

1449/1
Mathematics
Kertas 1
2013
 $1\frac{1}{4}$ jam



SEKOLAH MENENGAH KEBANGSAAN KAMPUNG GELAM, MELAKA

PEPERIKSAAN PERCUBAAN SPM
TAHUN 2013

MATHEMATICS

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. Kertas soalan ini mengandungi **40 soalan**.
4. Jawab **semua** soalan.
5. Jawab **semua** soalan dengan **menghitamkan** ruangan yang betul pada kertas jawapan objektif.
6. **Hitamkan satu** ruangan sahaja bagi setiap soalan.
7. Rajah yang mengiringi soalan **tidak dilukis** mengikut skala kecuali dinyatakan.
8. Satu senarai rumus disediakan di halaman 2 dan 3.
9. Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.

Kertas soalan ini mengandungi 19 halaman bercetak.

MATHEMATICAL FORMULAE

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

RELATIONS

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

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

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

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

$$5 \quad P(A) = \frac{n(A)}{n(S)}$$

$$6 \quad P(A') = 1 - P(A)$$

$$7 \quad \text{Distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$8 \quad \text{Midpoint, } (x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$9 \quad \text{Average speed} = \frac{\text{distance travelled}}{\text{time taken}}$$

$$10 \quad \text{Mean} = \frac{\text{sum of data}}{\text{number of data}}$$

$$11 \quad \text{Mean} = \frac{\text{sum of (class mark} \times \text{frequency)}}{\text{sum of frequencies}}$$

$$12 \quad \text{Pythagoras Theorem} \\ c^2 = a^2 + b^2$$

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

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

SHAPES AND SPACE

- 1 Area of trapezium = $\frac{1}{2} \times \text{sum of parallel sides} \times \text{height}$
- 2 Circumference of circle = $\pi d = 2\pi r$
- 3 Area of circle = πr^2
- 4 Curved area of cylinder = $2\pi r h$
- 5 Surface area of sphere = $4\pi r^2$
- 6 Volume of right prism = cross sectional area \times length
- 7 Volume of cylinder = $\pi r^2 h$
- 8 Volume of cone = $\frac{1}{3} \pi r^2 h$
- 9 Volume of sphere = $\frac{4}{3} \pi r^3$
- 10 Volume of right pyramid = $\frac{1}{3} \times \text{base area} \times \text{height}$
- 11 Sum of interior angles of a polygon = $(n - 2) \times 180^\circ$
- 12
$$\frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$
- 13
$$\frac{\text{area of sector}}{\text{area of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$
- 14 Scale factor, $k = \frac{PA'}{PA}$
- 15 Area of image = $k^2 \times \text{area of object}$

1 Which number is rounded off correctly to three significant figures.

Nombor yang manakah dibundarkan betul kepada tiga angka bererti .

	Number <i>Nombor</i>	Rounded off correct to three significant figures <i>Dibundarkan betul kepada tiga angka bererti</i>
A	0.08567	0.0857
B	0.08575	0.0857
C	94120	94200
D	94250	94200

2 Given that $12\,630\,000 = m \times 10^n$, where $m \times 10^n$ is a number in standard form. State the value of m and of n .

Diberi bahawa $12\,630\,000 = m \times 10^n$, di mana $m \times 10^n$ ialah satu nombor dalam bentuk piawai. Nyatakan nilai m dan nilai n .

- A** $m = 1.263$, $n = -7$
B $m = 1.263$, $n = 7$
C $m = 12.63$, $n = -7$
D $m = 12.63$, $n = 7$

3 $4.3 \times 10^4 - 2.5 \times 10^3 =$

- A** 4.05×10^4
B 4.05×10^3
C 1.80×10^4
D 1.80×10^3

4 $\frac{0.00056}{40000} =$

- A** 1.4×10^{-9}
B 1.4×10^9
C 1.4×10^{-8}
D 1.4×10^8

5 What is the value of the digit 4 , in base ten ,of the number 1430_5

Apakah nilai digit 4 ,dalam asas sepuluh , bagi nombor 1430_5 .

- A** 25
B 100
C 125
D 500

6 $100110_2 + 110101_2 =$

- A 1111011₂
 B 1101101₂
 C 1101110₂
 D 1011011₂

- 7 In Diagram 1, $PQRST$ is a irregular pentagon and USV is an equilateral triangle.
 Dalam Rajah 1, $PQRST$ ialah sebuah pentagon tak sekata dan USV adalah segitiga sama sisi .

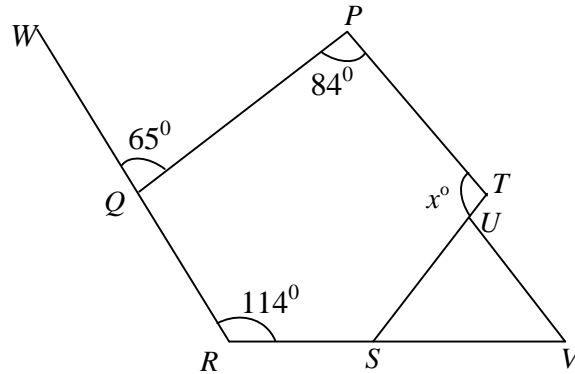


Diagram 1
Rajah 1

Find the value of x° .
 Cari nilai x° .

