1449/1
Matematik
Kertas 1
Sept 2020
$1\frac{1}{4}$ jam

MODUL ULANGKAJI KECEMERLANGAN BERFOKUS SPM 2020
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.*

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.
Rumus-rumus berikut boleh membantu anda menjaab 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 = $\frac{1}{2}$ × *hasil tambah sisi selari* × *tinggi*

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

3 Area of circle = πr^2 *Luas bulatan* = πj^2

4 Curved surface area of cylinder = $2\pi rh$ *Luas permukaan melengkung silinder* = $2\pi jt$

5 Surface area of sphere = $4\pi r^2$ *Luas permukaan sfera* = $4\pi j^2$

6 Volume of right prism = cross sectional area × 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 $$\frac{\text{arc length}}{\text{circumference of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$

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

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

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

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

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

1. Express 5 130 000 in standard form.
Ungkapkan 5 130 000 *dalam bentuk piawai.*

A 5.13×10^{-6}
B 5.13×10^{-7}
C 5.13×10^{6}
D 5.13×10^{7}

2. Round off 78 950 to three significant figures.
Bundarkan 78 950 *kepada tiga angka bererti.*

A 78 000
B 79 900
C 78 900
D 79 000

3. Given that the speed of light is 3×10^{5} km s^{-1} , find the distance, in km, travelled by light in 22 minutes. Express the answer in standard form.
Diberi bahawa laju cahaya ialah 3×10^{5} km s^{-1} , *cari jarak, dalam* km, *yang dilalui oleh cahaya dalam masa* 22 *minit. Nyatakan jawapan dalam bentuk piawai.*

A 3.96×10^{6}
B 3.96×10^{8}
C 3.96×10^{9}
D 39.6×10^{9}

4. The diameter of the moon is 12 742 km. Calculate the surface area of the moon, in km^2.
Diameter bulan ialah 12 742 km. *Hitung luas permukaan bulan, dalam* km^2.
(Use/*Guna* $\pi = 3.142$)

A 8.007×10^{4}
B 5.101×10^{8}
C 4.00×10^{4}
D 1.083×10^{12}

5. Find the value of p for $4 \times 5^4 + 3 \times 5^3 + 5p = 43040_5$
Cari nilai p bagi $4 \times 5^4 + 3 \times 5^3 + 5p = 43040_5$

A 0
B 1
C 4
D 5

6. State 1100011110101_2 as a number in base 8.
Nyatakan 1100011110101_2 *sebagai satu nombor dalam asas* 8.

A 13456_8
B 4356_8
C 3465_8
D 14365_8

7. In Diagram 1, *PQRSTU* is a hexagon.
Dalam Rajah 1, *PQRSTU adalah heksagon.*

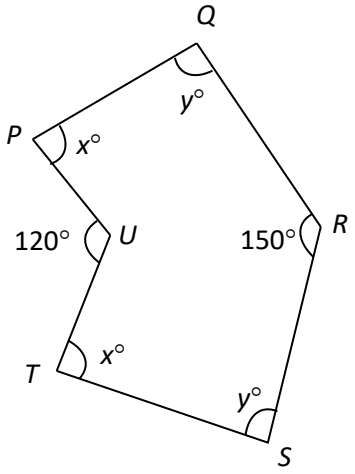

Diagram 1
Rajah 1

Calculate the value of $x + y$
Hitung nilai bagi $x + y$

A 135
B 165
C 195
D 225

8. In Diagram 2, *PQRTX* is a pentagon which is symmetrical about the straight line *QWV*. *TWX* and *RTV* are a straight line. *SRVU* is a part of a regular hexagon.
Dalam Rajah 2, *PQRTX ialah pentagon bersimetri pada garis lurus QWV. TWX dan RTV ialah garis lurus. SRVU ialah sebahagian heksagon sekata.*

