

1449/1
Matematik
Kertas 1
Ogos/ September
2009

1 $\frac{1}{4}$ jam



**PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN DARUL KHUSUS**

**PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2009**

MATEMATIK

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. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Kertas soalan ini mengandungi 30 halaman bercetak dan 1 halaman kosong.

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

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

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

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

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

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

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

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

SHAPE AND SPACE
BENTUK DAN RUANG

1. Area of trapezium = $\frac{1}{2} \times \text{sum of parallel sides} \times \text{height}$
Luas trapezium = $\frac{1}{2} \times \text{hasil tambah dua sisi selari} \times \text{tinggi}$
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 \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 = $\frac{1}{3} \times \text{base area} \times \text{height}$
Isipadu piramid tegak = $\frac{1}{3} \times \text{luas tapak} \times \text{tinggi}$
11. Sum of interior angles of a polygon
Hasil tambah sudut pedalaman poligon
= $(n - 2) \times 180^\circ$

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

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

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

$$\frac{\text{luas sektor}}{\text{luas bula tan}} = \frac{\text{sudut pusat}}{360^\circ}$$

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

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

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

$$\text{Luas imej} = k^2 \times \text{luas objek}$$

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HALAMAN KOSONG

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

- 1 Round off 30 483 correct to three significant figures.

Bundarkan 30 483 betul kepada tiga angka bererti.

- A 304
- B 305
- C 30 400
- D 30 500

- 2 Express 2.13×10^{-3} as a single number.

Ungkapkan 2.13×10^{-3} sebagai satu nombor tunggal.

- A 0.213
- B 0.0213
- C 0.00213
- D 0.000213

- 3 $4.28 \times 10^{-3} - 7.16 \times 10^{-4} =$

- A 2.88×10^{-3}
- B 3.564×10^{-3}
- C 2.88×10^{-4}
- D 3.564×10^{-4}

- 4 A rectangular mural has an area of 8.61 m^2 . Its length is 454 cm. Calculate the width, in cm, of the mural.

Sebuah mural berbentuk segiempat tepat mempunyai luas 8.61 m^2 .

Panjang mural itu ialah 454 cm.

Hitung lebar, dalam cm, mural itu.

- A 1.896×10^2
- B 1.896×10^4
- C 5.273×10^{-3}
- D 5.273×10^{-1}

- 5 $1011_2 + 101_2 =$
- A 10000_2
- B 10101_2
- C 11010_2
- D 11111_2

- 6 Express 301_5 as a number in base eight .

Ungkapan 301_5 sebagai nombor dalam asas lapan.

- A 114_8
- B 163_8
- C 301_8
- D 455_8

- 7 In Diagram 1, $EFGHJK$ is a regular hexagon. P and Q are midpoints of GH and HJ respectively.

Dalam Rajah 1, $EFGHJK$ ialah sebuah heksagon sekata. P dan Q adalah titik tengah GH dan HJ .

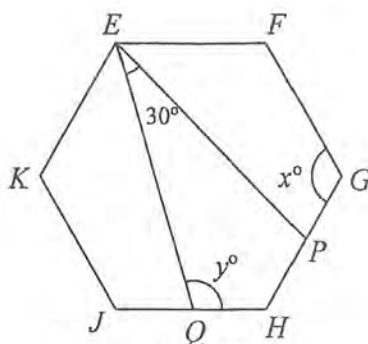


Diagram 1
Rajah 1

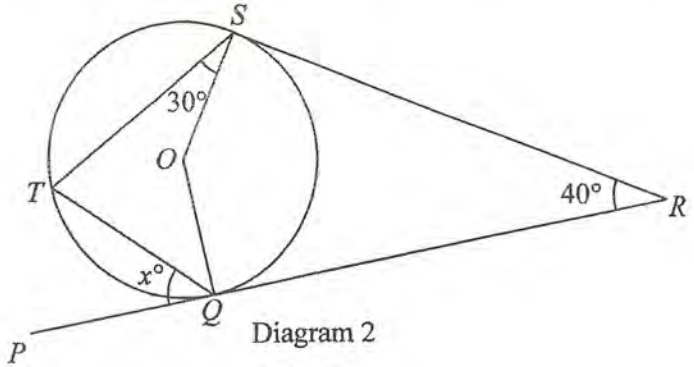
Find the value of $x + y$.

Cari nilai $x+y$.

- A 210
- B 225
- C 300
- D 330

8 In Diagram 2, PQR and RS are tangents to the circle with centre O , at Q and S .

Dalam Rajah 2, PQR dan RS ialah tangen kepada bulatan berpusat O , di Q dan S .



Find the value of x .

Cari nilai x .

- A 30
- B 40
- C 50
- D 60

9 Diagram 3 shows five points drawn on square grids.

Rajah 3 menunjukkan lima titik pada grid segiempat sama.

