Matematik
Kertas 1
Oktober 2020
1 $\frac{1}{4}$ jam

KAD PENGENALAN

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Nama Pelajar : ……

Tingkatan : ……

MAJLIS PENGETUA SEKOLAH MALAYSIA (MPSM)
CAWANGAN KELANTAN

PEPERIKSAAN PERCUBAAN SPM 2020

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
$= (n-2) \times 180°$

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

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

13. $$\frac{\text{area of sector}}{\text{area of circle}} = \frac{\text{angle subtended at centre}}{360^\circ}$$

$$\frac{luas\ sektor}{luas\ bulatan} = \frac{sudut\ pusat}{360^0}$$

14. Scale factor, $k = \frac{PA'}{PA}$

Faktor skala, $k = \frac{PA'}{PA}$

15. Area of image $= k^2 \times$ area of object

Luas imej $= k^2 \times$ *luas objek*

Answer **all** questions

*Jawab **semua** soalan.*

1. m is rounded off correct to three significant figures to be 5.41. Which of the following is the possible value of m?
   m dibundarkan betul kepada tiga angka bererti menjadi 5.41. Antara yang berikut, yang manakah adalah nilai m yang mungkin?

   A 5.4002

   B 5.4035

   C. 5.4173

   D 5.4085

2. Express $\frac{301}{25\ 000}$ in standard form.

   Ungkapkan $\frac{301}{25\ 000}$ *dalam bentuk piawai.*

   A 0.1204×10^{-2}

   B 1.204×10^{-2}

   C. 0.1204×10^{-3}

   D 1.204×10^{-3}

3. Given 59 020 000 = $p \times 10^{q}$, where $p \times 10^{q}$ is a number in standard form. State the value of p and of q.
   Diberi 59 020 000 = $p \times 10^{q}$*, di mana* $p \times 10^{q}$ *ialah nombor dalam bentuk piawai. Nyatakan nilai p dan nilai q.*

   A $p = 5.902,\ q = -8$

   B $p = 5.902,\ q = -7$

   C $p = 5.902,\ q = 7$

   D $p = 5.902,\ q = 8$

4. The weight of an A4 paper is 0.0049896 kg. If a ream contains 500 sheets of A4 paper, what is the weight, in g, of 100 reams of A4 paper in standard form?
Jisim sehelai kertas A4 ialah 0.0049896 kg. Jika 1 rim mengandungi 500 helai kertas A4, berapakah berat, dalam g, 100 rim kertas A4 dalam bentuk piawai?.

   A 2.4948×10^2

   B 2.4948×10^3

   C 2.4948×10^4

   D 2.4948×10^5

5. 6050402_8 =

   A. $6 \times 8^4 + 5 \times 8^3 + 4 \times 8^2 + 2 \times 8^1$

   B. $6 \times 8^7 + 5 \times 8^5 + 4 \times 8^3 + 2 \times 8^1$

   C. $6 \times 8^6 + 5 \times 8^4 + 4 \times 8^2 + 2 \times 8^1$

   D. $6 \times 8^6 + 5 \times 8^4 + 4 \times 8^2 + 2 \times 8^0$

6. Given $1100_2 < x_{10} < 10001_2$, the possible value of x is
Diberi $1100_2 < x_{10} < 10001_2$, *nilai yang mungkin bagi x ialah*

   A. 10

   B. 11

   C. 15

   D. 20

7. In diagram 1, ABCDEF is a regular hexagon. AFG and BDH are straight lines.
Dalam Rajah 1, ABCDEF ialah sebuah heksagon sekata. AFG dan BDH ialah garis lurus.