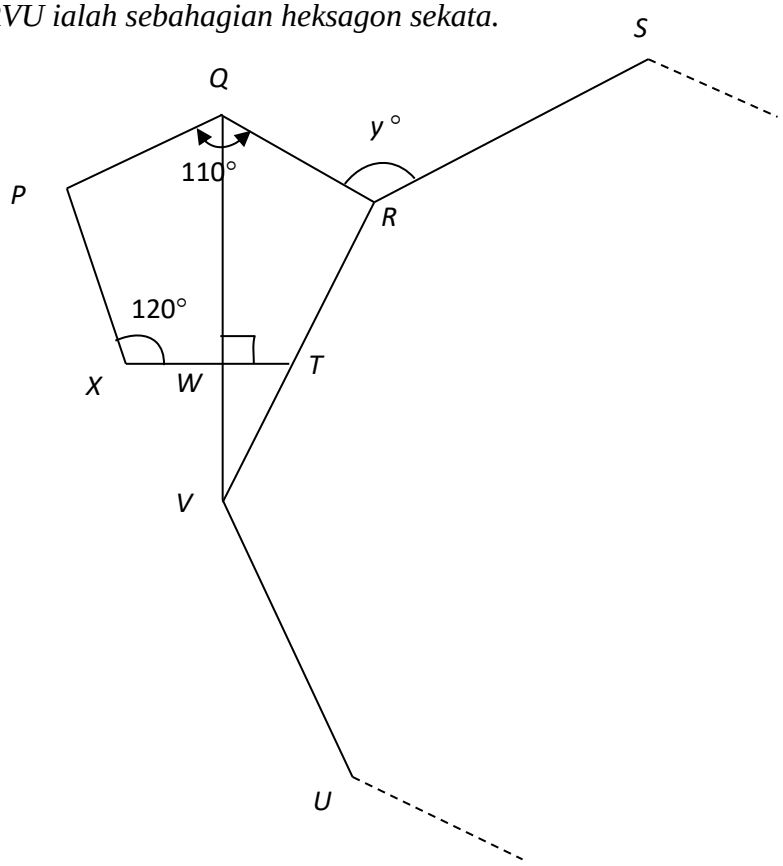

Diagram 2
Rajah 2

Calculate the value of *y*.
Hitung nilai bagi y.

A 130
B 132
C 144
D 145

9. Diagram 3, shows a circle, *PFQ* with centre, *O*. *EFG* is a tangent to the circle at *F*.
Rajah 3, *menunjukkan sebuah bulatan, PFQ berpusat, O. EFG ialah tangen kepada bulatan pada F.*

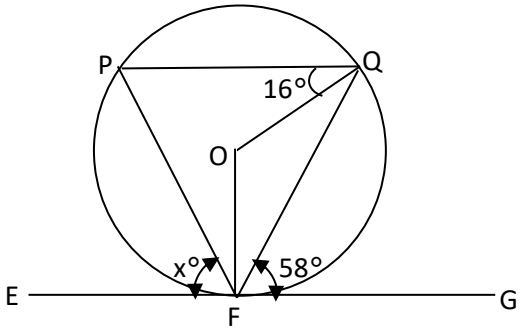

Diagram 3
Rajah 3

Find the value of *x.*
Hitung nilai x.

A 32
B 48
C 61
D 74

10. In the Diagram 4, *G* is the image of *H* under a translation $\begin{pmatrix} h \\ k \end{pmatrix}$. The distance of *GH* is 13 units.
Dalam Rajah 4, *G ialah imej kepada H di bawah translasi* $\begin{pmatrix} h \\ k \end{pmatrix}$. *Jarak antara GH ialah 13 unit.*

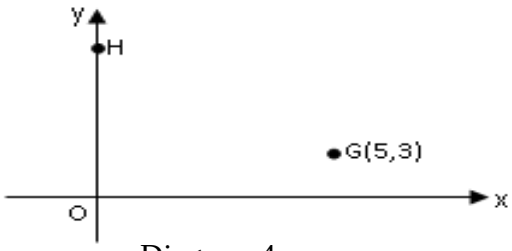

Diagram 4
Rajah 4

State translation $\begin{pmatrix} h \\ k \end{pmatrix}$.
Nyatakan translasi $\begin{pmatrix} h \\ k \end{pmatrix}$.