- A 107
 B 115
 C 120
 D 162
- 8 In Diagram 2, PQR is a tangent to the circle TQS with centre O at Q .
 Dalam Rajah 2, PQR ialah tangen kepada bulatan TQS , berpusat O di Q .

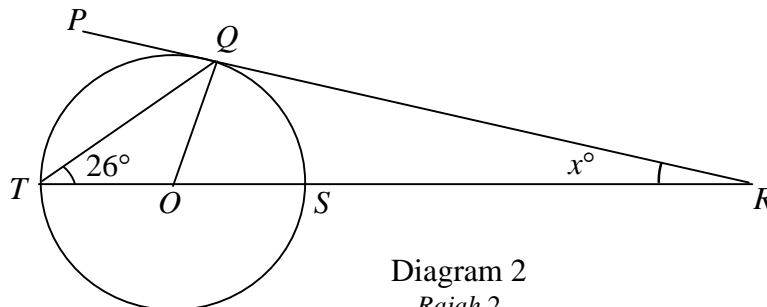


Diagram 2
Rajah 2

Find the value of x° .
 Cari nilai x° .

- A 13
 B 38
 C 52
 D 64

- 9 In Diagram 3, point Q undergoes a rotation of 180° about centre $(0, 1)$.
 Dalam Rajah 3, titik Q melalui putaran 180° pada pusat $(0, 1)$.

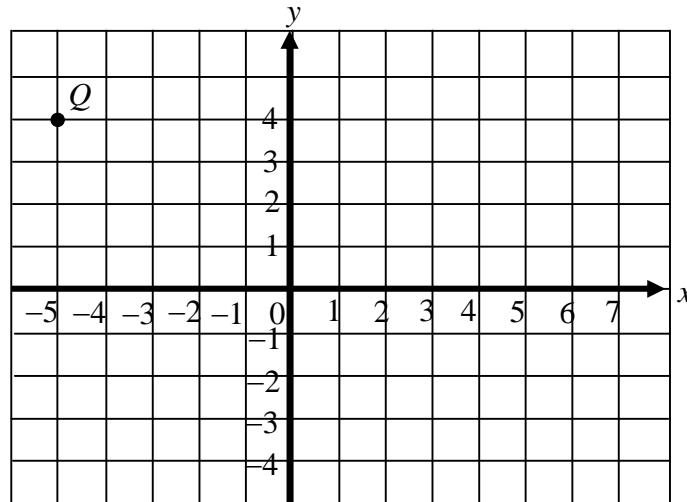


Diagram 3
 Rajah 3

The coordinates of the image of point Q under that rotation is
 Koordinat bagi imej Q di bawah putaran tersebut ialah

- A $(-2, -5)$
 B $(-5, -2)$
 C $(5, -2)$
 D $(-2, 5)$
- 10 Under an enlargement, the area of an object is 63 cm^2 and the area of its image is 7 cm^2 .
 Find the scale factor of the enlargement.
 Di bawah suatu pembesaran, luas suatu objek ialah 63 cm^2 dan luas imejnya ialah 7 cm^2 . Cari faktor skala pembesaran itu.
- A 3
 B 9
 C $\frac{1}{9}$
 D $\frac{1}{3}$

- 11 Diagram 4 shows a right angled triangle PQR and PQS . $PR = RS$.
Rajah 4 menunjukkan dua buah segi tiga bersudut tegak PQR dan PQS . $PR = RS$.

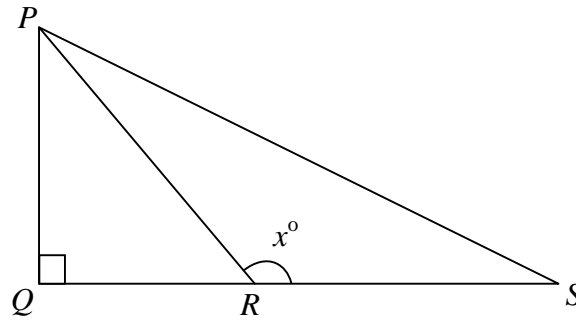


Diagram 4
Rajah 4

Given $\sin x = \frac{3}{5}$ and $RS = 25$ cm, calculate the length, in cm, of QS .

Diberi $\sin x = \frac{3}{5}$ dan $RS = 25$ cm, hitung panjang, dalam cm, bagi QS .

