1449/1
Matematik
Kertas 1
Ogos 2019
$1\frac{1}{4}$ jam

MODUL KECEMERLANGAN ULANGKAJI BERFOKUS SPM 2019
SET 2

MATEMATIK
Kertas 1
Satu jam lima belas minit

JANGAN BUKA MODUL INI SEHINGGA DIBERITAHU

1. *Modul ini mengandungi 40 soalan dalam dwibahasa.*
2. *Jawab semua soalan.*
3. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
4. *Satu senarai rumus disediakan di halaman 2 dan 3.*
5. *Anda dibenarkan menggunakan kalkulator saintifik.*

Modul ini mengandungi 28 halaman bercetak.

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

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

7 Distance / *Jarak* $= \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

8 Midpoint / *Titik tengah* $(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

9 Average speed $= \frac{\text{distance travelled}}{\text{time taken}}$ *Purata laju* $= \frac{\textit{jarak yang dilalui}}{\textit{masa yang diambil}}$

10 Mean $= \frac{\text{sum of data}}{\text{number of data}}$ *Min* $= \frac{\textit{hasil tambah nilai data}}{\textit{bilangan data}}$

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

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

12 Pythagoras Theorem / *Teorem Pythagoras*

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

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

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

SHAPES AND SPACE / *BENTUK DAN RUANG*

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

Luas trapezium = $\frac{1}{2}$ *x hasil tambah sisi selari x 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 permkaan sfera* = $4\pi j^2$

6 Volume of right prism = cross sectional area × length
Isipadu prisma tegak = luas keratan rentas x 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 = $\frac{1}{3}$ × base area × height

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

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

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

$$\frac{\textit{panjang lengkok}}{\textit{lilitan bulatan}} = \frac{\textit{sudut pusat}}{360^\circ}$$

13 $\frac{\text{area of sector}}{\text{Area of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$, $\frac{\textit{luas sector}}{\textit{luas bulatan}} = \frac{\textit{sudut pusat}}{360^\circ}$

14 Scale factor , $k = \frac{PA'}{PA}$, *Faktor skala,* $k = \frac{PA'}{PA}$

15 Area of image = k^2 × area of object *Luas imej* = k^2 × *luas objek*

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

1. Which of the following numbers when rounded off correct to two significant figures and three significant figures will give the same answer?
Antara nombor berikut, yang manakah apabila dibundarkan betul kepada dua angka bererti dan tiga angka bererti akan memberikan jawapan yang sama?

A 0.02759
B 0.8094
C 10 952
D 50 896

2. Express 2.78×10^{-6} as a single number.
Ungkapkan 2.78×10^{-6} *sebagai satu nombor tunggal.*

A 0.000000278
B 0.00000278
C 2 780 000
D 278 000 000

3. A metal sphere with a radius of 7 cm is melted to make ball bearings of a radius of 1 mm. Find the number of ball bearings produced.
Sebiji sfera logam yang mempunyai jejari 7 cm *dileburkan untuk membuat galas bebola dengan jejari* 1 mm.
Cari bilangan bebola yang dapat dihasilkan.

A 3.43×10^2
B 3.43×10^5
C 4.90×10^4
D 4.90×10^6

4. Given that $18 - P_2 = 5_8$, find the value of P.
Diberi bahawa $18 - P_2 = 5_8$, *cari nilai* P.

A 1100
B 1101
C 10111
D 11000

5. $101101_2 + 111_2 =$
A 101111_2
B 110100_2
C 111000_2
D 111100_2

6. In Diagram 1, *NPQRSTUV* is a regular octagon. *NVW* and *STW* are straight lines.
Dalan Rajah 1*, NPQRSTUV ialah sebuah oktagon sekata. NVW dan STW ialah garis lurus.*

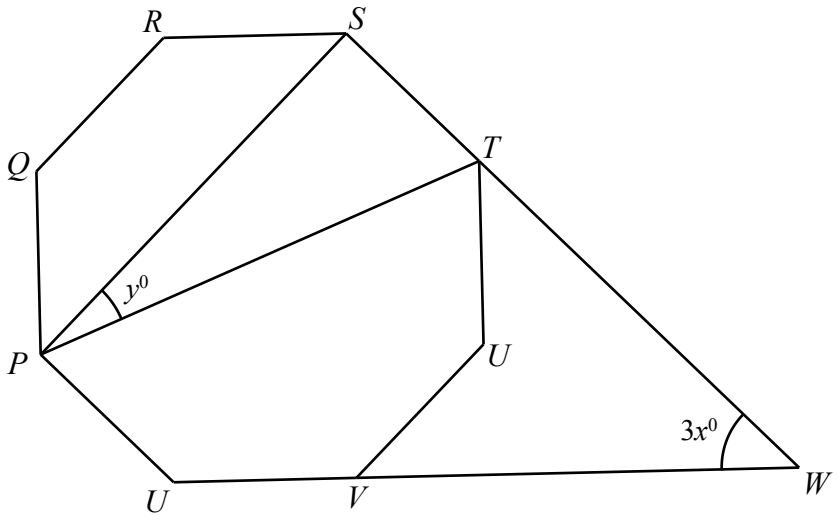


Diagram 1
Rajah 1

Find the value of $x + y$.
Cari nilai $x + y$.

A 37.5°
B 45°
C 67.5°
D 90°

7. In Diagram 2, *PRS* and *QRU* are straight lines where *RQ* = *RP*.
Dalam Rajah 2, PRS dan QRU ialah garis lurus di mana RQ = RP.