A $\begin{pmatrix} -5 \\ 13 \end{pmatrix}$
B $\begin{pmatrix} -5 \\ -3 \end{pmatrix}$
C $\begin{pmatrix} 5 \\ -12 \end{pmatrix}$
D $\begin{pmatrix} -12 \\ 5 \end{pmatrix}$

11. Diagram 5 shows two polygons, *PQRST* and *UVWXY*, drawn on square grids. *UVWXY* is the image of PQRST under an enlargement.
Rajah 5 *menunjukkan dua poligon, PQRST dan UVWXY, dilukis di atas grid segi empat sama. UVWXY ialah imej kepada PQRST di bawah satu pembesaran.*

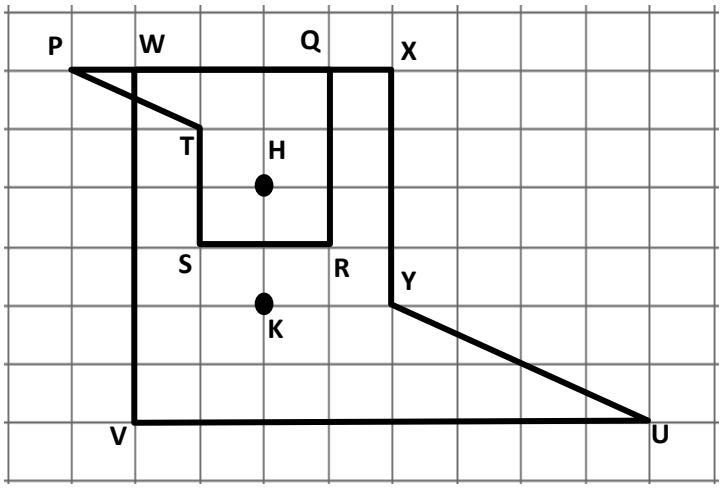

Diagram 5
Rajah 5

Which of the following is true?
Yang manakah antara berikut adalah benar?

	Centre of Enlargement *Pusat Pembesaran*	Scale Factor *Faktor skala*
A	H	2
B	H	- 2
C	K	2
D	K	- 2

12. Diagram 6 shows a right angled triangle *PQR*.
Rajah 6 *menunjukkan segi tiga bersudut tegak PQR.*

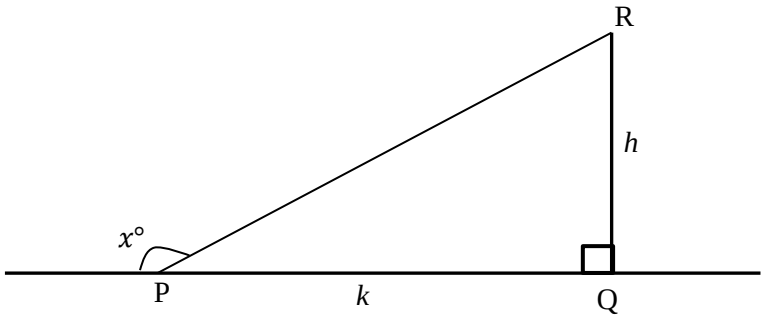

Diagram 6
Rajah 6

Given $\sin x^o = \frac{1}{2}$, find the value of *h*.
Diberi $\sin x^o = \frac{1}{2}$ *, cari nilai h.*

A $\frac{k}{\tan 30^o}$
B $k \tan 30°$
C $\frac{k}{\cos 60^o}$
D $k \cos 60°$

13. Given $\cos x° = -0.8910$ and $0° \leq x° \leq 360°$, find the values of *x*.
Diberi kos $x° = -0.8910$ *dan* $0° \leq x° \leq 360°$, *cari nilai x.*

