Matematik
Kertas 1
Ogos 2019
1 $\frac{1}{4}$ jam

KAD PENGENALAN

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Nama Pelajar : ……

Tingkatan : …….

MAJLIS PENGETUA SEKOLAH MALAYSIA (MPSM)
CAWANGAN KELANTAN

PEPERIKSAAN PERCUBAAN SPM 2019

MATEMATIK
KERTAS 1

Masa : Satu Jam Lima Belas Minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

Arahan

1. Kertas soalan ini adalah dalam dwibahasa
2. Jawab semua soalan.

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

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

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

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

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

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

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

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

SHAPES AND SPACE
BENTUK DAN RUANG

1 Area of trapezium $= \frac{1}{2} \times$ sum of parallel sides $\times$ height

Luas trapezium $= \frac{1}{2} \times$ *hasil tambah dua sisi selari* $\times$ *tinggi*

2 Circumference of circle $= \pi d = 2\pi r$
Lilitan bulatan $= \pi d = 2\pi j$

3 Area of circle $= \pi r^2$
Luas bulatan $= \pi j^2$

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 $= \frac{1}{3} \times$ base area $\times$ height

Isipadu piramid tegak $= \frac{1}{3} \times$ *luas tapak* $\times$ *tinggi*

11 Sum of interior angles of a polygon
Hasil tambah sudut pedalaman poligon
$= (n-2) \times 180°$

Answer **all** questions
*Jawab **semua** soalan*

1. Round off 0.007207 correct to three significant figures.
Bundarkan 0.007207 betul kepada tiga angka bererti.

A 0.007
B 0.00721
C 0.00720
D 0.0072

2. The mass of an atom X is 2.7×10^{-23} g. Find the mass, in gram, of 6×10^{18} atoms X.
Jisim untuk satu atom X ialah 2.7×10^{-23} g. Hitungkan jisim, dalam gram, bagi 6 juta atom X.

A 1.62×10^{16}
B 1.62×10^{-16}
C 4.5×10^{-30}
D 1.62×10^{6}

3. $\dfrac{4.74 \times 10^{-3}}{(2 \times 10^{-4})^2}$

A 1.499×10^{4}
B 1.498×10^{5}
C 1.185×10^{4}
D 1.185×10^{5}

4. In Diagram 1, ABCDEF is a prism with a cross section of ABC.

Dalam Rajah 1, ABCDEF ialah prisma dengan keratan rentas ABC.

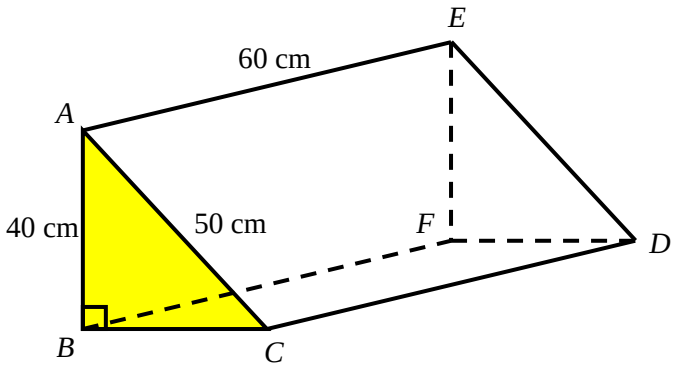


Diagram 1 / Rajah1

Calculate the volume of prism ABCDEF in cm^3

Hitungkan isipadu prisma ABCDEF dalam cm^3.

A $3{\cdot}6 \times 10^4$

B $4{\cdot}5 \times 10^4$

C $6{\cdot}0 \times 10^4$

D $7{\cdot}2 \times 10^4$

5. $100101_2 - 11010_2 =$

A 1011_2

B 10011_2

C 11011_2

D 11101_2

6. Given $227_8 = 5^m + 5^n + 1$, find the value of *m* and *n*

Diberi $227_8 = 5^m + 5^n + 1$, *Cari nilai m dan n*

A $m = 1, n = 3$

B $m = 3, n = 2$

C $m = 2, n = 3$

D $m = 3, n = 1$

7. In Diagram 2, *PQRST* is a regular pentagon. *TUV* and *PRV* are straight lines.
Dalam Rajah 2, PQRST ialah sebuah pentagon sekata. TUV dan PRV adalah garis lurus.