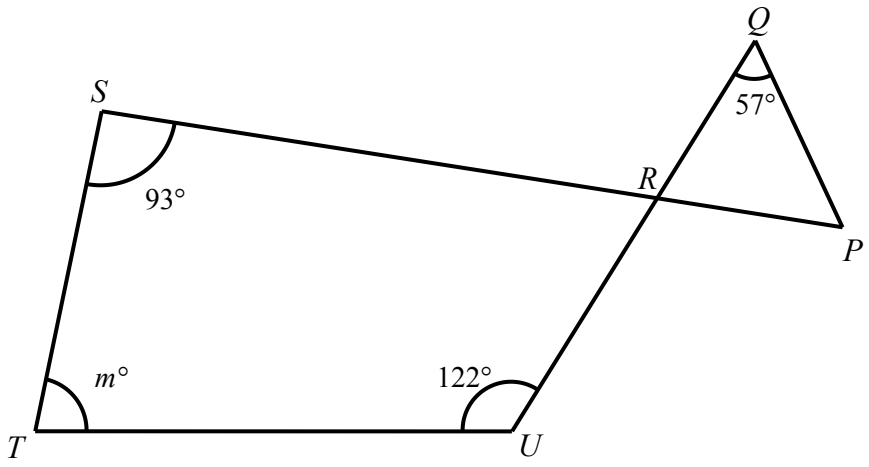


Diagram 2
Rajah 2

Find the value of *m*.
Cari nilai m.

A 66°
B 69°
C 79°
D 88°

8. Diagram 3 shows two circles with centres *P* and *S* respectively. *JKLM* is a common tangen to the circles at *K* and *L* respectively. *PQRS* is a straight line.
Rajah 3 *menunjukkan dua bulatan yang masing-masing berpusat P dan S. JKLM ialah tangen sepunya kepada bulatan-bulatan itu masing-masing di K dan L. PQRS ialah garis lurus.*

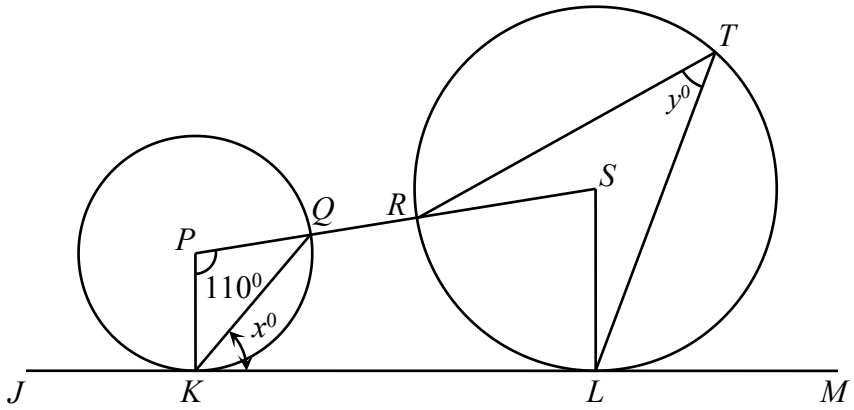


Diagram 3
Rajah 3

Find the value of $x + y$.
Cari nilai $x + y$.

A 90°
B 105°
C 100°
D 110°

9. Diagram 4 shows two triangles, *P* and *Q*, drawn on a square grid.
Rajah 4 *menunjukkan dua segi tiga, P dan Q, yang dilukis pada grid segi empat sama.*

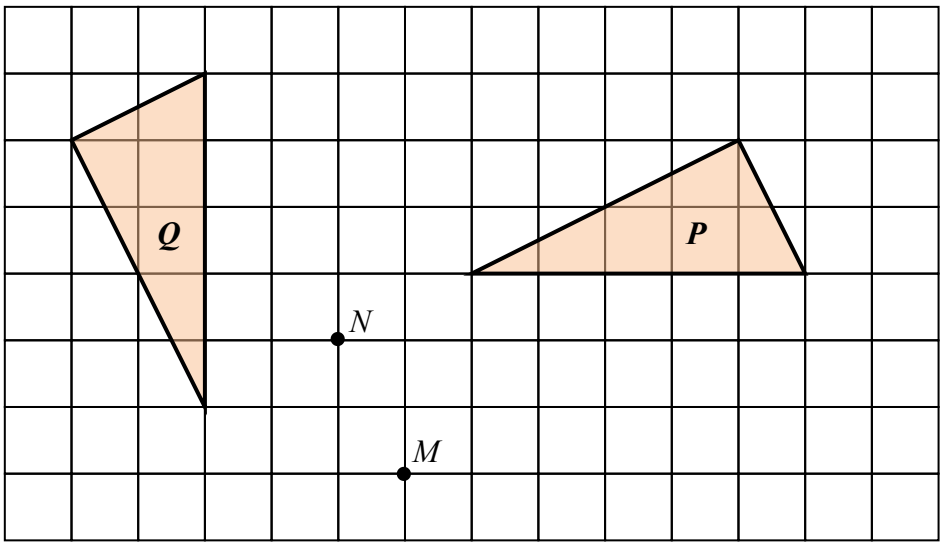


Diagram 4
Rajah 4

Q is the image of *P* under a rotation. What is the centre, direction and angle of the rotation?
Q ialah imej bagi P di bawah satu putaran. Apakah pusat, arah dan sudut bagi putaran tersebut?