A $117°, 243°$
B $117°, 297°$
C $153°, 207°$
D $153°, 333°$

14. Diagram 7 shows the Ferris wheel in regular octagon shaped with sides of length 10 m. When the Ferris wheel stop, Aiman is exactly 90° above the center of the Ferris wheel. Adam who was in cabin *R* was watching his brother Aiman in cabin *Q*.
Rajah 7 *menunjukkan roda Ferris berbentuk oktagon sekata dengan panjang sisi* 10 m. *Ketika roda Ferris berhenti, Aiman berada tepat* 90° *di atas pusat roda Ferris. Adam yang berada di kabin R sedang memerhatikan abangnya Aiman yang berada di kabin Q.*

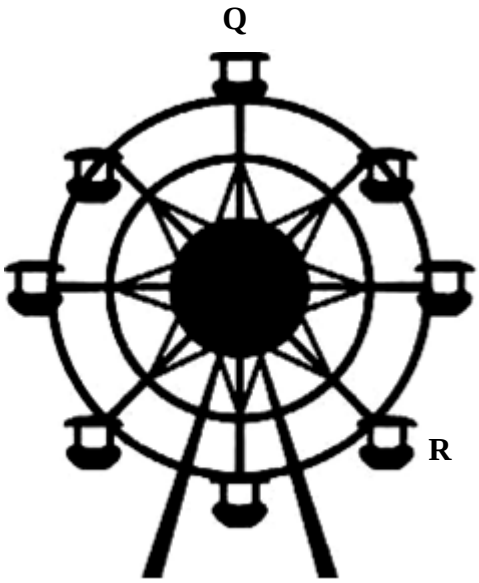

Diagram 7
Rajah 7

Calculate the angle of elevation of Aiman from Adam's place.
Hitungkan sudut dongakan Aiman dari tempat Adam.

A 67.5^0
B 69.5^0
C 77.5^0
D 79.5^0

15. Diagram 8 shows three vases of flower *A, B* and *C* on a horizontal ground. The height of flower *B* is 50 cm and the distance of flower tree *B* and flower tree *C* is 30 cm.
Rajah 8 *menunjukkan tiga buah pasu bunga A, B dan C di atas tanah mengufuk. Tinggi pokok bunga B ialah* 50 cm *dan jarak antara pokok bunga B dan pokok bunga C ialah* 30 cm.

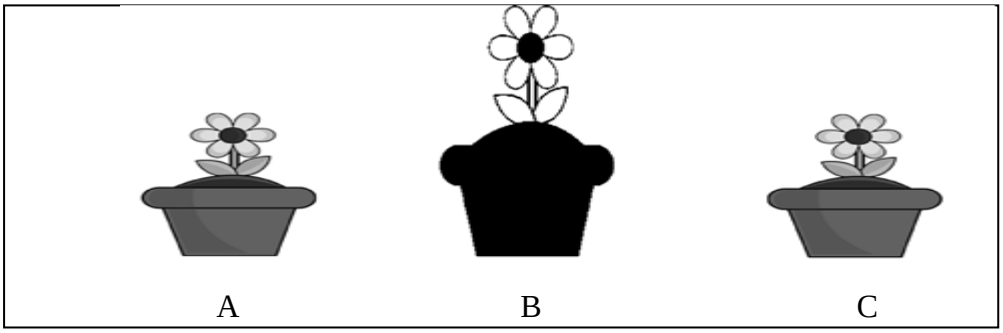

Diagram 8
Rajah 8

If the angle of elevation of flower tree *B* from flower tree *A* is 69^o , find the distance of flower tree *A* and flower tree *C*, in cm.
Jika sudut dongakan pokok bunga B dari pokok bunga A ialah 69^o *, cari jarak pokok bunga A ke pokok bunga C, dalam* cm.