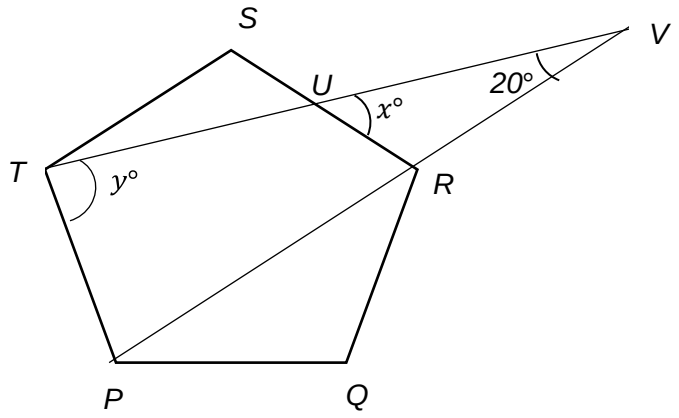


Diagram 2 / Rajah 2

The value of $y - x$ =
Nilai $y - x$ =

A 88
B 140
C 52
D 36

8. In Diagram 3, PQ = PT, QT = TS and RS = RQ. The TS line is parallel to the straight line QR.
Dalam Rajah 3, PQ = PT , QT = TS dan RS = RQ. Garis lurus TS adalah selari dengan garis lurus QR.

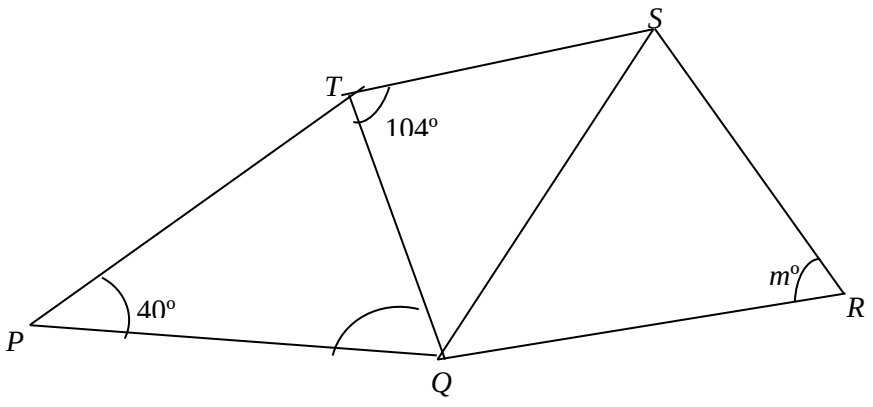


Diagram 3 / Rajah 3

Find the value of m.

Hitung nilai m.

A 70

B 104

C 76

D 142

9. In Diagram 4 , *PQR* is a tangent to the circle at *Q*.

Dalam Rajah 4 , PQR ialah tangen kepada bulatan pada Q.

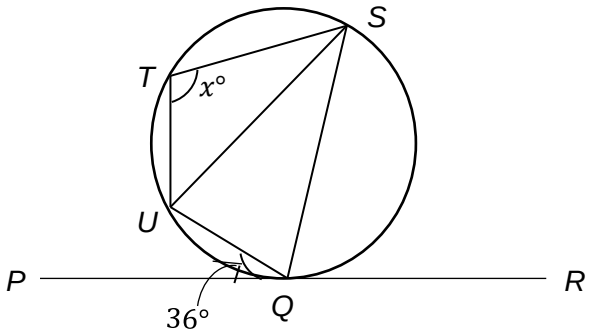


Diagram 4 / Rajah 4

Given that *SU* = *SQ*, find the value of x.

Diberi SU = SQ, cari nilai x.

A 72

B 90

C 108

D 115

10. Under an enlargement, the area of an object 2π cm^2 and the area of its image is 50π cm^2. Find the scale factor of the enlargement.

Di bawah suatu pembesaran, luas suatu objek ialah 2π cm^2 dan luas imejnya ialah 50π cm^2. Cari faktor skala pembesaran itu.

A 5

B 25

C $\frac{1}{5}$

D $\frac{1}{25}$

11. Diagram 5 shows five points plotted on a Cartesian plane.

Rajah 5 menunjukkan lima titik diplot di atas satah Cartesan.