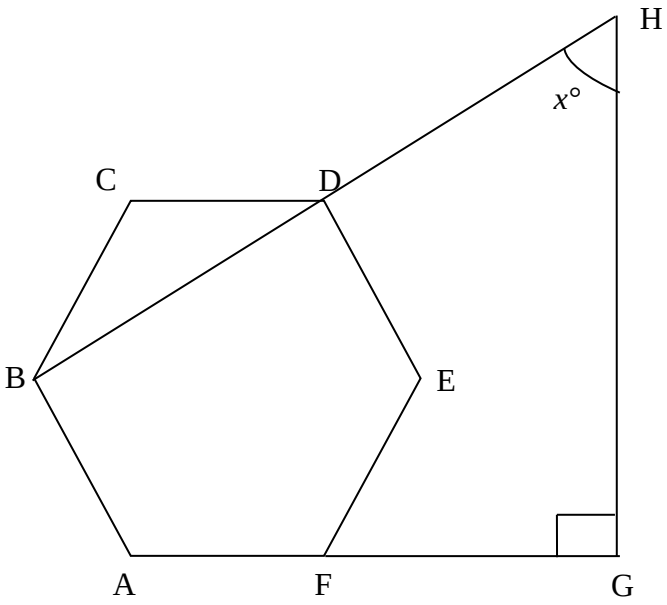


Diagram 1 / *Rajah 1*

Find the value of x
Cari nilai x

A 60
B 65
C 70
D 55

8. Diagram 2, shows a circle JKL with centre O. MLN is a tangent to the circle at L.

Rajah 2, menunjukkan sebuah bulatan JKL dengan pusat O. MLN ialah tangen kepada bulatan pada L.

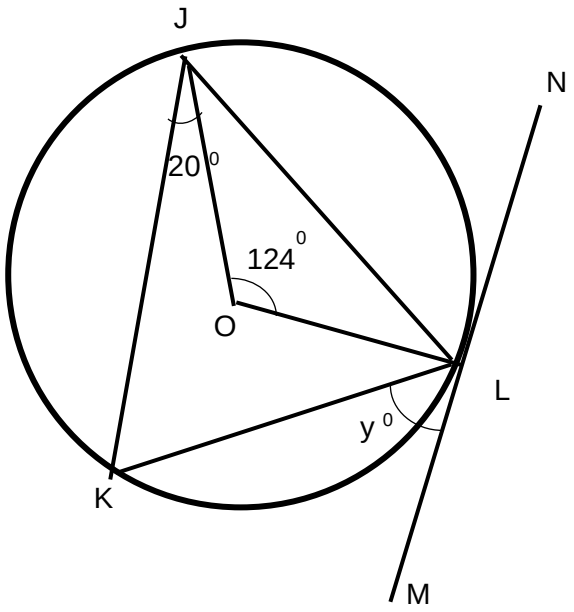


Diagram 2 / *Rajah 2*

Find the value of y

Cari nilai y.

A 48

B 36

C 63

D 75

9. In Diagram 3, which the dot A, B, C and D are image for dot P under a reflection of line RS.
Dalam Rajah 3 , antara titik A, B, C dan D, yang manakah imej bagi titik P di bawah suatu pantulan pada garis RS..

