integer x yang memuaskan kedua-dua ketaksamaan linear serentak

$$3 < 13 - 2x \text{ dan } 3 + \frac{x}{2} \geq 4.$$

A 1, 2, 3, 4

B 1, 2, 3, 4, 5

C 2, 3, 4

D 2, 3, 4, 5

27

Find the solution for $-5x \leq 3(x + 8)$.

Cari penyelesaian bagi $-5x \leq 3(x + 8)$.

A $x \leq -1$

B $x \leq -3$

C $x \geq -3$

D $x \leq -12$

28 Diagram 12 is a bar chart which shows the number of cars sold by Shahmi from January to June.

Rajah 12 ialah carta palang yang menunjukkan bilangan sejenis kereta yang dijual oleh Shahmi dalam bulan Januari sehingga bulan Jun.

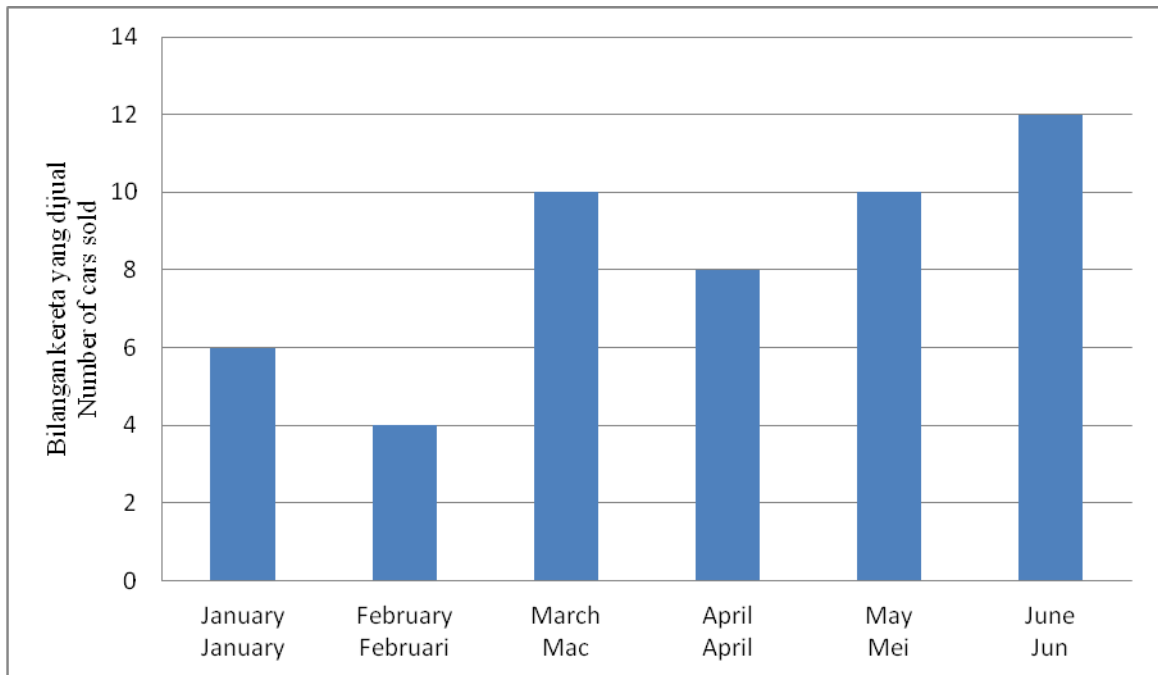


Diagram 12
Rajah 12

If the data is represented by a pie chart, calculate the sector angle represented the number of the car that sold in the last three month.

Jika semua maklumat dalam carta palang itu diwakili oleh sebuah carta pai, hitungkan sudut sektor yang mewakili bilangan kereta yang dijual dalam tiga bulan yang terakhir.

- A 87°
- B 108°
- C 144°
- D 216°

- 29 Table 1 shows the School Average Grade obtained by a group of 50 school in a final examination.

Jadual 1 menunjukkan Gred Purata Sekolah yang diperolehi oleh sekumpulan 50 buah sekolah dalam suatu peperiksaan.