- A 12
 B 15
 C 25
 D 45
- 12 Diagram 5 shows a sailing boat. The sail SPN has a shape of right angled triangle, $MNPQ$ and RSP are a straight lines.
Rajah 5 menunjukkan sebuah kapal layar. Layar SPN berbentuk segi tiga bersudut tegak, $MNPQ$ dan RSP ialah garis lurus.

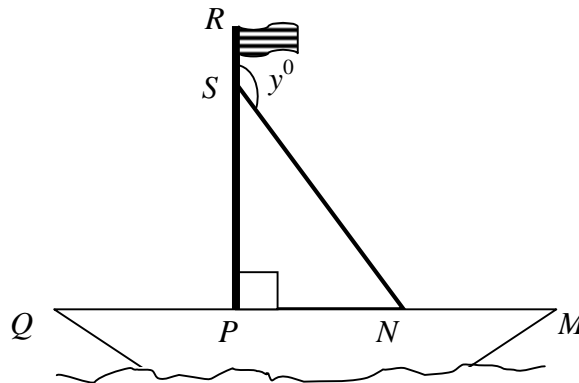


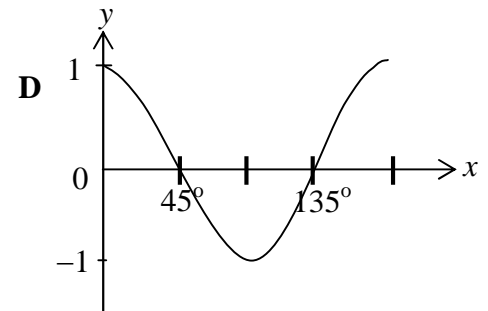
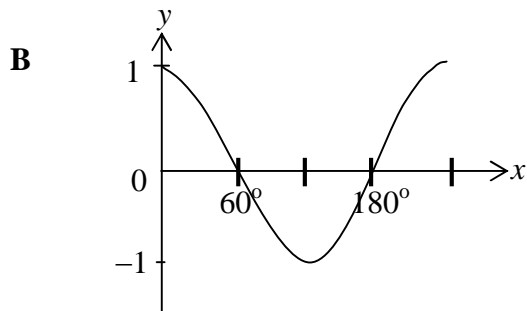
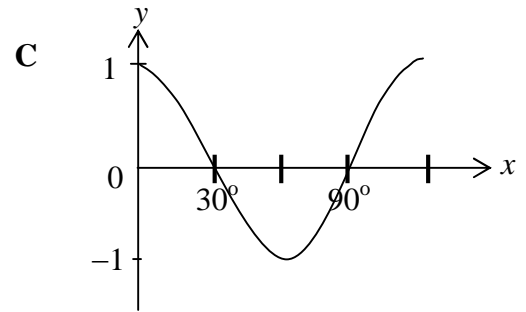
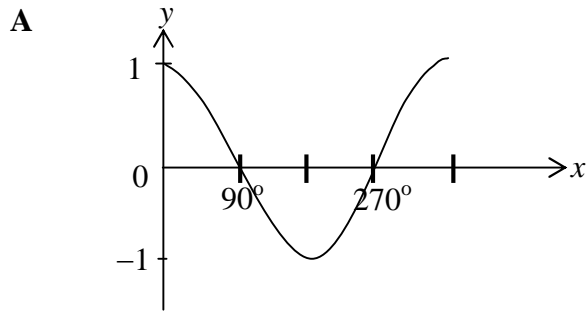
Diagram 5
Rajah 5

Given that $PN = 9$ m and $\cos y = -\frac{3}{5}$, find the height, in m, of SP .

Diberi $PN = 9$ m dan $\cos y = -\frac{3}{5}$, cari tinggi, dalam m, bagi SP .

- A 2.25
 B 6.75
 C 8.75
 D 11.25

- 13 Which graph represents part of $y = \cos 2x^\circ$?
 Graf manakah yang mewakili $y = \cos 2x^\circ$?



- 14 Diagram 6 shows a cuboid with rectangle $PQRS$ as its horizontal base.
 Rajah 6 menunjukkan sebuah kuboid dengan segiempat tepat $PQRS$ sebagai tapak mengufuk .

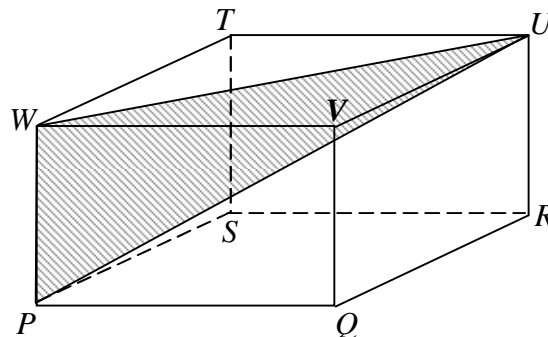


Diagram 6
 Rajah 6

Name the angle between the plane PWU and the plane $TURS$.
 Namakan sudut antara satah PWU dengan satah $TURS$.