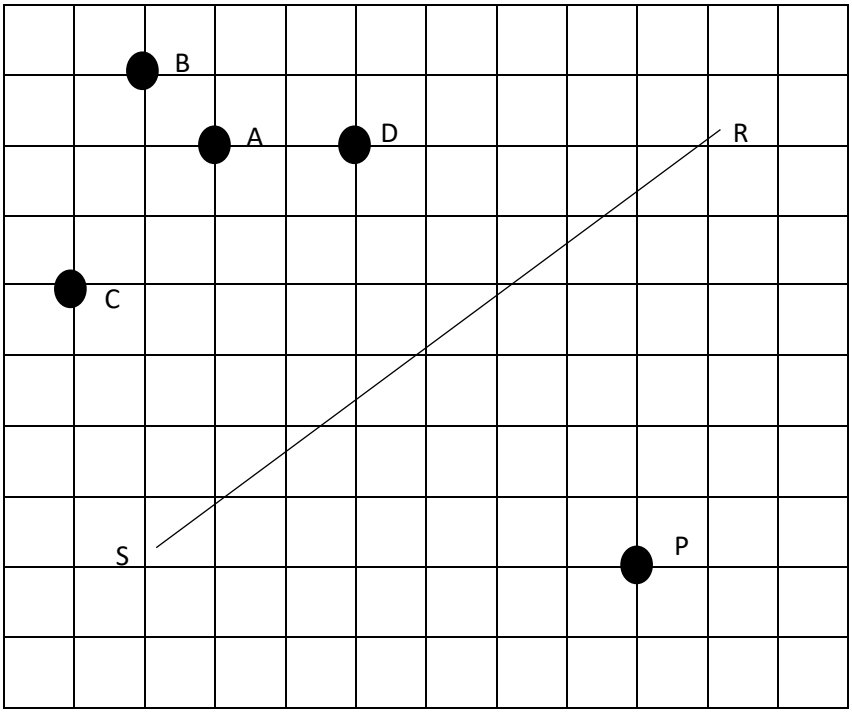


Diagram 3 / *Rajah 3*

10. The position of the Bahar table in class 5 Anggerik is at coordinates (-1, 2). Mr Rahim has transferred Bahar's position according to the translation $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$. Bahar's declining achievement in the March Test caused his class teacher to change Bahar's position again according to the translation $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$. What are the coordinates of Bahar's current position?
Kedudukan meja Bahar dalam kelas 5 Anggerik adalah pada koordinat (-1, 2). Cikgu Rahim telah memindahkan kedudukan Bahar mengikut translasi $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$*. Pencapaian merosot Bahar dalam Ujian Mac membuatkan guru kelasnya mengubah sekali lagi kedudukan Bahar mengikut translasi* $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$*. Berapakah koordinat kedudukan Bahar sekarang?*

A (4, 5) B (4, 4)

C (4, -1) D (0, 5)

11. In Diagram 4, shows the graphs of $y = \sin x$ for $0° \leq x \leq 360°$.

Rajah 4, menunjukkan graf bagi $y = \sin x$ *untuk* $0° \leq x \leq 360°$.

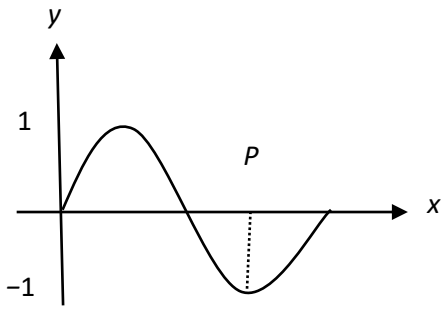


Diagram 4 / *Rajah 4*

Find the value of *p*

Cari nilai *p*

A 210

B 240

C 270

D 30

12. In diagram 5, PR and QS are straight lines. M and R are the midpoints of PR and QS respectively.

Dalam rajah 5, PR dan QS ialah garis lurus. M dan R masing-masing adalah titik tengah bagi PR dan QS.

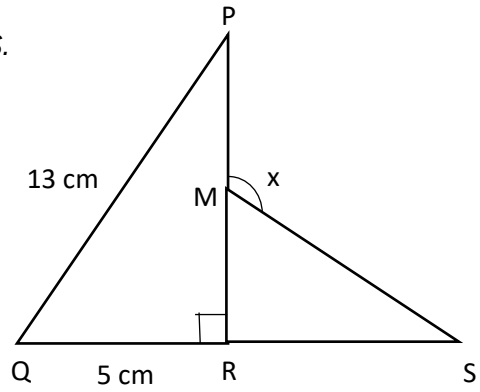


Diagram 5 / Rajah 5

Find tan x

Cari tan x

A $\frac{6}{5}$ B $-\frac{6}{5}$

C $\frac{5}{6}$ D $-\frac{5}{6}$

13. Diagram 6, shows a cuboid with a horizontal base *JMRS.*

Rajah 6, menunjukkan sebuah kuboid dengan tapak mengufuk JMRS

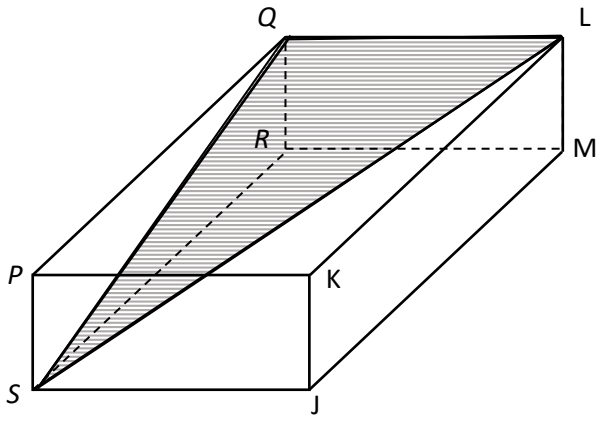


Diagram 6 / *Rajah 6*

Name the angle between the plane *LMRQ* and the plane *LQS*?