A 19.19
B 39.12
C 49.19
D 52.12

16. Diagram 9 shows a right-angled triangular prism with the horizontal base *QSTV.*
Rajah 9 *menunjukkan sebuah prisma segitiga bersudut tegak dengan tapak mengufuk QSTV.*

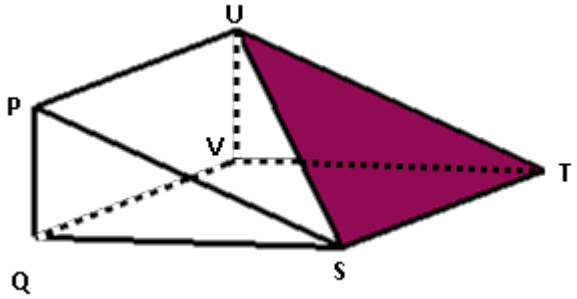

Diagram 9
Rajah 9

Name the angle between the plane *STU* and the plane *QSTV.*
Namakan sudut antara satah STU dan satah QSTV.

A $\angle$ *TUV*
B $\angle$ *UTV*
C $\angle$ *USV*
D $\angle$ *SUV*

17. Diagram 10, *P, Q* and *R* are on the horizontal ground. *PQ = QR*. The bearing of *R* from *P* is 250° and the bearing of *Q* from *P* is 160°.
Rajah 10, *P, Q dan R berada di satah mengufuk. PQ = QR. Bearing R dari P ialah* 250° *dan bearing Q dari P ialah* 160° .

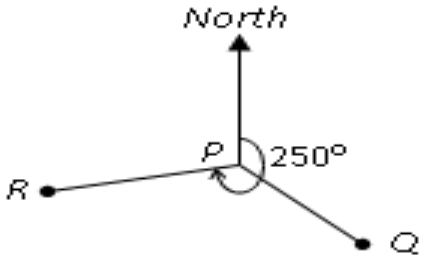

Diagram 10
Rajah 10

Find the bearing of *Q* from R.
Cari bearing Q dari R.

A 045°
B 070°
C 115°
D 330°

18. *P* and *Q* are two points on the surface of the earth and the latitude of *P* is 60°N.
P dan Q merupakan dua titik pada permukaan bumi dengan latitude P ialah 60°U.

Given that *Q* is located 20° south of *P*. Find the latitude of *Q*.
Diberi Q terletak 20° *ke selatan P. Cari latitude Q.*

A 40°S / 40°S
B 40°N / 40°U
C 100°S / 100°S
D 100°N / 100°U

19. $3x(x - 2y) - (3x - y)^2 =$

A $-6xy + y^2$
B $-6x^2 - y^2$
C $-6x^2 - 6xy + y^2$
D $-3x^2 - 9xy - y^2$

20. Express $\frac{n+2}{m} - \frac{n-3}{mn}$ as a single fraction in its simplest form.
Ungkapkan $\frac{n+2}{m} - \frac{n-3}{mn}$ *sebagai satu pecahan tunggal dalam bentuk termudah.*

A $\frac{n^2-n-1}{mn}$

B $\frac{n^2+n-3}{mn}$

C $\frac{n^2-n+1}{mn}$

D $\frac{n^2+n+3}{mn}$

21. Given that $\frac{2t}{\sqrt{n}-1} = 3$, express *n* in terms of *t*.
Diberi bahawa $\frac{2t}{\sqrt{n}-1} = 3$, *ungkapkan n dalam sebutan t.*

A $36t^2 + 1$

B $(6t - 1)^2$

C $\left(\frac{2t}{3}\right)^2 - 1$

D $\left(\frac{2t}{3} + 1\right)^2$

22. Simplify :
Permudahkan :

$$\left(\frac{8^2 \times 7^{\frac{1}{3}}}{14^2}\right)^3.$$

A $2^4 \times 7^{-3}$

B $2^6 \times 7^{-2}$

C $2^{12} \times 7^{-5}$

D $2^{16} \times 7^{-1}$

23. Find the value of :
Cari nilai bagi :

$$\frac{2^2 \times 3^3}{\left(16 \times 3^{-8}\right)^{\frac{1}{4}}}$$

A 6
B 24
C 243
D 486

24. Given that $a^2 + a - 12 = (a + b)(a + c)$. Find the value *b* and *c*.
Diberi $a^2 + a - 12 = (a + b)(a + c)$. *Cari nilai b dan c.*

A $b = 1, c = -12$
B $b = 1, c = 12$
C $b = 3, c = -4$
D $b = -3, c = 4$

25. Which of the following represents the graph of a quadratic function?
Antara graf berikut, yang manakah mewakili graf kuadratik?