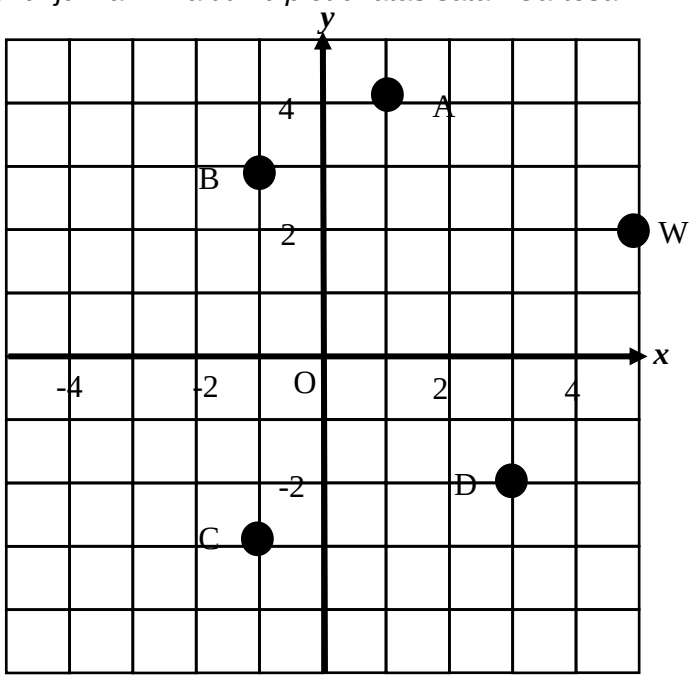


Diagram 5 / Rajah 5

Which of the point A, B, C or D, is image of point W under an anticlockwise rotation of 90º about the centre (2,1)?

Antara titik A, B, C dan D, yang manakah merupakan imej bagi titik W di bawah suatu putaran 90° lawan arah jam pada pusat (2,1)?

12. Given $\tan x = -\frac{5}{12}$ and $180° \leq x \leq 360°$. Find the sin x value.

Diberi $\tan x = -\frac{5}{12}$ dan $180° \leq x \leq 360°$. Cari nilai sin x.

A $-\frac{12}{13}$

B $\frac{5}{13}$

C $\frac{12}{13}$

D $-\frac{5}{13}$

13. Diagram 6 shows a pyramid with a horizontal rectangular base *PQRS*. Vertex T is vertically above P.

Rajah 6 menunjukkan sebuah piramid dengan tapak mengufuk segi empat tepat PQRS. Bucu T berada tegak di atas P.