	Centre ***Pusat***	**Direction** ***Arah***	**Angle** ***Sudut***
A	*M*	Clockwise *Ikut Arah jam*	90°
B	*M*	Anticlockwise *Lawan arah jam*	90°
C	*N*	Clockwise *Ikut Arah jam*	180°
D	*N*	Anticlockwise *Lawan arah jam*	180°

10. Under an enlargement, the area of an object is 64 cm² and the area of the image is 16 cm². Find the area, in cm², of another object with an area of 80 cm² under the same enlargement.
Di bawah suatu pembesaran, luas sebuah objek ialah 64 cm² *dan luas imejnya ialah* 16 cm². *Cari luas, dalam* cm², *imej bagi objek yang satu lagi dengan luasnya* 80 cm² *di bawah pembesaran yang sama.*

A 20 **B** 40

C 160 **D** 320

11. Diagram 5 shows straight lines *URS* and *PQR*. *R* is a point on *US* such that $UR = \frac{2}{5}RS$.
Rajah 5 *menunjukkan garis lurus URS dan PQR. R ialah titik pada US dengan keadaan* $UR = \frac{2}{5}RS$.

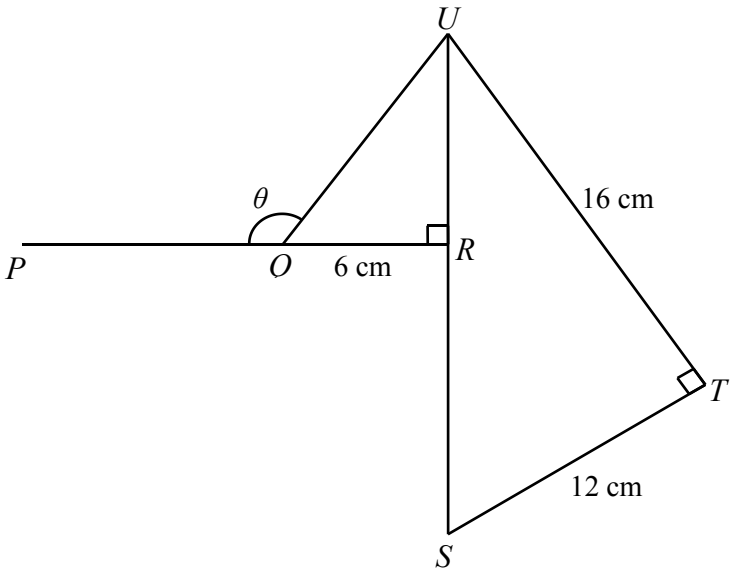


Diagram 5
Rajah 5

Calculate the value of $\cos \theta°$.
Cari nilai bagi kos $\theta°$

A $\frac{3}{5}$ **C** $-\frac{4}{3}$

B $-\frac{3}{5}$ **D** $\frac{4}{3}$

12. Diagram 6 shows the graphs of $y = \sin x$ and $y = \cos x$ for $0° \leq x \leq 360°$.

Rajah 6 menunjukkan graf $y = \sin x$ *dan* $y = \cos x$ *untuk* $0° \leq x \leq 360°$.

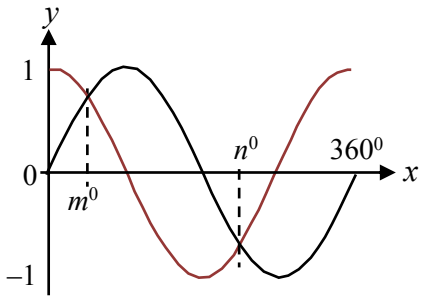


Diagram 6
Rajah 6

Find the value of $n - 2m$.

Cari nilai $n - 2m$.

A 225

B 180

C 135

D 45

13. Diagram 7 shows a prism. Points *M, N* and *K* are the midpoints of *PQ, TW* and *UV*, respectively.

Rajah 7 *menunjukkan sebuah prisma. Titik M, N dan K masing-masing ialah titik tengah bagi PQ, TW dan UV.*

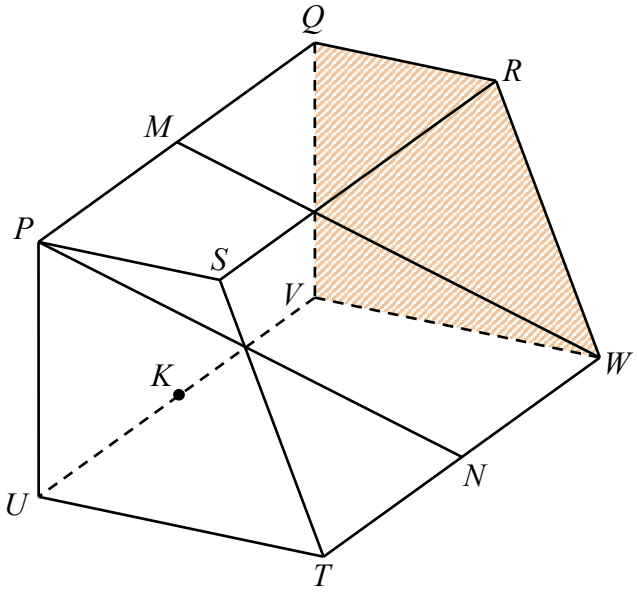


Diagram 7
Rajah 7

State the angle between plan *PMWN* and plane *UVWT* .
Nyatakan sudut antara satah PMWN dan satah UVWT .