A $y = 2 + x^2$
B $xy = 2^2$
C $x - y^2 = 2$
D $y = 2x^{-2}$

26. Given that $m < k \leq n$ satisfy both two linear inequalities $2k - 5 \leq 11$ and $k > 3 + \frac{k}{3}$, find the values of *m* and *n.*
Diberi $m < k \leq n$ *memenuhi dua ketaksamaan linear* $2k - 5 \leq 11$ *dan* $k > 3 + \frac{k}{3}$, *cari nilai m dan n.*

A $m = 4$ and / *dan* $n = 7$
B $m = 4$ and / *dan* $n = 8$
C $m = 5$ and / *dan* $n = 7$
D $m = 5$ and / *dan* $n = 8$

27. List all the integers n that satisfy the following $3n < 40$ and $2(7 - n) \leq -5$.
Senaraikan semua integer n yang memuaskan $3n < 40$ *dan* $2(7 - n) \leq -5$.

A 9, 10,11
B 10,11,12
C 9,10,11,12
D 10,11,12,13

28. Table 1 is a cumulative frequency table which shows the height of 50 young plants.
Jadual 1 *merupakan jadual kekerapan longgokan yang menunjukkan ketinggian bagi 50 anak benih.*

Height (cm) ***Tinggi* (cm)**	**10 - 12**	**13 - 15**	**16 – 18**	**19 – 21**	**22 - 24**
Cumulative Frequency ***Kekerapan longgokan***	4	16	34	44	50

Table 1
Jadual 1

Which of the following is the correct calculation for the mean height of the 50 young plants?

Antara berikut, yang manakah pengiraan yang tepat bagi mencari ketinggian min untuk 50 biji benih tersebut?

A $\dfrac{10(4)+13(12)+16(18)+19(10)+22(6)}{50}$

B $\dfrac{10(4)+13(16)+16(34)+19(44)+22(50)}{50}$

C $\dfrac{11(4)+14(12)+17(18)+20(10)+23(6)}{50}$

D $\dfrac{12(4)+15(16)+18(34)+21(44)+24(50)}{50}$

29. Table 2 shows the sale for four types of gifts.
Jadual 2 *menunjukkan jualan bagi empat jenis hadiah.*

Gift ***Hadiah***	Flower *Bunga*	Toys *Mainan*	Books *Buku*	Pens *Pen*
Frequency ***Kekerapan***	18	10	5	x

Table 2
Jadual 2

Given that the mode of the gifts is flower, find the maximum value of x.
Diberi mod bagi hadiah ialah bunga, cari nilai maksimum bagi x.

A 16
B 17
C 18
D 19

30. Diagram 13 is a pie chart showing how Adam uses his income each month. Adam's income is RM 3500 per month. Adam's saving is RM 350 and he spends 40% of his income on miscellaneous.
Rajah 13 *ialah satu carta pai yang menunjukkan bagaimana Adam menggunakan pendapatannya setiap bulan. Pendapatan Adam setiap bulan ialah* RM 3500. *Simpanan Adam ialah* RM 350 *dan dia membelanjakan* 40% *daripada pendapatannya untuk kegunaan pelbagai.*