Namakan sudut di antara satah LMRQ dengan satah LQS?

A $\angle SQR$

B $\angle QSL$

C $\angle QLS$

D $\angle QSR$

14. In Diagram 7, GH and JM are two vertical poles on a horizontal plane.

Rajah 7, GH dan JM adalah dua tiang tegak pada satah mengufuk.

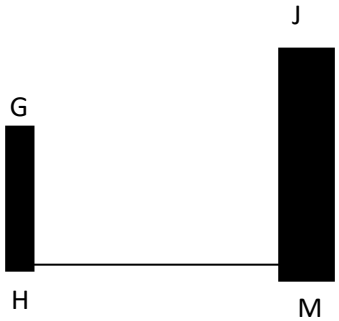


Diagram 7 / *Rajah 7*

The angle of elevation of point J from point H is

Sudut dongak bagi titik J dari titik H adalah

A $\angle$JGM

B $\angle$JHM

C $\angle$GJH

D $\angle$GMH

15. Kumar standing at the balcony on the 6th floor of a building. The height of one storey of the building is 6 m. There is a car and a bicycle parked on the horizontal ground. Given that the angle of depression of the car and bicycle from Kumar's point of view is 30 ° and 45 ° respectively. Calculate the distance, in *m*, from car to *bicycle*.
Kumar berdiri di balkoni di tingkat 6 *sebuah bangunan. Tinggi satu tingkat bangunan itu ialah 6 m. Terdapat sebuah kereta dan sebuah basikal yang diletakkan di atas tanah mengufuk. Diberi bahawa sudut tunduk kereta dan basikal dari mata Kumar masing-masing ialah* 30° *dan 4*5°. *Hitung jarak, dalam m, dari kereta ke basikal.*

A 62.35

B 36

C 26.35

D 9.86

16. Diagram 8, shows the positions of point *P* and *Q*.
Rajah 8, menunjukkan kedudukan titik P dan titik Q.

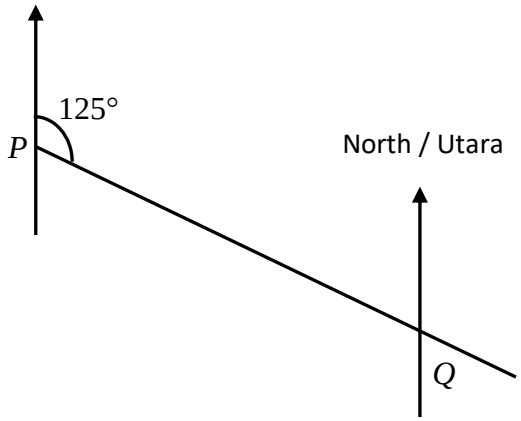


Diagram 8 / *Rajah 8*

Find the bearing of *P* from *Q*.

Cari bearing P dari Q .

A 315°

B 305°

C 125°

D 055°

17. In Diagram 9, *N* is the North Pole and *S* is the South Pole. *PM = MS*.

Dalam Rajah 9, U ialah Kutub Utara dan S ialah Kutub Selatan. PM = MS.

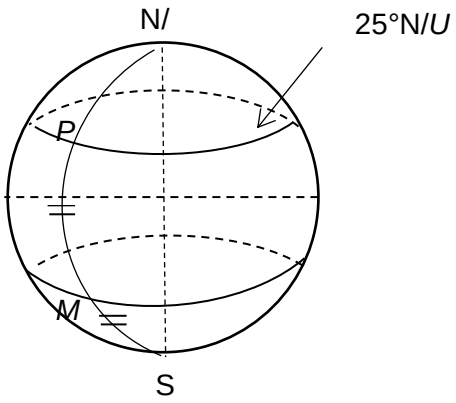


Diagram 9 / *Rajah 9*

Find the latitude of M.