A $\angle MWV$

B $\angle MNK$

C $\angle PNK$

D $\angle PNU$

14. Diagram 8 shows a photo frame in the shape of a regular hexagon *PQRSTU.*
Rajah 8 *menunjukkan suatu bingkai gambar yang berbentuk heksagon sekata PQRSTU.*

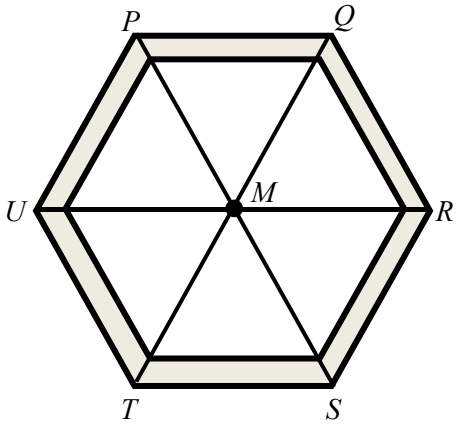


Diagram 8
Rajah 8

TS lies on a horizontal plane and point *M* is centre of the hexagon. Which of the following is the angle of depression from point *M*?
TS terletak pada satah mengufuk dan M ialah pusat heksagon itu. Antara berikut, yang manakah sudut tunduk dari titik M?

A $\angle QMR$

B $\angle UMT$

C $\angle PQM$

D $\angle MRS$

15. In the diagram 9, *PS* and *RT* are building and crane in front of Paradigm Mall on horizontal ground. The angle of elevation of *S* from *Q* is 60° and the angle of depression of *Q* from *T* is 35°.

Dalam Rajah 9, *PS dan RT ialah sebuah bangunan dan sebuah kren di hadapan Paradigm Mall pada tanah mengufuk. Sudut dongakan S dari Q ialah* 60° *dan sudut tunduk Q dari T ialah* 35°.

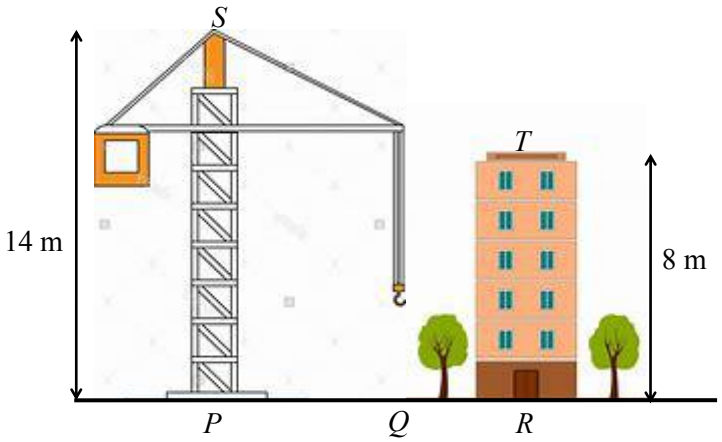


Diagram 9
Rajah 9

Find the difference in distance, in m, between *PQ* and *QR*.
Cari beza jarak, dalam m, *di antara PQ dan QR.*

A 1.61
B 3.34
C 6.19
D 18.65

16. Diagram 10 shows the position of three points *K, L,* and *M* on a flat surface such that point *L* lies due north point *K.*

Rajah 10 *menunjukkan kedudukan tiga titik K,L dan M pada permukaan yang rata dengan keadaan titik L berada ke utara titik K.*

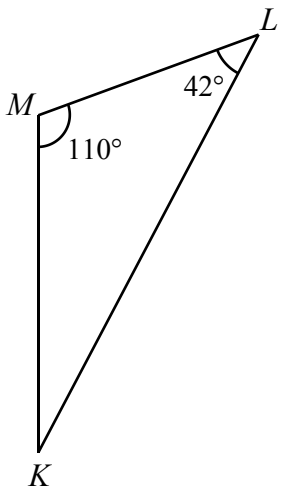


Diagram 10
Rajah 10

Find the bearing of *M* from *K*.
Cari bearing M dari K.

A 028^0
B 152^0
C 332^0
D 250^0

17. Express $\frac{9-m^2}{2m^2}\times\frac{m}{3+m}$ as a single fraction in its simplest form.

Ungkapkan $\frac{9-m^2}{2m^2}\times\frac{m}{3+m}$ *sebagai satu pecahan tunggal dalam bentuk termudah.*

A $\frac{3-m}{2m}$
B $\frac{3+m}{2m}$
C $\frac{3-m}{6m}$
D $\frac{3+m}{6m}$

18. *P* (25° S, 20° W), *Q* and *R* are three points on the earth's surface. *Q* is due north of *P*. The difference in latitude between *P* and *Q* is 40°. *R* is due east of *Q.* The difference in longitude between *Q* and *R* is 50°. Find the position of *R.*
P(25° S, 44° B), *Q dan R ialah tiga titik pada permukaan bumi. Q terletak ke utara P. Beza latitud P dan Q ialah* 40°. *R terletak ke timur Q. Beza longitud antara Q dan R ialah* 50°. *Cari kedudukan R.*

A (15° N, 30° E)
(15 ° U, 30° T)

B (15° N, 30° W)
(15 ° U, 30° B)

C (65° S, 50° E)
(65 ° S, 50° T)

D (65° S, 50° W)
(65 ° S, 50° B)

19. Simplify:
Permudahkan :

$$x(x+3)-4(x-2)(x+2)=$$

A $3x^2-3x-16$

B $3x^2-3x+16$

C $-3x^2+3x+16$

D $-3x^2+3x-16$

20. Given $3-V=\frac{2}{\sqrt{R-T}}$, the following steps are correct to express *T* in terms of *R* and *V* **except**

Diberi $3-V=\frac{2}{\sqrt{R-T}}$, *langkah berikut adalah betul untuk mengungkapkan T dalam sebutan R dan V* ***kecuali***

A $\sqrt{R-T}=\frac{2}{3-V}$

B $\left(\sqrt{R-T}\right)^2=\frac{2}{(3-V)^2}$

C $R-T=\frac{4}{(3-V)^2}$

D $T=R-\frac{4}{(3-V)^2}$

21. Diagram 11 shows the entry tickets price of Rainbow Theme Park.
Rajah 11 menunjukkan harga tiket masuk bagi Taman Tema Rainbow.