School Average Grade <i>Gred Purata Sekolah</i>	1.2	1.5	2.0	2.5	3.0	3.5
Frequency <i>Kekerapan</i>	12	14	12	7	4	1

Table 1
Jadual 1

Determine the School Average Grade mode.

Tentukan mod Gred Purata Sekolah.

- A 12
- B 1.2
- C 1.5
- D 14

- 30 It is given that set $S = \{\text{pentagon, hexagon, octagon}\}$. Determine the number of subset for set S .

Diberi bahawa set $S = \{\text{pentagon, heksagon, oktagon}\}$. Tentukan bilangan subset bagi set S .

- A 8
- B 7
- C 9
- D 3

- 31 Diagram 13 shows a Venn diagram with the universal set $\xi = \{\text{Form five students}\}$,
 Set $M = \{\text{Students who choose Biology}\}$
 Set $R = \{\text{Students who choose Physics}\}$

Rajah 13 menunjukkan gambarajah Venn dengan set semesta $\xi = \{\text{Pelajar Tingkatan Lima}\}$,
 Set $M = \{\text{Pelajar yang memilih mata pelajaran Biologi}\}$
 Set $R = \{\text{Pelajar yang memilih mata pelajaran Fizik}\}$

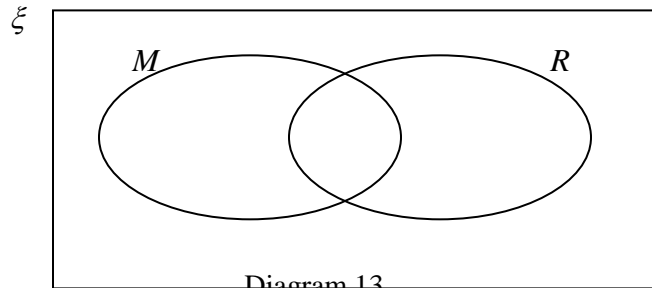


Diagram 13

Rajah 13

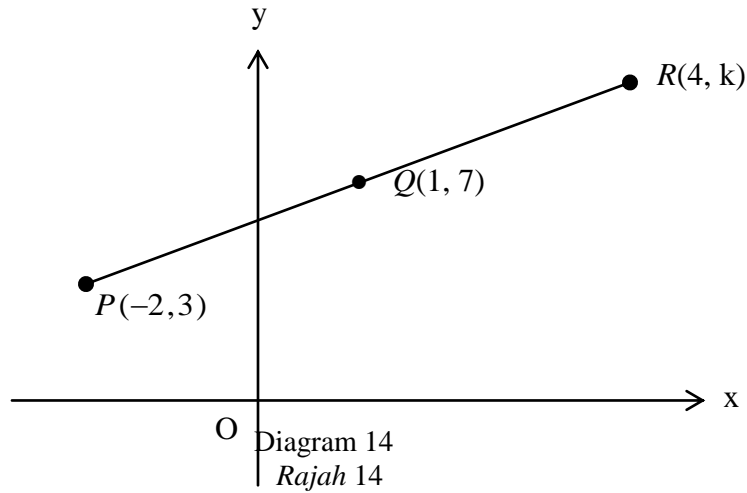
Given that $n(M) = 108$, $n(R) = 84$, $n(M \cap R) = 14$ and the total number of Form Five student is 200. Find the number of students who **do not** choose either subject.

Diberi $n(M) = 108$, $n(R) = 84$, $n(M \cap R) = 14$ dan jumlah pelajar Tingkatan Lima ialah 200. Cari bilangan pelajar yang **tidak** memilih mana-mana mata pelajaran.

- A 6
- B 8
- C 16
- D 22

- 32 Diagram 14 shows points $P(-2, 3)$, $Q(1, 7)$ and $R(4, k)$ lies on the straight line. Find the value of k .

Rajah 14 menunjukkan titik $P(-2, 3)$, $Q(1, 7)$ dan $R(4, k)$ yang terletak pada suatu garis lurus. Cari nilai k .



- A 11
- B 10
- C 9
- D 8

33 Diagram 15 shows a straight line GH on a Cartesian plane.

Rajah 15 menunjukkan satu garis lurus GH pada suatu satah Cartesan.