- A** $\angle WUS$
B $\angle TUW$
C $\angle TWU$
D $\angle UWS$

- 15 Diagram 7 shows two vertical flags on a horizontal plane. P and Q are two points on the two flags.
Rajah 7 menunjukkan dua tiang bendera tegak di atas satah mengufuk. P dan Q adalah dua titik pada dua tiang bendera itu.

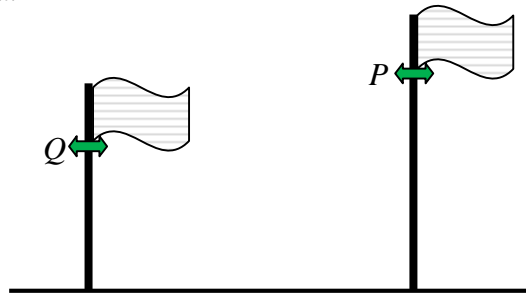


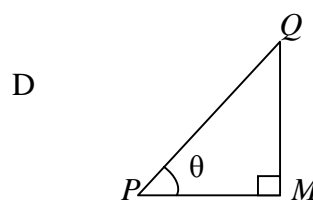
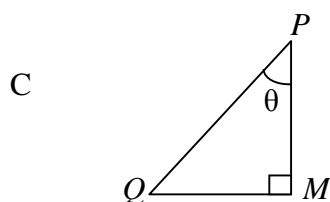
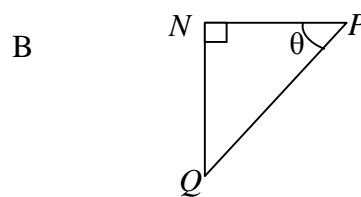
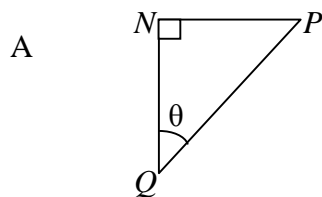
Diagram 7
Rajah 7

Point M is vertically below P , at the same level as Q . Point N is vertically above Q , at the same level as P .

Which diagram shows the angle of depression, θ , of point Q from point P

Titik M berada tegak di bawah P , pada paras yang sama dengan Q . Titik N berada tegak di atas Q , pada paras yang sama dengan P .

Rajah yang manakah menunjukkan sudut tunduk, θ titik Q dari titik P .



- 16 Diagram 8 shows a group of scouts in a camp. The angle of elevation of the kite from instructor's eye is 48° .

Rajah 8 menunjukkan sekumpulan pengakap di kawasan perkhemahan. Sudut dongak sebuah layang-layang dari mata jurulatih itu ialah 48°

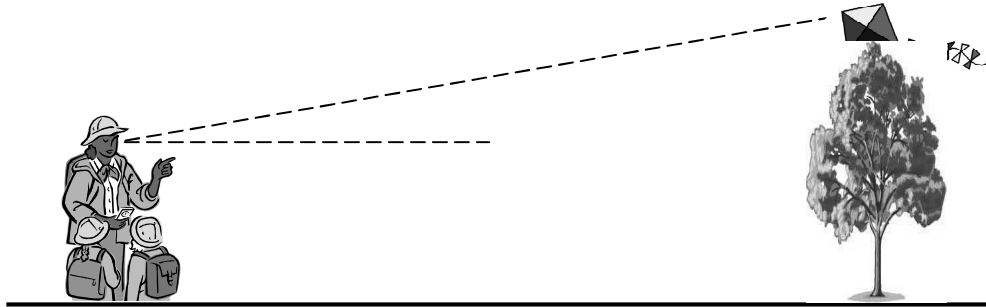


Diagram 8

Rajah 8

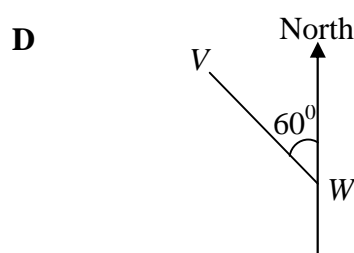
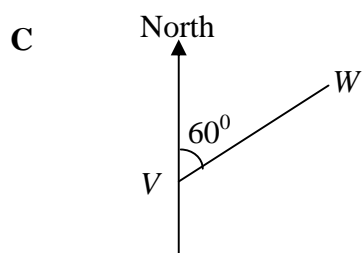
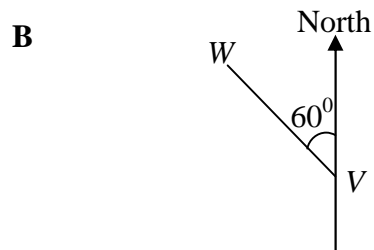
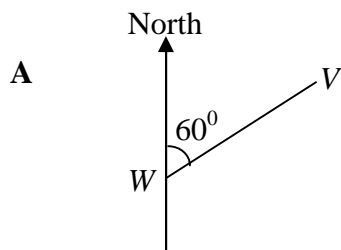
It is given that the base of the tree is 15 m from them and the kite are hang-up 30 m on the tree above the horizontal ground.