Diagram 11
Rajah 11

The total ticket price for 3 adults and 2 children is RM 64. Express the ticket price of an adult in terms of the ticket price of child.
Harga tiket untuk 3 *orang dewasa dan* 2 *orang kanak-kanak ialah* RM 64. *Ungkapkan harga tiket bagi seorang dewasa dalam sebutan harga tiket bagi seorang kanak-kanak.*

A $y = \frac{64 - 3x}{2}$

B $x = \frac{64 - 2y}{3}$

C $y = \frac{64 - 2x}{3}$

D $x = \frac{64 - 3y}{2}$

22. Given that $8^y = \frac{512}{8^{2y}}$, find the value of y.

Diberi $8^y = \frac{512}{8^{2y}}$, *cari nilai* y.

A 1

B 3

C 6

D 12

23. Find the maximum value of integer p which satisfies both the simultaneous linear inequalities $1-2p<3$ and $\frac{3p+5}{2}<8$.

Cari nilai maksimum bagi integer p yang memuaskan kedua-dua ketaksamaan linear serentak $1-2p<3$ *dan* $\frac{3p+5}{2}<8$.

A -2

B -1

C 3

D 4

24. Diagram 12 shows a number line.

Rajah 12 *menunjukkan satu garis nombor.*

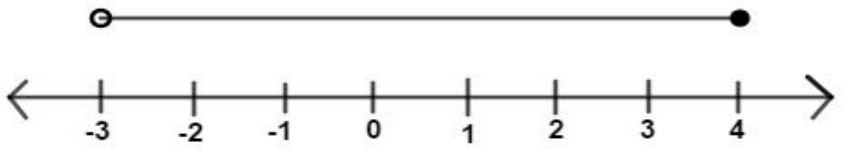


Diagram 12
Rajah 12

Which linear inequality represents number line in Diagram 12?

Ketaksamaan linear manakah yang mewakili garis nombor dalam Rajah 12?

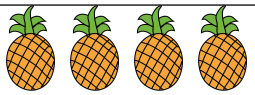
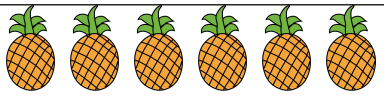
A $-3 \le x \le 4$

B $-3 \le x < 4$

C $-3 < x \le 4$

D $-3 < x < 4$

25. Diagram 13 is a pictograph which shows the sales of pineapples on Monday, Tuesday, Wednesday and Thursday. The sales for Tuesday and Thursday are not shown.
Rajah 13 *ialah sebuah piktograf yang menunjukkan jualan nanas pada hari Isnin, Selasa, Rabu dan Khamis. Jualan pada hari Selasa dan Khamis tidak ditunjukkan.*

Monday *Isnin*	
Tuesday *Selasa*	
Wednesday *Rabu*	
Thursday *Khamis*	

 Represents 20 pineapple
Mewakili 20 biji nanas

Diagram 13
Rajah 13

The ratio of the sales of pineapples on Monday, Tuesday, Wednesday and Thursday is 4 : 7 : 6 : 5. Find the total number of pineapples sold in the four days.
Nisbah jualan nanas pada hari Isnin, Selasa, Rabu dan Khamis ialah 4 : 7 : 6 : 5. Cari jumlah nanas yang dijual dalam tempoh empat hari tersebut.

A 200
B 400
C 420
D 440

26. Diagram 14 is a line graph which shows the scores of a group of students in a game.
Rajah 14 *ialah graf garis yang menunjukkan skor bagi sekumpulan murid dalam suatu permainan.*