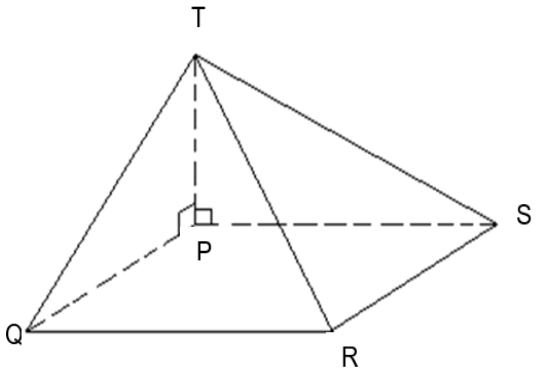


Diagram 6 / Rajah 6

Name the angle between the plane *PTQ* and the plane *PTS.*

Namakan sudut di antara satah P*TQ* dengan satah P*TS.*

A $\angle TQP$

B $\angle QTP$

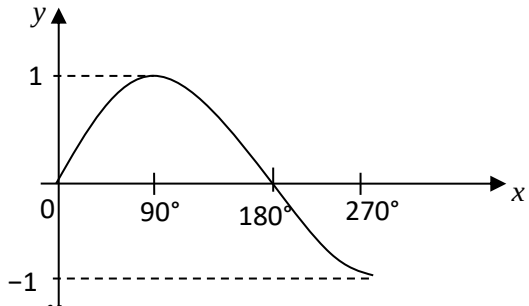
C $\angle QPT$

D $\angle QPS$

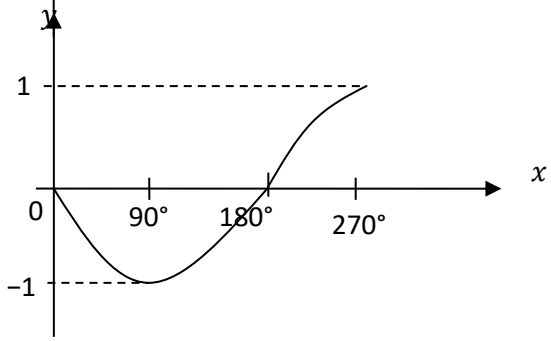
14. Which of the following represents the graph of y = sin x ° of $0° \le x \le 270°$?

Antara yang berikut, yang manakah mewakili graf y = sin x° bagi $0° \le x \le 270°$ *?*

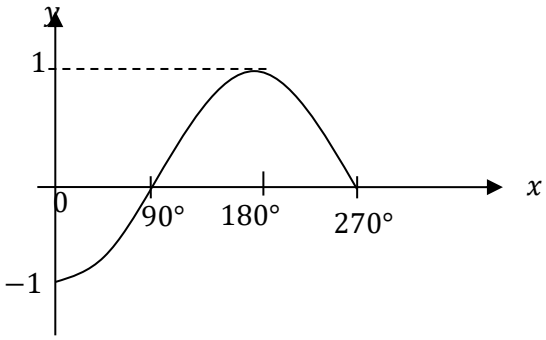
A



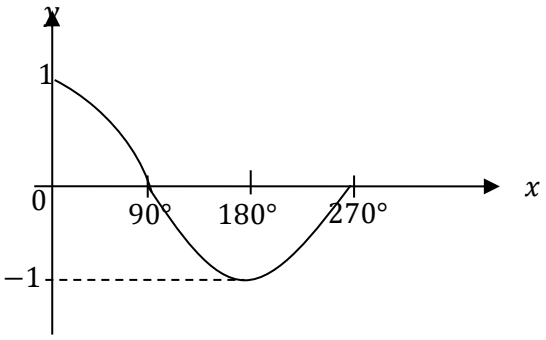
B



C



D



15.

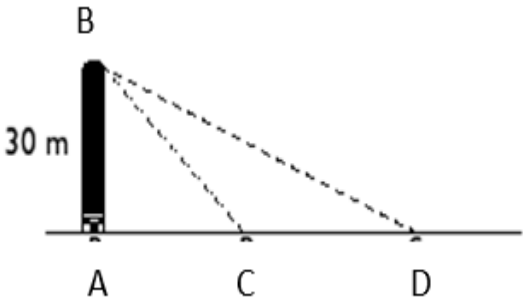


Diagram 7 / Rajah 7

Diagram 7 shows a building AB. The points A, C and D lie on a horizontal plane. C is the midpoint of AD. The angle of elevation of B from D is 30°.
Find the angle of depression of C from B.
Rajah 7 menunjukkan sebuah bangunan AB. Titik A, C dan D terletak di atas satah mengufuk. C ialah titik tengah bagi AD. Sudut dongakan B dari D ialah 30°.
Cari sudut tunduk C dari B.

A 32°12'

B 40°55'

C 49°5'

D 65°26'

16. Diagram 8 is the 'flying fox' cable, QS for delivering goods and landing place between two building blocks. The building worker has set the bow angle of landing from the top of the transmission terminal is 65º.

Rajah 8 ialah kabel 'flying fox', QS bagi menghantar barang dan tempat mendarat yang terdapat di antara dua blok bangunan. Pekerja bangunan telah menetapkan sudut tunduk tempat mendarat dari puncak terminal penghantaran ialah 65°.

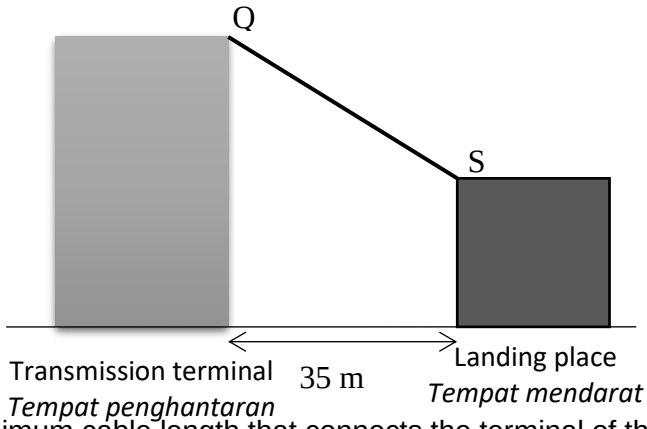


Diagram 8 / Rajah 8

Find the minimum cable length that connects the terminal of the transmission terminal to the landing place, in m.