Calculate the eye level of the instructor, in m, from the ground.

Diberi jarak pokok adalah 15 m dari mereka dan layang-layang itu tersangkut 30 m tegak di atas pokok dari tanah mengufuk.

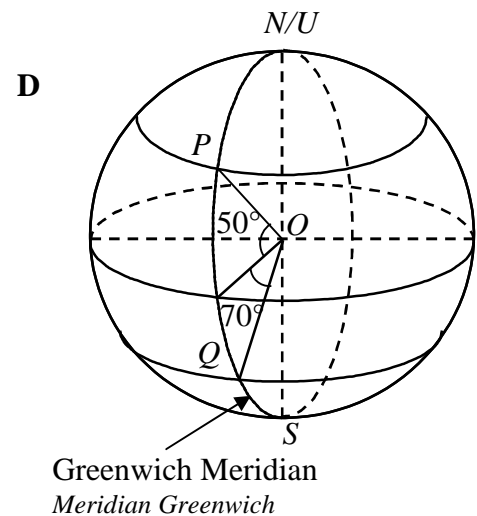
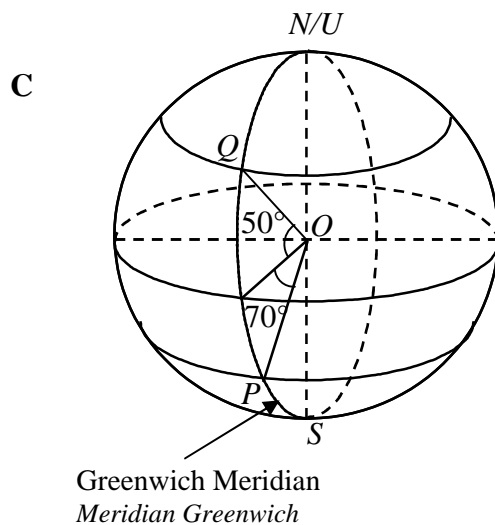
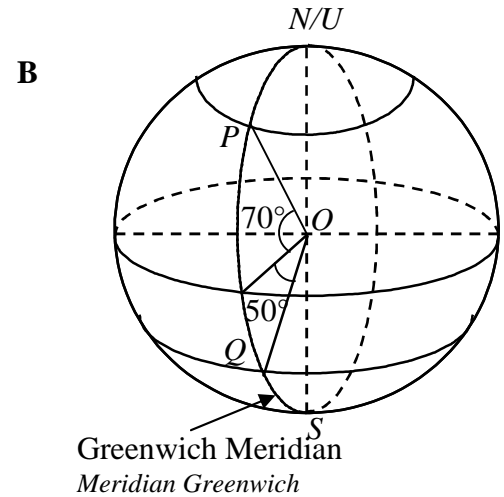
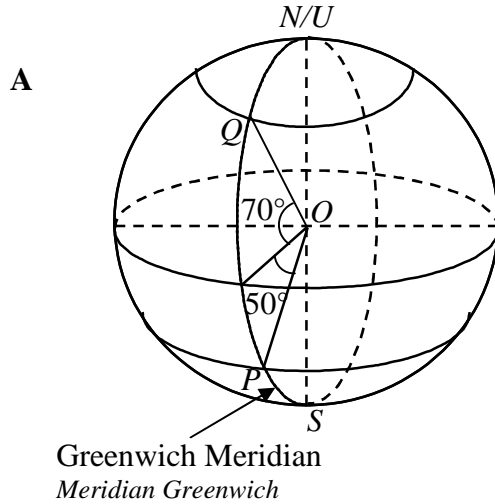
Hitung aras mata jurulatih, dalam m, dari tanah mengufuk.

- A 13.34
 B 13.51
 C 16.49
 D 16.65
- 17 Points W and V lie on a horizontal plane. The bearing of W from V is 060° . Which diagram shows the correct locations of W and V ?
- Diberi bahawa titik W dan titik V terletak pada suatu satah mengufuk. Bearing W dari V ialah 060° . Rajah manakah yang menunjukkan kedudukan yang betul bagi W dan V ?



- 18 N is the North Pole, S is the South Pole and O is the centre of the earth. P and Q are two points on the Greenwich Meridian. The latitude of P is $70^\circ N$ and the latitude of Q is $50^\circ S$. Which diagram shows the correct locations of P and Q ?

*U ialah Kutub Utara, S ialah Kutub Selatan dan O ialah pusat bumi. P dan Q ialah dua titik pada Meridian Greenwich. Latitud P ialah $70^\circ U$ dan latitud Q ialah $50^\circ S$.
Rajah manakah yang menunjukkan kedudukan yang betul bagi P dan Q?*



19 $n(n + m) - (n - m)^2 =$

- A $3nm - m^2$
 B $m^2 - nm$
 C $nm - m^2$
 D $m^2 - 3nm$

20 Express $\frac{4m+3}{5n} - \frac{2mn-6n}{10n^2}$ as a single fraction in its simplest form.

Ungkapkan $\frac{4m+3}{5n} - \frac{2mn-6n}{10n^2}$ sebagai pecahan tunggal dalam bentuk terendah.