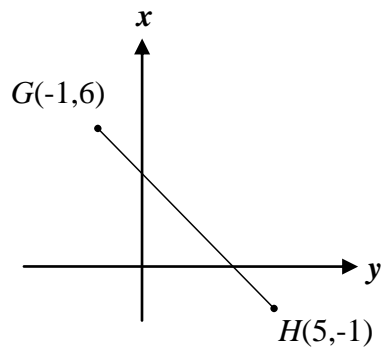


Diagram 15
Rajah 15

Find the gradient of the GH .

Cari kecerunan GH .

A $-\frac{7}{6}$

B $-\frac{6}{7}$

C $\frac{4}{7}$

D $-\frac{4}{7}$

34 Diagram 16 shows a set of 13 number cards.

Rajah 16 menunjukkan satu set 13 kad nombor.

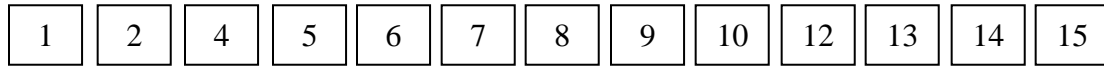


Diagram 16
Rajah 16

A card is chosen at random.

Find the probability that an even number card is chosen.

Satu kad dipilih secara rawak.

Cari kebarangkalian bahawa satu kad nombor genap dipilih.

A $\frac{4}{13}$

B $\frac{6}{13}$

C $\frac{7}{13}$

D $\frac{7}{15}$

35 Diagram 17 shows a circular board which is divided into 12 equal sectors and labelled with alphabets.

Rajah 17 menunjukkan sekeping papan bulatan yang dibahagi kepada 12 sektor yang sama besar dan dilabel dengan huruf.

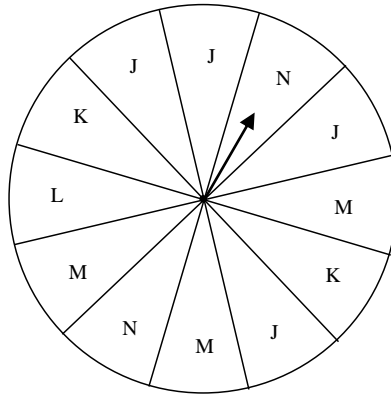


Diagram 17
Rajah 17

A pointer is placed at the centre of the board. The pointer is rotated about the centre of the board and will equally likely to stop at any sector.

What is the probability that the pointer will **not** stopped in the sectors labelled *J*?

Satu jarum penunjuk diletakkan di pusat papan itu. Jarum penunjuk itu diputarkan pada pusat papan itu dan akan berhenti di mana-mana sektor dengan kemungkinan yang sama.

*Apakah kebarangkalian bahawa jarum penunjuk itu **tidak** akan berhenti dalam sector yang berlabel *J*?*

A $\frac{1}{3}$

B $\frac{2}{3}$

C $\frac{1}{12}$

D $\frac{1}{6}$

$$36 \quad \begin{pmatrix} 3 \\ 7 \end{pmatrix} - \begin{pmatrix} -2 \\ 5 \end{pmatrix} + \frac{1}{2} \begin{pmatrix} -6 \\ 8 \end{pmatrix} = \begin{pmatrix} m \\ 6 \end{pmatrix}$$

Find the value of m .

Cari nilai m .

- A -1
- B -2
- C 2
- D 11

$$37 \quad \begin{pmatrix} -1 \\ 3 \end{pmatrix} \begin{pmatrix} 2 & 4 \end{pmatrix} =$$

- A (10)
- B (-2 12)
- C $\begin{pmatrix} -2 \\ 12 \end{pmatrix}$
- D $\begin{pmatrix} -2 & -4 \\ 6 & 12 \end{pmatrix}$

38 In Diagram 18, R is a point on the earth. N is the North Pole, S is the South Pole and NOS is the axis of the earth.

Dalam Rajah 18, R ialah titik di atas permukaan bumi. U ialah Kutub Utara, S ialah Kutub Selatan dan UOS ialah paksi Bumi.