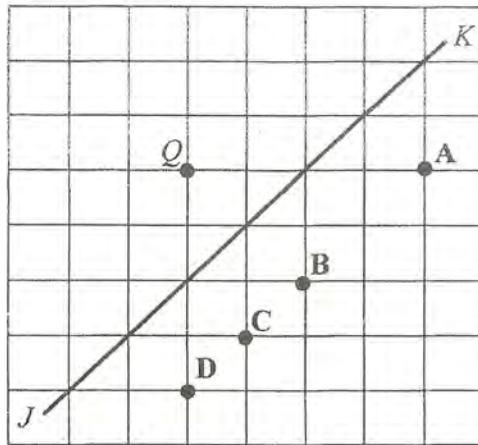


Diagram 3

Rajah 3

Which of the points **A**, **B**, **C** or **D** is the image of point Q under a reflection in the line JK ?

*Antara titik **A**, **B**, **C** dan **D**, yang manakah imej bagi titik Q di bawah suatu pantulan pada garis JK ?*

- 10 In Diagram 4, triangle Q is the image of triangle P under a clockwise rotation of 90° .

Dalam Rajah 4, segitiga Q ialah imej bagi segitiga P di bawah suatu putaran 90° ikut arah jam.

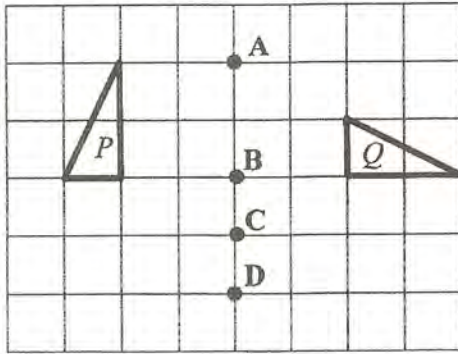


Diagram 4
Rajah 4

Which of the points A, B, C, or D, is the centre of rotation?

Antara titik A, B, C dan D, yang manakah pusat putaran itu?

11 In Diagram 5, JKL is a straight line.

Dalam Rajah 5, JKL ialah garis lurus.

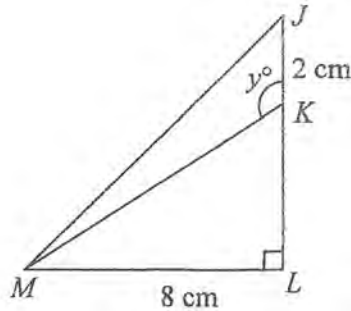


Diagram 5

Rajah 5

Given that $JL = LM$, find the value of $\cos y^\circ$.

Diberi $JL = LM$, cari nilai kos y° .

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

12 It is given that $\tan \theta = -0.3462$ where $180^\circ \leq \theta \leq 360^\circ$.
Find the value of θ .

*Diberi bahawa $\tan \theta = -0.3462$ dengan keadaan $180^\circ \leq \theta \leq 360^\circ$.
Cari nilai θ .*

- A 199.1°
- B 250.9°
- C 289.1°
- D 340.9°

13 In Diagram 6, O is the centre of a unit circle.

Dalam Rajah 6, O ialah pusat bulatan unit.

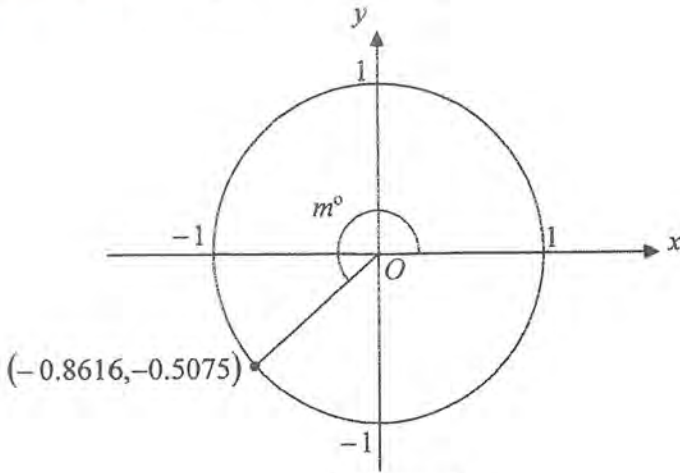


Diagram 6

Rajah 6

Find the value of m .

Cari nilai m .

- A 210.5
- B 216.1
- C 233.9
- D 239.5

- 14 Diagram 7 shows a pyramid with its rectangle base $PQRS$. Vertex T is vertically above P .

Rajah 7 menunjukkan sebuah piramid dengan tapak segi empat $PQRS$. Puncak T berada tegak di atas P .