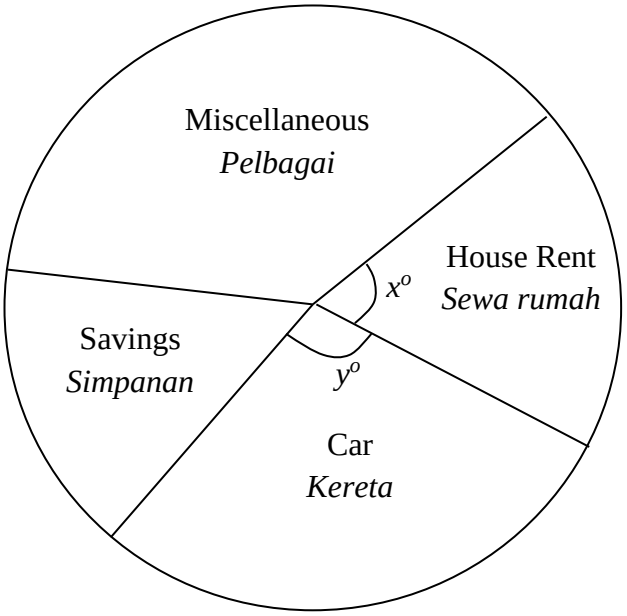

Diagram 11
Rajah 11

Given that $x^o : y^o = 2 : 3$. Find the value of x^o.
Diberi $x^o : y^o = 2 : 3$. *Cari nilai* x^o.

A 72
B 108
C 144
D 216

31. Diagram 14 is a pie chart which shows the type of drink commonly ordered by the customers in a cafe.
Rajah 14 *menunjukkan satu pie chart yang menunjukkan jenis pesanan minuman yang selalu dipesan oleh pelanggan dalam sebuah kafe.*

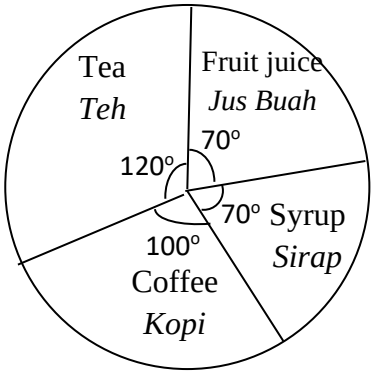

Diagram 12
Rajah 12

Determine the mode of the types of drink.
Tentukan mod bagi jenis minuman tersebut.

A Fruit Juice
Jus Buah
B Coffee
Kopi
C Syrup
Sirap
D Tea
Teh

32. Given that the universal set $\xi = \{x : 1 \le x \le 12,\ x \text{ is an integer}\}$, $P = \{2,3,7,9\}$, $Q = \{x: x \text{ is a prime number}\}$ and $R = \{x: x \text{ is multiple of } 4\}$
State the elements of $(P \cup R)' \cap Q$.
Diberi bahawa $\xi = \{x: 1 < x < 12, x \text{ ialah integer}\}$, $P = \{2,3,7,9\}$,
$Q = \{x: x \text{ ialah nombor perdana}\}$ *dan* $R = \{x: x \text{ ialah gandaan } 4\}$
Nyatakan unsur bagi $(P \cup R)' \cap Q$.

A {5,11}
B {1,5,11}
C {2,3,11}
D {2,3,9}

33. Diagram 15 is a Venn diagram with the universal set ξ, set *A*, and set *B.*
Rajah 15 *ialah gambar rajah Venn dengan set semesta* ξ, *set A dan set B.*

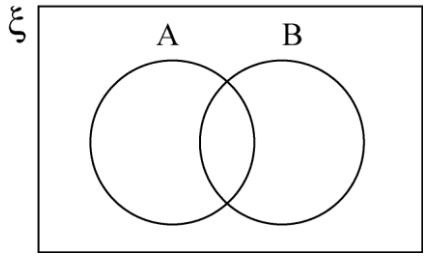

Diagram 13
Rajah 13

Set ξ = {Form 4 students},
Set *A* = {Students who like Basketball},
Set *B* = {Students who like Badminton}.
Set ξ = {*Pelajar tingkatan* 4}
Set A = {*Pelajar minat Bola Keranjang*},
S*et B* = {*Pelajar minat Badminton*}.

Given $n(A) = 60$, $n(B) = 84$, and $n(A \cap B) = 16$ and 6 of them dislike playing any game.
Diberi $n(A) = 60$, $n(B) = 84$, *dan* $n(A \cap B) = 16$ *dan 6 daripada mereka tidak suka mana-mana permainan.*

Find the total of Form 4 students.
Cari bilangan pelajar Tingkatan 4.