Cari panjang minimum kabel yang menghubungkan puncak terminal penghantaran dengan tempat mendarat, dalam m.

A 35

B 73.8

C 82.8

D 75.1

17. Diagram 9 shows three points F, G and H, on a horizontal plane. H lies due north of G and bearing of F from H is 210º.

Rajah 9 menunjukkan tiga titik, F, G dan H yang terletak pada suatu satah mengufuk. H berada ke utara G dan bearing F dari H ialah 210º.

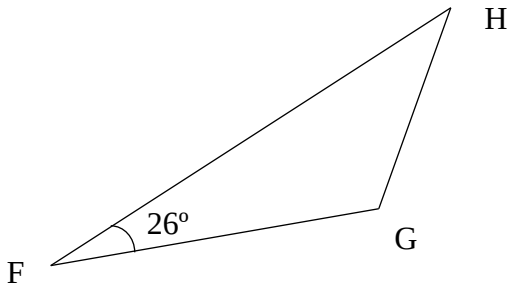


Diagram 9 / Rajah 9

Find the bearing of F from G.

Cari bearing F dari G.

A 056º

B 124º

C 210º

D 236º

18. $X(70°N, 110°W)$ and Y are two points on the earth's surface such that XY is the diameter of the parallel of latitude $70°N$. Calculate the shortest distance, in nautical mile, between X and Y.

$X(70°U, 110°S)$ *dan* Y *ialah dua titik pada permukaan bumi dengan keadaan* XY *ialah diameter selarian latitud* $70°U$. *Hitung jarak terpendek, dalam batu nautika, di antara* X *dan* Y.

A 2 400

B 3 694

C 8 400

D 10 800

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

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

A $\frac{2-3(m-1)}{m(m-1)}$

B $\frac{-1-4m}{m(m-1)}$

C $\frac{5+3m}{m(m-1)}$

D $\frac{5-3m}{m(m-1)}$

20. Simplify:

Ringkaskan:

$$\frac{x}{y^3(x+2y)} \times (2y^2 + xy)$$

A $\frac{x}{y}$

B $\frac{x}{y^2}$

C $\frac{2x}{y^3}$

D $\frac{2x}{y^4}$

21. Given $(\sqrt{w} - 3) = v - 2\sqrt{w},$ then w =

Diberi $(\sqrt{w} - 3) = v - 2\sqrt{w},$ *maka* w =

A $\frac{v^2+9}{9}$ C $\frac{v^2+6}{6}$

B $\left(\frac{v-3}{3}\right)^2$ D $\left(\frac{v+3}{3}\right)^2$

. 22. Given $\frac{2(t-2)}{2}+1=\frac{3t}{4}$, calculate the value of t.
Diberi $\frac{2(t-2)}{2}+1=\frac{3t}{4}$, hitung nilai t