A $\frac{3m+6}{5n}$

B $\frac{3m-6}{5n}$

C $\frac{m+2}{5n}$

D $\frac{m-2}{5n}$

21 Given that $3g = \frac{h-4}{2-h}$, express h in terms of g .

Diberi $3g = \frac{h-4}{2-h}$, ungkapkan h dalam sebutan g .

A $h = \frac{2g+4}{1+g}$

B $h = \frac{2g+4}{g-1}$

C $h = \frac{6g+4}{1+3g}$

D $h = \frac{6g-4}{3g-1}$

22 Given that $\frac{2p+1}{2} - \frac{5-p}{4} = 3$, find the value of p .

Diberi bahawa $\frac{2p+1}{2} - \frac{5-p}{4} = 3$, carikan nilai p .

A 2

B 3

C 5

D 6

23 $5^{-\frac{2}{3}} =$

A $-\frac{1}{\sqrt{5^3}}$

B $-\frac{1}{\sqrt[3]{5^2}}$

C $\frac{1}{\sqrt{5^3}}$

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

24 Simplify :

Ringkaskan :

$$\frac{\left(2h^{\frac{3}{4}}k\right)^4}{h^{-4}k^5} =$$

A $\frac{2}{hk}$

B $\frac{2h^7}{k}$

C $\frac{16}{hk}$

D $\frac{16h^7}{k}$

25 List all the integer p that satisfy both the simultaneous linear inequalities $3p - 2 \geq 7$ and $p + 18 > 3p + 2$.

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

$3p - 2 \geq 7$ dan $p + 18 > 3p + 2$

A 3, 4, 5, 6, 7

B 3, 4, 5, 6, 7, 8

C 4, 5, 6, 7

D 4, 5, 6, 7, 8

- 26 Diagram 9 is a pie chart which shows the number of members in three society in SMK Bestari Indah. The members of Science & Mathematics society are 45 students and the members of English society are 50 students.

Rajah 9 menunjukkan carta pai bagi bilangan ahli dalam tiga persatuan di SMK Bestari Indah. Ahli bagi persatuan Sains dan Matematik adalah seramai 45 orang dan ahli persatuan Bahasa Inggeris ialah 50 orang.

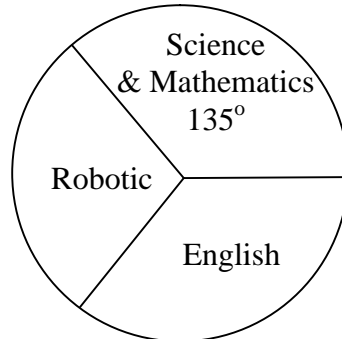


Diagram 9
Rajah 9

Find the number of students in Robotic society.
Cari bilangan ahli persatuan Robotik.

- A 10
B 15
C 25
D 30
- 27 Diagram 10 is a bar chart which shows the scores of a group of students in a contest.
Rajah 10 ialah carta palang yang menunjukkan skor bagi sekumpulan murid dalam satu pertandingan.

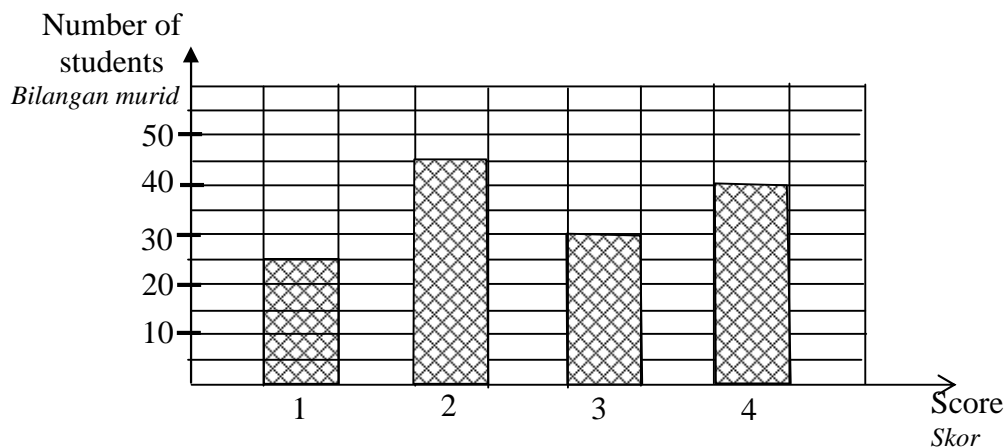


Diagram 10
Rajah 10

Determine the score mode.
Tentukan skor mod.