Cari latitude M.

A 25°*S*

B 32.5°*S*

C 45°*S*

D 57.5°*S*

18. Factorise $36x - 4xy^2$ completely.

Faktorkan $36x - 4xy^2$ *selengkapnya*

A. $4\,(9x - xy^2)$

B. $4x\,(9 - y)^2$

C. $9x\,(4 - y^2)$

D. $4x\,(3 + y)\,(3 - y)$

19. Express $\frac{2mn+4n}{9-n^2} \div \frac{6mn}{3-n}$ as a single fraction in its simplest form.

Ungkapkan $\frac{2mn+4n}{9-n^2} \div \frac{6mn}{3-n}$ *sebagai satu pecahan tunggal dalam bentuk termudah.*

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

B $\frac{3m(3+n)}{m+2}$

C $\frac{m+2}{3m(3-n)}$

D $\frac{m+2}{3m(3+n)}$

20. Given that $P = \frac{5}{\sqrt{Q+R}}$, express Q in terms of *P* and *R*.

Diberi bahawa $P = \frac{5}{\sqrt{Q+R}}$, *ungkapkan Q dalam sebutan P dan R.*

A $\frac{5}{P^2} - R$

B $\frac{5-R}{P^2}$

C $\frac{25}{P^2} - R$

D $\frac{25-R}{P^2}$

21. Given that $3 - \frac{2(x-1)}{3} = \frac{x}{2}$, find the value of x.

Diberi bahawa $3 - \frac{2(x-1)}{3} = \frac{x}{2}$, *cari nilai* x.

A $\frac{17}{7}$

B $\frac{22}{7}$

C $\frac{14}{5}$

D $\frac{22}{5}$

22. Simplify $(a^2b^5)^{\frac{1}{2}} \times (a^{-4}b^{\frac{3}{2}})$.

Ringkaskan $(a^2b^5)^{\frac{1}{2}} \times (a^{-4}b^{\frac{3}{2}})$.

A $\frac{b^7}{a^2}$

B $\frac{b^4}{a^3}$

C $\frac{b^4}{a^2}$

D $\frac{b^2}{a^3}$

23. Given $a < x \leq b$, find the values of a and b which satisfies both the inequalities $1 - 3x < 7$ and $4x - 8 \leq 20$.
Diberi $a < x \leq b$, cari nilai yang mungkin bagi a dan b yang memuaskan kedua-dua ketaksamaan $1 - 3x < 7$ dan $4x - 8 \leq 20$.

A. $a = -3, b = 7$

B. $a = -2, b = 6$

C. $a = -1, b = 6$

D. $a = -2, b = 7$

24. List all the integers r that satisfy the inequalities $-12 - 2r \leq 4r - 6 < r$
Senaraikan semua integer r yang memuaskan ketaksamaan $-12 - 2r \leq 4r - 6 < r$

A. –2, –1, 0, 1, 2

B. –2, –1, 0, 1

C. –1, 0, 1, 2

D. –1, 0, 1

25. Table 1, shows the number of members in five societies in SMK Durian Runtuh.
Jadual 1, menunjukkan bilangan ahli dalam lima persatuan di SMK Durian Runtuh.

Societies/ Persatuan	Number/Bilangan
Mathematics/ Matematik	100
History/ Sejarah	60
Language/ Bahasa	80
Science/ Sains	50
Geography/ Geografi	70

Table 1 /Jadual 1

If the information given was represented by a pie chart, find the angle that represents the number of members in History Society and Language Socienty.
Jika maklumat yang diberikan itu diwakili oleh sebuah carta pai, cari sudut yang mewakili bilangan ahli dalam Persatuan Sejarah dan Persatuan Bahasa.

A 60° B 80°
C 140° D 160°

26. Table 2, shows a set of data
Rajah 2, menunjukkan satu set data

11	10	5	5
6	5	5	7
4	6	11	3

Table 2 /Jadual 2

Find the mean of the data.
Cari min bagi data itu.