A 1 B 3

C 2 D 4

23. Given $18^{\frac{3}{4}}=\sqrt[m]{18^n}$, state the value of m and n.

Diberi $18^{\frac{3}{4}}=\sqrt[m]{18^n}$ *, nyatakan nilai m dan nilai n.*

A $m=4$, $n=3$

B $m=3$, $n=4$

C $m=4$, $n=\frac{1}{3}$

D $m=3$, $n=\frac{1}{4}$

24. Simplify $\left(\frac{3^4\times5^{\frac{1}{2}}}{15^3}\right)^2$

Ringkaskan $\left(\frac{3^4\times5^{\frac{1}{2}}}{15^3}\right)^2$

A $3^1 \times 5^{-4}$

B $3^4 \times 5^{-3}$

C $3^2 \times 5^{-5}$

D $3^{16} \times 5^{-2}$

25. Diagram 10 shows a rectangle KLMN.
Rajah 10 menunjukkan sebuah segi empat tepat KLMN.

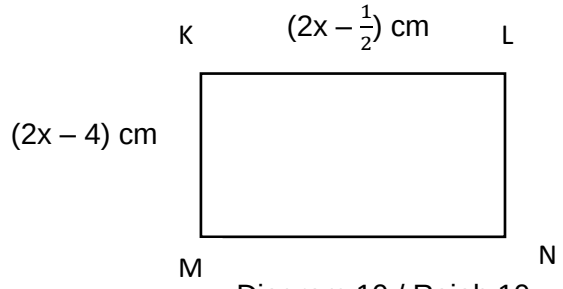


Diagram 10 / Rajah 10

Given that the perimeter of KLMN is more than 17 cm, then the solution for x is
Diberi bahawa perimeter KLMN adalah lebih daripada 17 cm, maka penyelesaian bagi x ialah

A $x > 2$
B $x \geq 2$
C $x > 4$
D $x \geq 4$

26. Given $-3 < 9 - 3y < 4$, then the smallest possible integer of y is
Diberi $-3 < 9 - 3y < 4$, maka integer terkecil yang mungkin bagi y ialah

A 1
B 2
C 3
D 4

27. Table 1 shows the frequency distribution of weight, in kg, of 38 students from form 4 Sains.
Jadual 1 menunjukkan taburan kekerapan jisim, dalam kg, 38 *orang pelajar dari tingkatan 4 Sains.*

Length (cm) ***Panjang* (cm)**	**Frequency** ***Kekerapan***
30 – 34	4
35 – 39	9
40 – 44	13
45 – 49	12

Table 1/*Jadual 1*

Calculate the midpoint of the modal class.
Hitung titik tengah kelas mod.

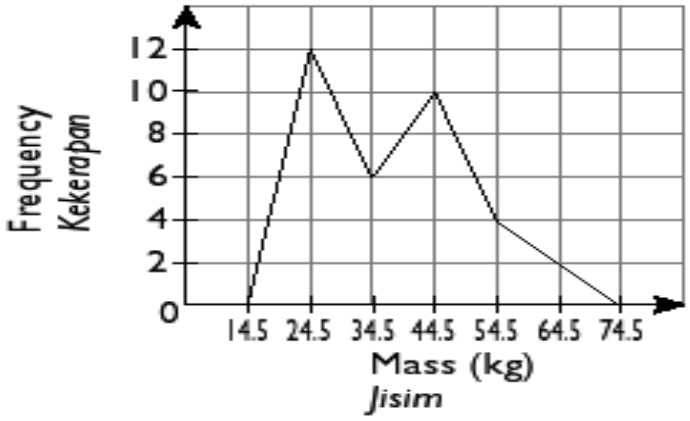
A 32

B 37

C 42

D 47

28.



Based on the frequency polygon, state the means of class.

Berdasarkan poligon kekerapan di atas, cari min bagi data di atas.

A 36.38

B 38.03

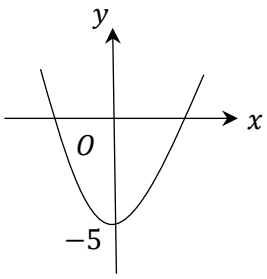
C 40.41

D 39.23

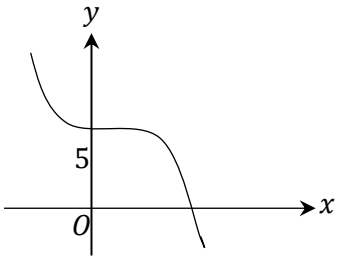
29. Which graph represents $y = x^3 + 5$

Graf manakah yang mewakili $y = x^3 + 5$

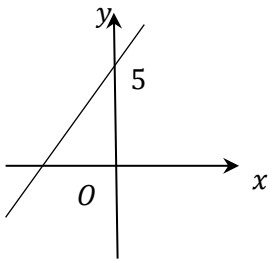
A



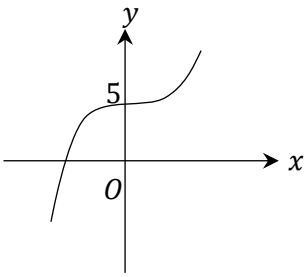
C



B



D



30. Diagram 11 shows a Venn diagram with the universal set ξ = L ∪ M ∪ N.

Rajah 11 menunjukkan gambar rajah Venn dengan set semesta ξ = $L \cup M \cup N$.