- A 2
B 4
C 40
D 45

- 28 Diagram 11 show a graph function of $y = -x^n + m$, where m and n are integers.
Rajah 11 menunjukkan graf bagi fungsi $y = -x^n + m$, di mana m dan n ialah integer.

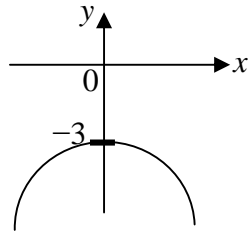
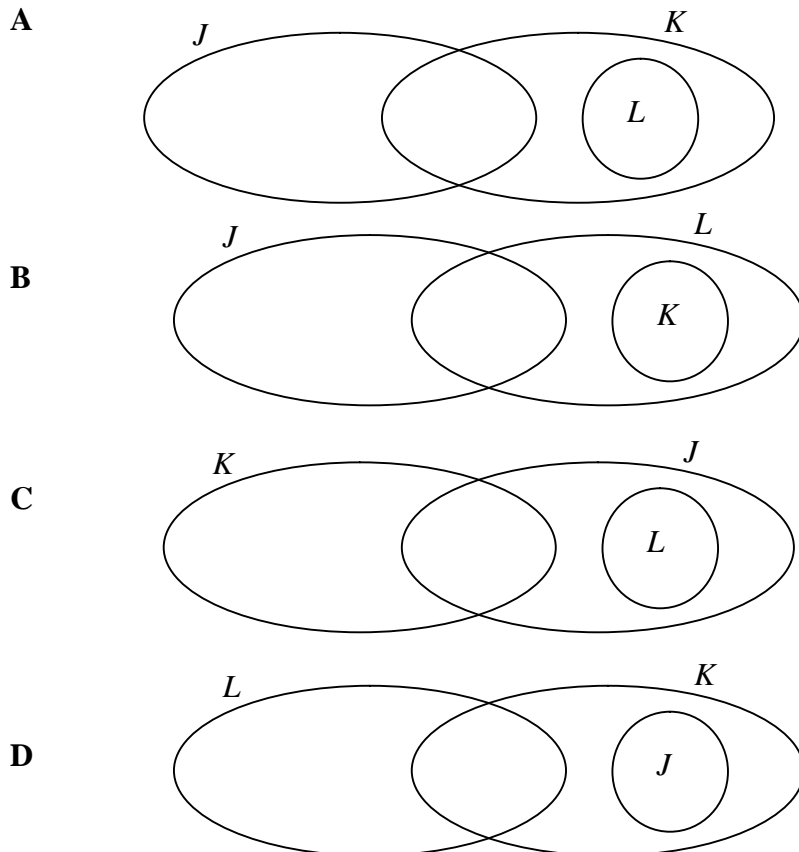


Diagram 11
Rajah 11

Determine the value of m and of n .
Tentukan nilai m dan nilai n .

- A $m = -3, n = -2$.
 B $m = 3, n = -2$.
 C $m = -3, n = 2$.
 D $m = 3, n = 2$.
- 29 It is given that the universal set, $\xi = J \cup K \cup L$, $J \subset K$ and $K \cap L \neq \emptyset$.
 Which Venn diagram represents these relationship ?
*Diberi bahawa set semesta, $\xi = J \cup K \cup L$, $J \subset K$ dan $K \cap L \neq \emptyset$.
 Gambar rajah Venn manakah yang mewakili hubungan ini ?*



- 30** It is given that the universal set $\xi = P \cup Q \cup R$, set $P = \{ a, c, e, g, h \}$, set $Q = \{ b, c, d, e, f \}$ and set $R = \{ a, b, d, h \}$.
List all the elements of set $P \cup (Q \cap R')$
Diberi bahawa set semesta, $\xi = P \cup Q \cup R$, set $P = \{ a, c, e, g, h \}$, set $Q = \{ b, c, d, e, f \}$ dan set $R = \{ a, b, d, h \}$.
Senaraikan semua unsur bagi set $P \cup (Q \cap R')$.

- A** $\{ c, e, g \}$
B $\{ c, e, g, f \}$
C $\{ a, c, e, g, h \}$
D $\{ a, c, e, f, g, h \}$

- 31** Diagram 12 is a Venn diagram showing the number of elements in sets K, L and M .
Given that $\xi = K \cup L \cup M$ and $n(K') = n(L \cap M)$.
Rajah 12 ialah sebuah gambar rajah Venn yang menunjukkan bilangan unsur dalam set K, L dan M .
Diberi $\xi = K \cup L \cup M$ dan $n(K') = n(L \cap M)$.