A 6.5
B 7
C 7.5
D 8

27. Diagram 10, is a bar chart showing the number of marbles in three boxes, *L, M*, and *N*. The number of mables in box S is not shown.
Rajah 10, ialah carta palang yang menunjukkan bilangan guli di dalam tiga buah kotak, L, M dan N. Bilangan guli di dalam kotak S tidak ditunjukkan.

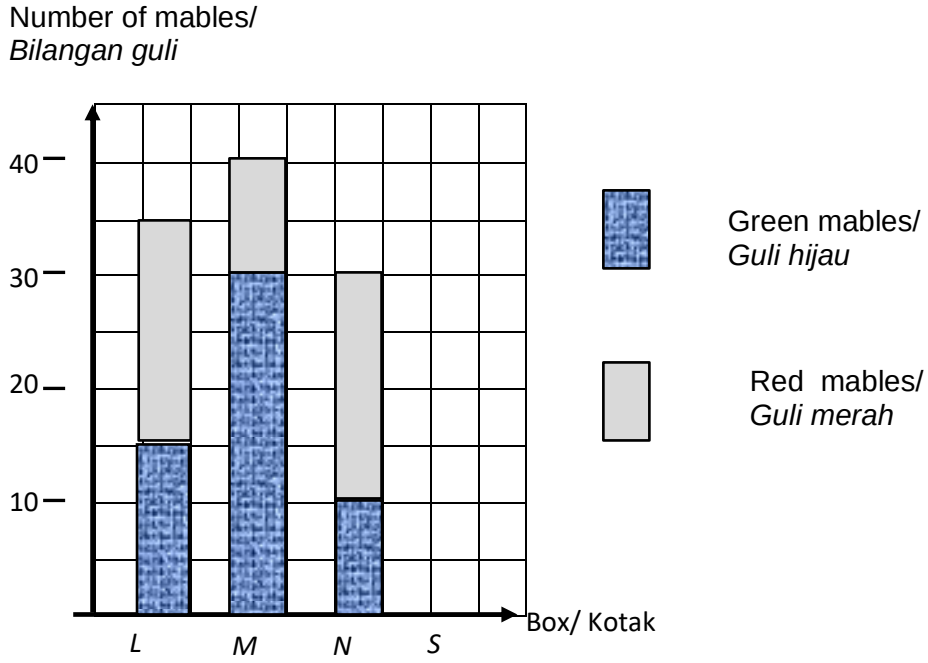


Diagram 10 / *Rajah 10*

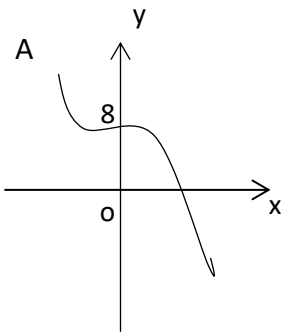
The total number of marbles in box *S* 50% more than the number of red mables in box *M*. Find the percentage of the number of marbles in the four boxes.
Jumlah guli di dalam kotak S ialah 50% lebih daripada bilangan guli merah di dalam kotak M. Cari peratus bilangan guli di dalam kotak S daripada jumlah guli di dalam ke empat-empat kotak itu.

A 12.5
B 25
C 30
D 40

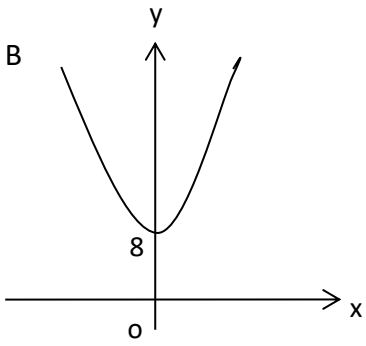
28. Which of the following graph represents $y = x^3 + 8$