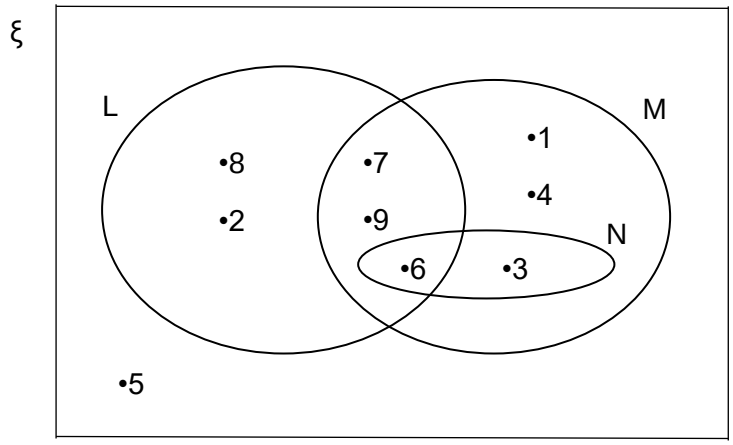


Diagram 11 / Rajah 11

List all the elements of set N'.

Senaraikan semua unsur set N'.

A {3, 6}

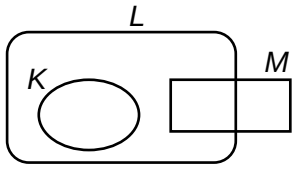
B {1, 4, 7, 9}

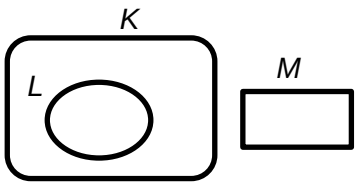
C {1, 2, 4, 5, 7, 8, 9}

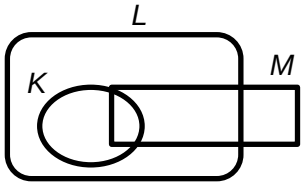
D {1, 2, 4, 7, 8, 9}

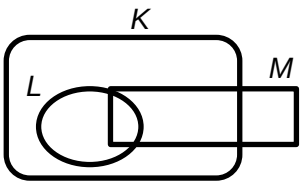
31. Given the universal set $\xi = K \cup L \cup M$, which of the following Venn Diagram represents $K \subset L$, $L \cap M \neq \emptyset$ and $K \cap M = \emptyset$.

Diberi set semesta $\xi = K \cup L \cup M$, yang manakah Gambarajah Venn yang mewakili $K \subset L$, $L \cap M \neq \emptyset$ and $K \cap M = \emptyset$.

A 

C 

B 

D 

32. Which of the following pairs are parallel lines.

Antara berikut yang manakah pasangan garis lurus selari.

A $2x + y = 1$ and $y + 2x = -5$
$2x + y = 1$ *dan* $y + 2x = -5$

B $y = 3x$ and $y + 3x = 11$
$y = 3x$ *dan* $y + 3x = 11$

C $y = -2x + 9$ and $-2y + 4x = 0$
$y = -2x + 9$ *dan* $-2y + 4x = 0$

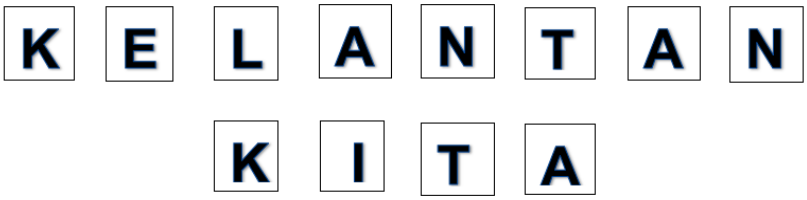
D $x = 5y - 10$ and $5x = y + 10$
$x = 5y - 10$ dan $5x = y + 10$

33. An equation for a straight line is $2x + 3y = 6$. Define the gradient and y-intercept of the straight line.

Persamaan bagi suatu garis lurus ialah $2x + 3y = 6$. Tentukan kecerunan dan pintasan-y bagi garis lurus itu.