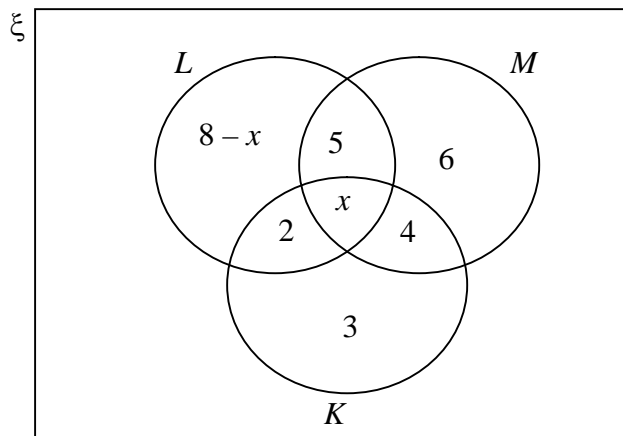


Diagram 12
Rajah 12

The value of x is
Nilai x ialah

- A** 4
B 5
C 7
D 9
- 32** Given that the straight line $2y + x = 6$ passes through the point $(p, -4)$.
Find the value of p .
Diberi bahawa garis lurus $2y + x = 6$ melalui titik $(p, -4)$.
Cari nilai bagi p .
- A** -14
B -5
C 5
D 14

- 33 Given that the straight line $y = 3x + 5$ is parallel to the straight line $2y + kx = 8$.
Find the value of k .

*Diberi bahawa garis lurus $y = 3x + 5$ adalah selari dengan garis lurus $2y + kx = 8$.
Cari nilai k .*

- A -6
B -3
C 3
D 6

- 34 Diagram 13 shows some alphabet cards.
Rajah 13 menunjukkan beberapa keping kad huruf.



Diagram 13
Rajah 13

A card is picked at random. Find the probability that a card with a consonant is picked.
Sekeping kad dipilih secara rawak. Cari kebarangkalian sekeping kad berharuf konsonan dipilih.

- A $\frac{2}{7}$
B $\frac{3}{7}$
C $\frac{4}{7}$
D $\frac{5}{7}$

- 35 A box contains 6 pieces of red cards, 8 pieces of yellow cards and x pieces of blue cards.

When a card is chosen at random from the box, the probability of getting a red card is $\frac{2}{7}$.

Find the value of x .

Sebuah kotak mengandungi 6 keping kad merah, 8 keping kad kuning dan x keping kad biru. Apabila sekeping kad dikeluarkan secara rawak daripada kotak itu, kebarangkalian kad merah diperolehi ialah $\frac{2}{7}$.

Cari nilai x

- A 2
B 5
C 7
D 14

- 36** w varies inversely as the cube root of y . Given that the constant is k , find the relation between w and y .
w berubah secara songsang dengan punca kuasa tiga y . Diberi k ialah pemalar, cari hubungan antara w dan y .

- A** $w = ky^3$
B $w = k\sqrt[3]{y}$
C $w = \frac{k}{y^3}$
D $w = \frac{k}{\sqrt[3]{y}}$

- 37** Given that $E \propto G$ such that $G = 2m - 1$ and $E = 6$ when $m = 5$, express E in terms of G .
Diberi $E \propto G$ dengan keadaan $G = 2m - 1$ dan $E = 6$ apabila $m = 5$, ungkapkan E dalam sebutan G .

- A** $E = 9G$
B $E = \frac{G}{9}$
C $E = \frac{2}{3}G$
D $E = \frac{3}{2}G$

- 38** Table 1 shows some values of the variables p , q and r such that p varies directly as q and inversely as the square root of r .
Jadual 1 menunjukkan sebahagian daripada pembolehubah-pembolehubah p , q dan r dengan keadaan p berubah secara langsung dengan q dan secara songsang dengan punca kuasadua r .

p	q	r
7	3	9
m	12	36

Table 1
 Jadual 1

Calculate the value of m .
 Hitung nilai m .

- A** $\frac{1}{2}$
B $\frac{7}{12}$
C 8
D 14

39 If $M - \begin{pmatrix} 2 & -3 \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} 4 & 0 \\ 2 & -1 \end{pmatrix}$, then matrix $M =$

Jika $M - \begin{pmatrix} 2 & -3 \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} 4 & 0 \\ 2 & -1 \end{pmatrix}$, maka matriks $M =$

A $\begin{pmatrix} -2 & -3 \\ -1 & 1 \end{pmatrix}$

B $\begin{pmatrix} 2 & 3 \\ 1 & -1 \end{pmatrix}$

C $\begin{pmatrix} 6 & -1 \\ 1 & -1 \end{pmatrix}$

D $\begin{pmatrix} 6 & -3 \\ 3 & -1 \end{pmatrix}$

40 $(2 \ -1) \begin{pmatrix} -3 & 5 \\ 2 & -2 \end{pmatrix} =$

A $(-11 \ 8)$

B $(-8 \ 12)$

C $\begin{pmatrix} -11 \\ 8 \end{pmatrix}$

D $\begin{pmatrix} -8 \\ 12 \end{pmatrix}$

END OF QUESTION PAPER

PERATURAN PEMARKAHAN MATEMATIK KERTAS 1 1449/1

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