Antara berikut yang manakah mewakili graf $y = x^3 + 8$

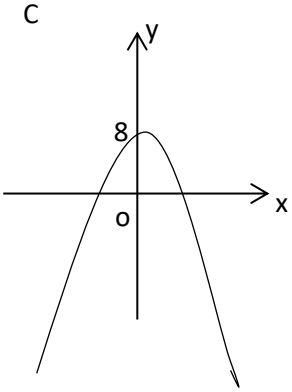
A



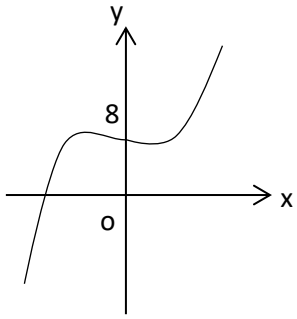
B



C



D



29. Given S = {x : x is an integer and x < 9} and T= {x : x is an odd number and x ≥ 3}.
State $S \cap T$.

Diberi S={x : x *ialah integer dan* x < 9} *dan* T= {x : x *ialah nombor ganjil dan* x ≥ 3}.
Nyatakan $S \cap T$.

A {3, 5, 7}

B {3, 5, 7, 9}

C {-7, -5, -3, 3, 5, 7}

D {-7, -5, -3, 3, 5, 7, 9}

30. Venn diagram in Diagram 11, shows the number of elements in sets K and L.
Gambar rajah Venn dalam Rajah 11, menunjukkan bilangan unsur dalam set K dan set L.

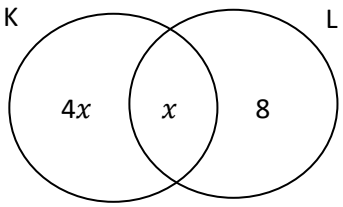


Diagram 11 / Rajah 11

Given ξ = K ∪ L and n(L) = 20, find n(K ∪ L).
Diberi ξ = K ∪ L dan n(L) = 20, cari n(K ∪ L).

A 6
B 20
C 24
D 68

31. Diagram12 is a Venn diagram that shows the universal set, ξ, set A dan set B.
Rajah 12 ialah gambar rajah Venn yang menunjukkan set semesta, ξ, set A dan set B.

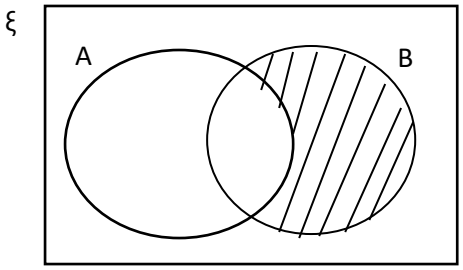


Diagram 12 / *Rajah 12*

The shaded region represents set
Kawasan berlorek mewakili set

A A ∩ B
B B ∩ A'
C A ∩ B'
D B' ∩ A'

32. A straight line has a gradient −3 and passes through the point (3, −6).
The *x*-intercept of the straight line is.
Satu garis lurus mempunyai kecerunan −3 *dan melalui titik* (3, −6).
Pintasan-x bagi garis lurus itu ialah

A. *3*

B. *1*

C. *- 1*

D. *- 3*

33. The coordinates of point *P* are (–3, 4) and the gradient of the straight line *PQ* is –1.
The coordinates of point *Q* could be
Koordinat bagi titik P ialah (–3, 4) *dan kecerunan garis lurus PQ ialah* –1.
Koordinat bagi titik Q yang mungkin ialah

A. (–3, –2)

B. (3, 2)

C. (–1, 2)

D. (1, 2)

34. A box contains 24 oranges and a number of apples. A fruit is chosen at random from the box. The probability of choosing an apple is $\frac{4}{7}$. Find the number of apples in the box.
Sebuah kotak mengandungi 24 biji oren dan beberapa biji epal. Sebiji buah dipilih secara rawak daripada kotak itu. Kebarangkalian memilih sebiji epal ialah $\frac{4}{7}$*. Cari bilangan epal di dalam kotak itu.*

A. 28
B. 30
C. 32
D. 36

35. Table 3 shows how a group of 400 students travel to school.

Jadual 3 menunjukkan bagaimana sekumpulan 400 orang murid ke sekolah.