	***Gradient* / Kecerunan**	***y-intercept* / pintasan-y**
A	$-\frac{2}{3}$	6
B	$-\frac{2}{3}$	2
C	$\frac{2}{3}$	2
D	$\frac{2}{3}$	6

34.



All the above alphabet cards are put into an empty box. A card is taken out at random from the box, state the probability that the card taken out is an alphabet *K*.
Semua kad berhuruf yang ditunjukkan di atas dimasukkan ke dalam sebuah kotak kosong. Jika sekeping kad dikeluarkan secara rawak daripada kotak itu, nyatakan kebarangkalian bahawa kad yang dikeluarkan itu berhuruf K.

A $\frac{5}{6}$

B $\frac{5}{12}$

C $\frac{1}{6}$

D $\frac{7}{12}$

35. There are several balls with letters from A to R in a basket. A ball is chosen at random from the basket. Find the probability of choosing a ball that is not a consonant.
Terdapat beberapa biji bola yang bertulis dari huruf A hingga R di dalam sebuah bakul. Sebiji bola dipilih secara rawak dari bakul itu. Cari kebarangkalian memilih sebiji bola yang bukan huruf konsonan.

A $\frac{2}{9}$

B $\frac{4}{9}$

C $\frac{5}{9}$

D $\frac{7}{9}$

36. A traffic penalty survey within a week is shown in Table 2.

Satu tinjauan denda trafik dalam masa seminggu ditunjukkan dalam Jadual 2.

Types of vehicles Jenis kenderaan	Number of penalty Bilangan denda
Bus/Bas	120
Lorry/Lori	105
Car/Kereta	45
Motocycle/Motosikal	130

Table 2 / Jadual 2

Find the probability of penalty involving cars or motorcycles.

Cari kebarangkalian denda melibatkan kereta atau motosikal.

A $\frac{7}{16}$

B $\frac{9}{16}$

C $\frac{13}{40}$

D $\frac{9}{80}$

37. Table 3 shows variables p, q and r connected by an equation $p = \frac{kq}{r^2}$.

Jadual 3 menunjukkan pembolehubah p, q dan r yang dihubungkan dengan persamaan $p = \frac{kq}{r^2}$.

p	4	36
q	8	2
r	2	x

Table 3 /Jadual 3

Find the values of k and x.

Cari nilai k dan nilai x.

A $k = 1, x = \frac{1}{3}$

B $k = 1, x = 3$

C $k = 2, x = \frac{1}{3}$

D $k = 2, x = 3$

38. Given $a \propto bc$ and a = 36 when b = 2 and c = 9, calculate the value of b when a = 20 and c = $\frac{1}{2}$.

Diberi $a \propto bc$ *dan* $a = 36$ *apabila* $b = 2$ *dan* $c = 9$, *hitung nilai b apabila* $a = 20$ *dan* $c = \frac{1}{2}$.

A 10

B 20

C 30

D 40

39. Given $\begin{pmatrix}2\\x\end{pmatrix}-4\begin{pmatrix}-3\\1\end{pmatrix}=\begin{pmatrix}y\\5\end{pmatrix}$. Find the values of x and y.

Diberi $\begin{pmatrix}2\\x\end{pmatrix}-4\begin{pmatrix}-3\\1\end{pmatrix}=\begin{pmatrix}y\\5\end{pmatrix}$. *Cari nilai* x *dan* y.

A $x = 1,\ y = 14$

B $x = 5,\ y = 10$

C $x = 9,\ y = 12$

D $x = 9,\ y = 14$

40. Given $\begin{pmatrix}9&0\\-5&4\end{pmatrix}+\frac{1}{2}\begin{pmatrix}8&-10\\6&n\end{pmatrix}=\begin{pmatrix}13&-5\\-2&7\end{pmatrix}$. Find the value of n.

Diberi $\begin{pmatrix}9&0\\-5&4\end{pmatrix}+\frac{1}{2}\begin{pmatrix}8&-10\\6&n\end{pmatrix}=\begin{pmatrix}13&-5\\-2&7\end{pmatrix}$. Cari nilai *n.*

A 6

B 2

C –2

D – 6