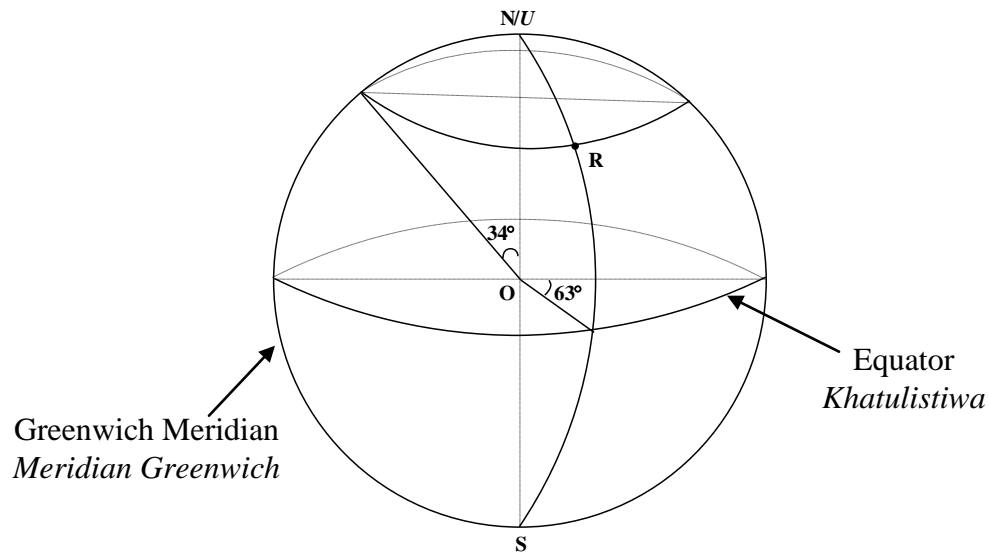


Diagram 18
Rajah 18

Find the location of point R .

Cari kedudukan titik R .

- A $(34^\circ N, 63^\circ E)$
 $(34^\circ U, 63^\circ T)$
- B $(34^\circ N, 117^\circ E)$
 $(34^\circ U, 117^\circ T)$
- C $(56^\circ N, 63^\circ E)$
 $(56^\circ U, 63^\circ T)$
- D $(56^\circ N, 117^\circ E)$
 $(56^\circ U, 117^\circ T)$

39. It is given that r varies inversely as the square root of s and $r = 4$ when $s = 36$.
Calculate the value of r when $s = 25$

Diberi bahawa r berubah secara songsang dengan punca kuasa dua s dan $r = 4$ apabila $s = 36$.

Hitung nilai r apabila $s = 25$.

A $\frac{24}{5}$

B $\frac{24}{25}$

C $\frac{144}{25}$

D $\frac{144}{5}$

40. It is given that K varies directly as the cube root of L and inversely as the square of M .
Find the relation between K , L , and M .

Diberi bahawa K berubah secara langsung dengan punca kuasa tiga L dan secara songsang dengan kuasa dua M .

Cari hubungan antara P , Q , dan R .

A $K \propto \frac{L^3}{M^2}$

B $K \propto \frac{\sqrt[3]{L}}{M^2}$

C $K \propto \frac{M^2}{\sqrt[3]{L}}$

D $K \propto \frac{M^2}{L^3}$

**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. Answer each question by blackening the correct space on the objective answer sheet.
Jawab setiap 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 baru.
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 3.
Satu senarai rumus disediakan di halaman 2 hingga 3.
8. A booklet of four-figure mathematical tables is provided.
Sebuah buku sifir matematik empat angka disediakan.
9. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

KERTAS 1

QUESTION	ANSWER	QUESTION	ANSWER
1	C	21	D
2	C	22	A
3	B	23	B
4	D	24	B
5	B	25	C
6	A	26	C
7	D	27	C
8	C	28	D
9	C	29	C
10	B	30	A
11	A	31	D
12	B	32	A
13	D	33	A
14	C	34	C
15	B	35	B
16	D	36	C
17	A	37	D
18	A	38	D
19	B	39	A
20	A	40	B