A 128
B 134
C 144
D 148

34. Diagram 16 shows two straight lines. The gradient of *QR* is –4 and the distance of *PQ* is 15 units.
Rajah 16 *menunjukkan dua garis lurus.Kecerunan garis QR ialah* –4 *dan jarak PQ ialah* 15 unit.

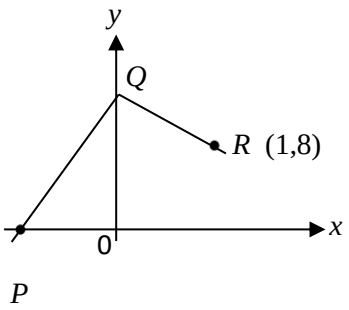

Diagram 14
Rajah 14

Find the *x*–intercept of *PQ*.
Cari pintasan–x bagi PQ.

A –9
B –12
C $-\frac{9}{4}$
D $-\frac{15}{4}$

35. State the *x*–intercept of the straight line $3x - 4y + 24 = 0$.
Nyatakan pintasan–x bagi garis lurus $3x - 4y + 24 = 0$.

A - 8
B - 6
C 6
D 8

36. Eight balls are numbered as shown in diagram below and inserted into an empty container.
Lapan biji bola bernombor seperti ditunjukkan dalam rajah di bawah dimasukkan ke dalam sebuah bekas kosong.

Diagram 15
Rajah 15

Kamal added *x* ball labelled with prime numbers into the container. A ball is then selected at random from the container. If the probability that the ball labelled with prime number selected is 0.75, find the value of *x.*
Kamal menambahkan x biji bola yang berlabel nombor perdana ke dalam bekas itu. Sebiji bola kemudian dipilih secara rawak daripada bekas itu. Jika kebarangkalian bahawa bola yang berlabel nombor perdana dipilih ialah 0.75, *cari nilai x.*

A 8
B 9
C 10
D 12

37. A box contains some black, white and red T-shirts. If a T-shirt is selected at random from the box, the probability of getting a black T-shirt is $\frac{3}{7}$ and the probability of getting a white T-shirt is $\frac{1}{3}$. Find the number of red T-shirts in the box if it contains 18 black T-shirts.
Sebuah kotak mengandungi beberapa baju-T hitam, putih dan merah. Jika baju-T dipilih secara rawak daripada kotak, kebarangkalian mendapat baju-T hitam adalah $\frac{3}{7}$ *dan kebarangkalian mendapat baju-T putih ialah* $\frac{1}{3}$. *Cari bilangan baju-T merah jika terdapat* 18 *baju-T hitam di dalam kotak.*

A 6
B 10
C 15
D 18

38. Given that y varies inversely as x squared and $x = 3p - 1$. If $y = 3$ when $p = 2$, express y in term of x.
Diberi y berkadar songsang dengan kuasa dua x dan $x = 3p - 1$. *Jika* $y = 3$ *apabila* $p = 2$, *ungkapkan y dalam sebutan x.*

A $y = \frac{25}{x^2}$

B $y = \frac{75}{x^2}$

C $y = \frac{25}{\sqrt{x}}$

D $y = \frac{75}{\sqrt{x}}$

39. Given that p varies directly as square root of q and $p=18$ when $q = 36$. Calculate the value of p when $q = 169$.
Diberi bahawa p berubah secara langsung dengan punca kuasa dua q dan $p = 18$ *apabila* $q = 36$. *Hitung nilai p apabila* $q = 169$.

A $\frac{13}{3}$

B $\frac{3}{13}$

C 39

D 26

40. Find the value of k in the following matrix equation:
Cari nilai k bagi persamaan matrik berikut:

$$2\begin{pmatrix} k \\ -1 \end{pmatrix} + \begin{pmatrix} 6 \\ -3 \end{pmatrix} = \begin{pmatrix} -k \\ -5 \end{pmatrix},$$

A –6

B –2

C 2

D 6

QUESTION PAPER END
KERTAS SOALAN TAMAT