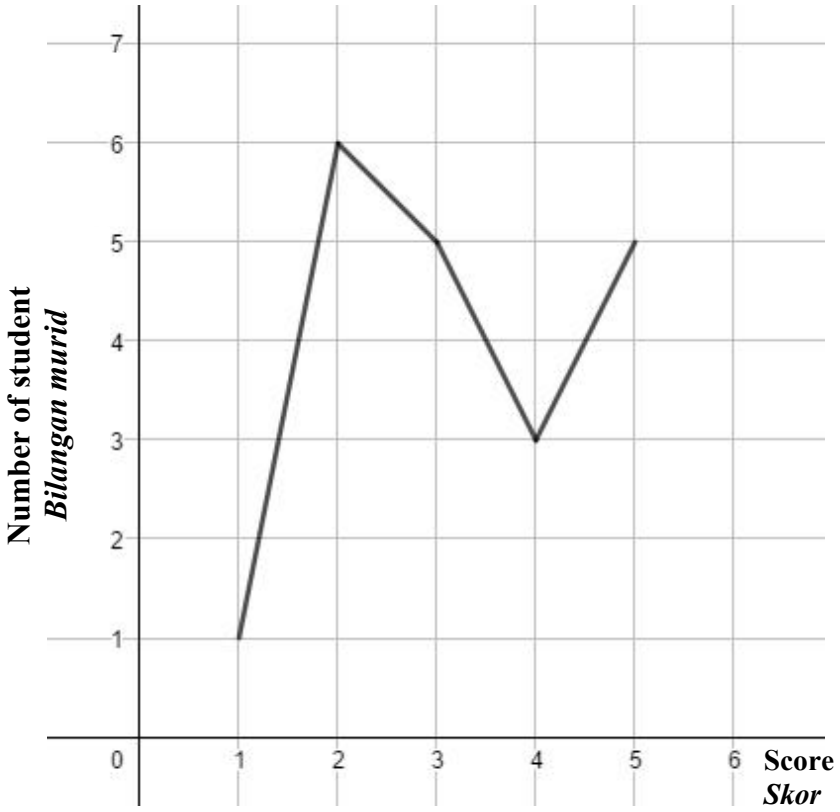


Diagram 14
Rajah 14

State the modal score.
Nyatakan skor mod.

A 1
B 2
C 5
D 6

27. Table 1 shows the scores of a group of students in a Mathematics quiz.

Jadual 1 *menunjukkan skor sekumpulan murid dalam suatu kuiz Matematik.*

Scores ***Skor***	**1 – 5**	**6 – 10**	**11 – 15**	**16 – 20**	**21 – 25**
Frequency *Kekerapan*	4	x	3	2	1

Table 1

Jadual 1

Given that the mean score is 10.5, find the value of x.

Diberi bahawa skor min ialah 10.5, *cari nilai* x.

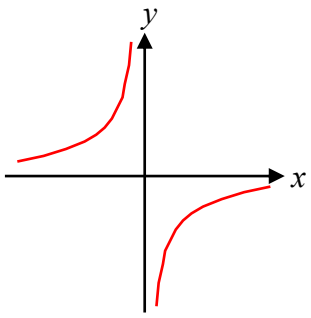
A 2 **C** 4

B 3 **D** 5

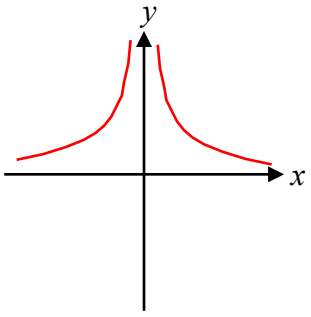
28. Which of the following graphs represents $y = \frac{x^{-1}}{2}$?

Antara graf berikut, yang manakah mewakili $y = \frac{x^{-1}}{2}$?

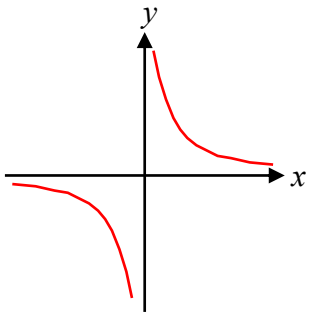
A



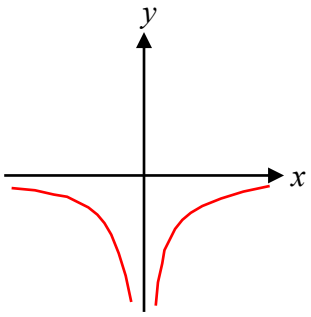
C



B



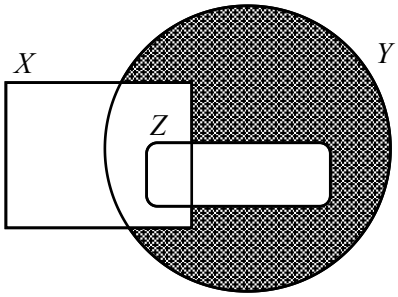
D



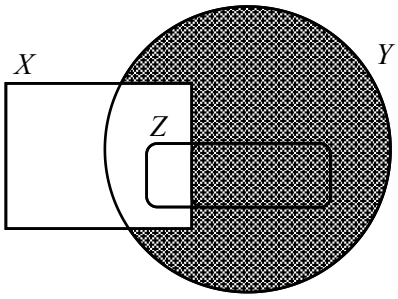
29. Given that the universal set, $\xi = X \cup Y \cup Z$. which of the following Venn diagrams represent $X' \cup Z$?

Diberi bahawa set semesta, $\xi = X \cup Y \cup Z$ *. Antara berikut, rajah Venn yang manakah mewakili* $X' \cup Z$?

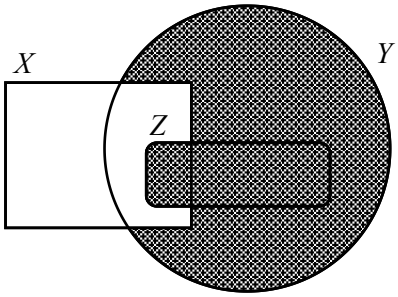
A



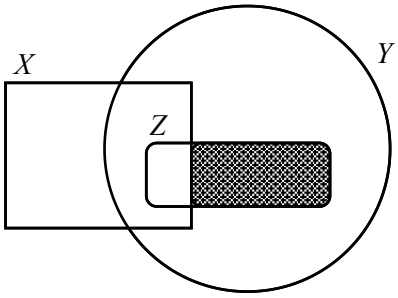
B



C

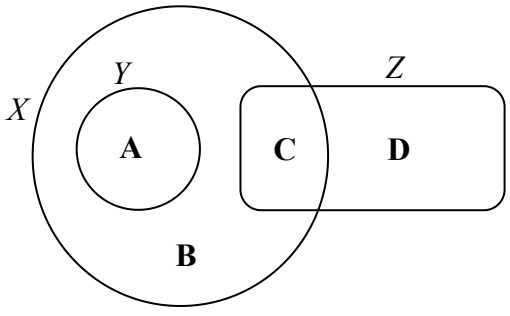


D



30. The Venn diagram shows the universal set, $\xi = X \cup Y \cup Z$.

Gambar Rajah Venn di bawah menunjukkan set semesta, $\xi = X \cup Y \cup Z$.