Types of transport. *Jenis pengangkutan.*	Bicycle *Basikal*	Motorcycle *Motosikal*	Car *Kereta*	Bus *Bas*
Number of students *Bilangan murid*	100	70	80	150

Table 3 / Jadual 3

A student is chosen at random from the group. Find the probability that the students to school by car.

Seorang murid dipilih secara rawak daripada kumpulan itu. Cari kebarangkalian bahawa murid itu pergi ke sekolah dengan kereta.

A. $\frac{1}{400}$

B. $\frac{1}{80}$

C. $\frac{1}{5}$

D. $\frac{1}{4}$

36. The relationship between the variables *x*, *y* and *z* is $x \propto \frac{y}{z}$. It is given that *x* = 10 when *y* = 4 and *z* = 8. Calculate the value of *z* when $x = \frac{2}{5}$ and *y* = 2.

Hubungan antara pembolehubah x, y dan z ialah $x \propto \frac{y}{z}$. *Diberi bahawa x* = 10 *apabila y* = 4 *dan z* = 8. *Hitung nilai z apabila* $x = \frac{2}{5}$ *dan y* = 2.

A. 50

B. 60

C. 80

D. 100

37. Given $Y \propto Z$ and $Z = 3N + 4$.

If $Y = 5$ when $N = 2$, express Y in terms of Z.

Diberi $Y \propto Z$ *dan* $Z = 3N + 4$.

Jika $Y = 5$ *apabila* $N = 2$, *ungkapkan* Y *dalam sebutan* Z.

A. $Y = \frac{z}{2}$

B. $Y = \frac{2}{z}$

C. $Y = 2z$

D. $Y = z$

38. Table 4 shows the relation between three variables, *p, q* and *r.*

Jadual 4 menunjukkan hubungan antara tiga pemboleh ubah, p, q dan r.

p	*4*	*9*
q	*2*	*3*
r	*16*	*m*

Table 4 / *Jadual 4*

Given $p \propto \frac{q^3}{r^{\frac{1}{2}}}$, calculate the value of m.

Diberi $p \propto \frac{q^3}{r^{\frac{1}{2}}}$, *cari nilai m.*

A. 26

B. 36

C. 46

D. 56

39. $\begin{pmatrix}7 & 1\\6 & 4\end{pmatrix}+\begin{pmatrix}4 & 7\\8 & 6\end{pmatrix}-\begin{pmatrix}5 & 3\\2 & 9\end{pmatrix}+\begin{pmatrix}2 & 4\\7 & 9\end{pmatrix}=$

A $\begin{pmatrix}8 & 1\\19 & 10\end{pmatrix}$

B $\begin{pmatrix}8 & 9\\19 & 10\end{pmatrix}$

C $\begin{pmatrix}14 & 9\\19 & 10\end{pmatrix}$

D $\begin{pmatrix}14 & 1\\7 & 10\end{pmatrix}$

40. The total price of 1 litre cooking oil brand X and 1 litre cooking oil brand Y is RM 19.50. The difference of price between 3 litre cooking oil brand X and 1 litre cooking oil brand Y is RM 12.50. Which of the following is correct method to calculate the price of 1 litre cooking oil brand X, RM x and 1 litre cooking oil brand Y, RM y?.

Jumlah harga bagi 1 liter minyak masak jenama X dan 1 liter minyak masak jenama Y ialah RM 19.50. Beza harga antara 3 liter minyak masak jenama X dan 1 liter minyak masak jenama Y ialah RM 12.50. Antara berikut, manakah kaedah yang betul untuk mengira harga 1 liter minyak masak jenama X, RM x, dan 1 liter minyak masak jenama Y, RM y?

A $\begin{pmatrix}1 & 3\\1 & 1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}19.50\\12.50\end{pmatrix}$

B $\begin{pmatrix}1 & 3\\1 & -1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}19.50\\12.50\end{pmatrix}$

C $\begin{pmatrix}1 & 1\\3 & 1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}19.50\\12.50\end{pmatrix}$

D $\begin{pmatrix}1 & 1\\3 & -1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}19.50\\12.50\end{pmatrix}$

END OF QUESTION PAPER

KERTAS SOALAN TAMAT