Which of the regions, **A, B, C** or **D,** represents the set $X \cap Y' \cap Z'$?

Antara kawasan **A, B, C** atau **D,** *yang manakah mewakili set* $X \cap Y' \cap Z'$?

31. Diagram 15 is a Venn Diagram showing the number of elements in the universal set, ξ, set *P,* set *Q* and set *R.*

Rajah 15 *ialah gambar rajah Venn yang menunjukkan bilangan unsur dalam set semesta,* ξ, *set P, set Q dan set R.*

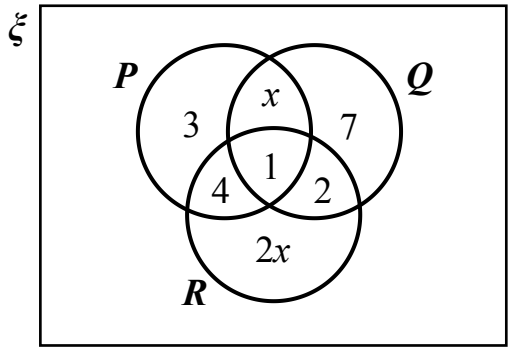


Diagram 15
Rajah 15

Given that $n(P \cup Q) = n(Q')$, find $n(\xi)$.

Diberi bahawa $n(P \cup Q) = n(Q')$, *cari* $n(\xi)$.

A 47

B 42

C 10

D 7

32. It is given that the equation of a straight line which passes through point $(0, -12)$ is $y = -3x + c$.

Find the point of intersection of the straight line and the *x*-axis.

Diberi bahawa persamaan suatu garis lurus yang melalui $(0, -12)$ *ialah* $y = -3x + c$.

Cari titik persilangan garis lurus itu dengan paksi-x.

A $(36, 0)$

B $(4, 0)$

C $(-4, 0)$

D $(-36, 0)$

33. Diagram 16 shows a parallelogram *PQRS* on a Cartesian plane.
Rajah 16 *di bawah menunjukkan segi empat selari PQRS pada satah Cartes.*

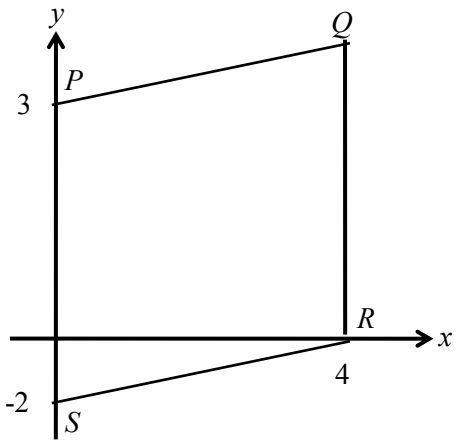


Diagram 16
Rajah 16

Fine the equation of the straight line *PQ*.
Cari persamaan garis lurus PQ.

A $y = -\frac{1}{2}x + 2$

B $y = -\frac{1}{2}x + 3$

C $y = \frac{1}{2}x + 3$

D $y = 2x + 3$

34. In Diagram 17, *JMKN* is a rectangle and *P* is the midpoint of *KJ*. Given that *LM* = 2*KL*.
Dalam Rajah 17*, JMKN ialah sebuah segi empat tepat dan P ialah titik tengah KJ. Diberi bahawa LM* = 2*KL.*

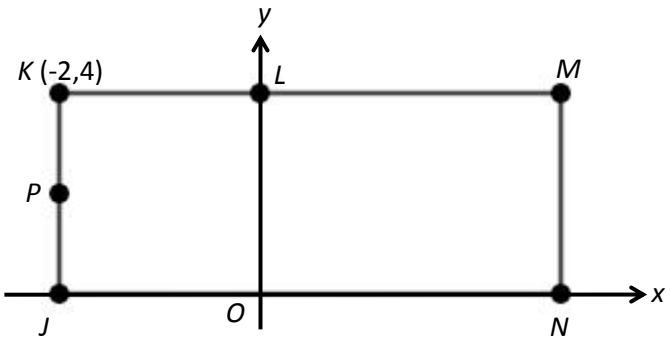


Diagram 17
Rajah 17

Find the equation of the straight line that is parallel to the straight line *JM* and passes through point *P*.
Cari persamaan garis lurus yang selari dengan garis lurus JM dan melalui titik P.

A $y = 2x + 6$

B $2y = x + 5$

C $3y = 2x + 10$

D $y = \frac{2}{3}x + 10$

35. Table 2 shows the number of students of different foreign language classes in a college.
Jadual 2 menunjukkan bilangan pelajar bagi kelas bahasa asing di sebuah kolej.

Foreign language ***Bahasa asing***	**Number of students** ***Bilangan pelajar***
French *Perancis*	30
Arabic *Arab*	60
German *Jerman*	x
Japanese *Jepun*	50

Table 2
Jadual 2

A student is chosen at random from the classes. The probability that the student is from German class is $\frac{2}{7}$. Find the total number of students who took foreign language classes.
Seorang pelajar dipilih secara rawak daripada kelas-kelas itu. Kebarangkalian bahawa pelajar itu daripada kelas bahasa Jerman ialah $\frac{2}{7}$. *Cari jumlah pelajar yang mengambil kelas bahasa asing.*

A 196
B 100
C 84
D 56

36. Diagram 18 shows an archery board. Timah shoots an arrow to the board. Calculate the probability that the arrow hits the board outside of the largest circle. (Use $\pi = \frac{22}{7}$)

Rajah 18 *menunjukkan sebuah papan memanah. Timah memanah ke arah papan itu. Hitung kebarangkalian bahawa anak panah akan mengena di bahagian luar bulatan paling besar pada papan itu.* (*Guna* $\pi = \frac{22}{7}$).

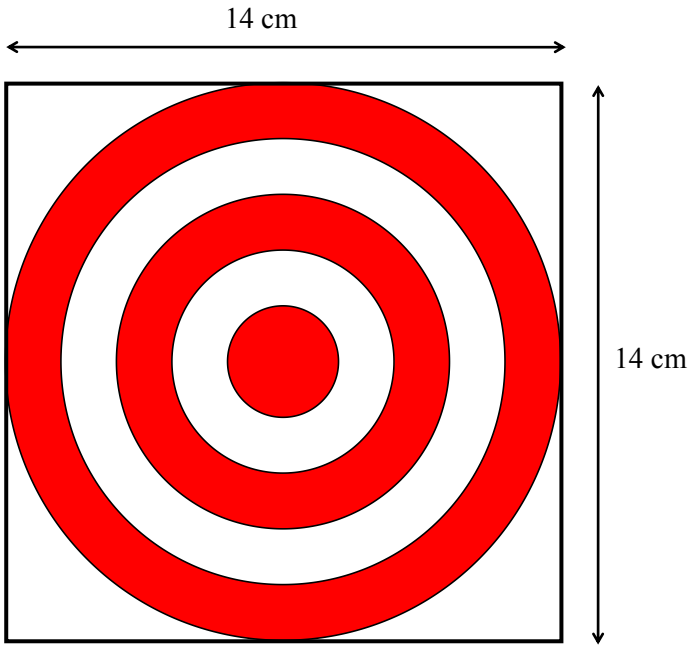


Diagram 18

Rajah 18

A $\frac{1}{7}$

B $\frac{3}{14}$

C $\frac{11}{14}$

D $\frac{13}{14}$

37. Encik Ramli wants to cover his living hall with tiles in the shape of rectangle. The number of tiles needed varies inversely as the lengths and the widths of the tiles used. 600 tiles are needed if the tiles measuring 0.2 m × 0.1 m are used. At the end, only 200 tiles are used for the living hall.
Which of the following could be the measurements of the tiles used?
Encik Ramli ingin memasang lantai ruang tamunya dengan jubin yang berbentuk segi empat tepat. Bilangan jubin yang diperlukan berubah secara songsang dengan panjang dan lebar jubin yang digunakan. 600 *keping jubin diperlukan jika jubin yang berukuran* 0.2 m × 0.1 m *digunakan. Akhirnya, hanya* 200 *keping jubin digunakan untuk ruang tamu itu.*
Antara berikut, yang manakah ukuran jubin yang mungkin digunakan?

A 0.3 m × 0.1 m
B 0.3 m × 0.2 m
C 0.4 m × 0.2 m
D 0.4 m × 0.3 m

38. Table 3 shows some values of the variables x and y which satisfies $y \propto \frac{1}{x}$.

Jadual 3 *menunjukkan beberapa nilai bagi pemboleh ubah x dan y yang memuaskan* $y \propto \frac{1}{x}$.

x	1	6	9	21
y	3	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{7}$

Table 3
Jadual 3

Find the relation between x and y.
Cari hubungan antara x dan y.

A $3xy = 1$
B $xy = 3$
C $x = 3y$
D $y = 3x$

39. It is given that $3Q+\begin{pmatrix}2 & 4\\ 6 & -3\end{pmatrix}=\begin{pmatrix}8 & 10\\ 6 & 12\end{pmatrix}$, find matrix Q.

Diberi bahawa $3Q+\begin{pmatrix}2 & 4\\ 6 & -3\end{pmatrix}=\begin{pmatrix}8 & 10\\ 6 & 12\end{pmatrix}$, *cari matriks* Q.

Find the value of *u.*

Cari nilai u.

A $\begin{pmatrix}2 & 2\\ 0 & 5\end{pmatrix}$

B $\begin{pmatrix}6 & 6\\ 0 & 9\end{pmatrix}$

C $\begin{pmatrix}6 & 6\\ 0 & 15\end{pmatrix}$

D $\begin{pmatrix}10 & 14\\ 12 & 9\end{pmatrix}$

40. Given that matrik $M=\begin{pmatrix}4 & -4\\ t & 5\end{pmatrix}$. If matrix *M* does not have inverse matrix, determine the value of *t.*

Diberi matriks $M=\begin{pmatrix}4 & -4\\ t & 5\end{pmatrix}$. *Jika matriks M tidak mempunyai matriks songsang, tentukan nilai t.*

A -5

B -4

C 4

D 5

QUESTION PAPER END

KERTAS SOALAN TAMAT