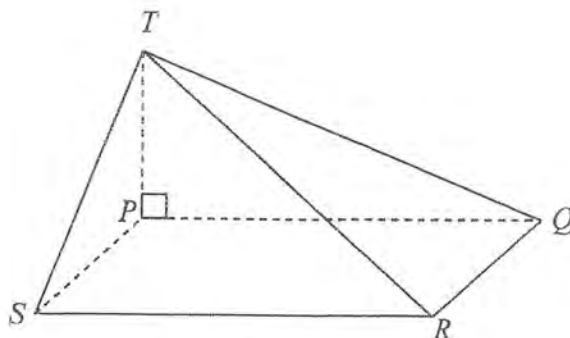


Diagram 7

Rajah 7

Name the angle between the line TR and the plane TPQ .

Namakan sudut di antara garis TR dan satah TPQ .

- A $\angle RTQ$
- B $\angle RTP$
- C $\angle TRQ$
- D $\angle TRP$

15 In Diagram 8, JK is a vertical tower. KL is horizontal.

Dalam Rajah 8, JK ialah sebuah menara tegak. KL adalah mengufuk.

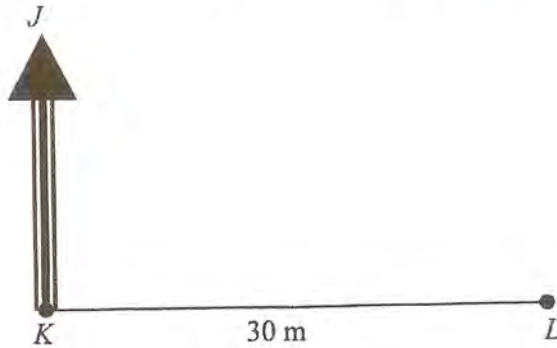


Diagram 8

Rajah 8

The angle of elevation of J from L is 38° . Calculate the height, in m , of the tower.

Sudut dongakan J dari L ialah 38° . Hitungkan tinggi, dalam m , menara itu.

- A 18.50
- B 23.44
- C 38.40
- D 48.73

- 16 In Diagram 9, PQ and TR are two vertical poles on a horizontal plane. S is a point on TR such that $PQ = SR$.

Dalam Rajah 9, PQ dan TR ialah dua batang tiang tegak pada satah mengufuk. S ialah titik pada TR dengan keadaan $PQ = SR$.

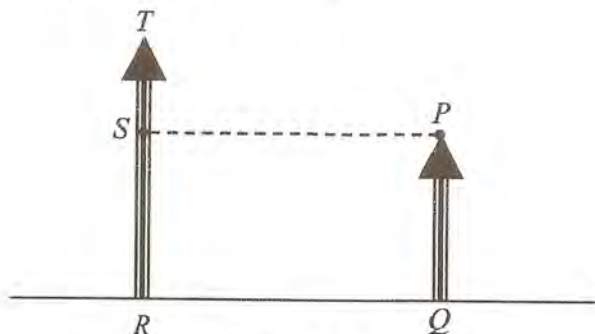


Diagram 9

Rajah 9

The angle of depression of R from point P is

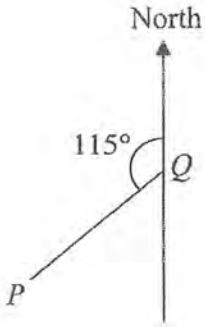
Sudut tunduk R dari P ialah

- A $\angle RPS$
- B $\angle RPQ$
- C $\angle TPR$
- D $\angle QRP$

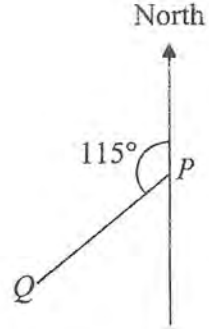
- 17 Points P and Q lie on a horizontal plane. The bearing of P from Q is 115° . Which of the following diagrams, shows the position of P and Q ?

Titik P dan titik Q terletak pada satah mengufuk. Bearing P dari Q ialah 115° . Antara rajah berikut, yang manakah menunjukkan kedudukan P dan Q ?

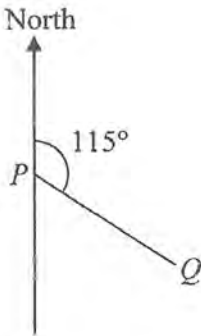
A



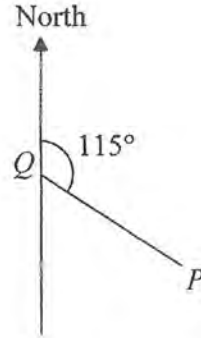
B



C



D



- 18 In Diagram 10, N is the North Pole, S is the South Pole, and NOS is the axis of the earth.

Dalam Rajah 10, N ialah Kutub Utara, S ialah Kutub Selatan dan NOS adalah paksi Bumi.

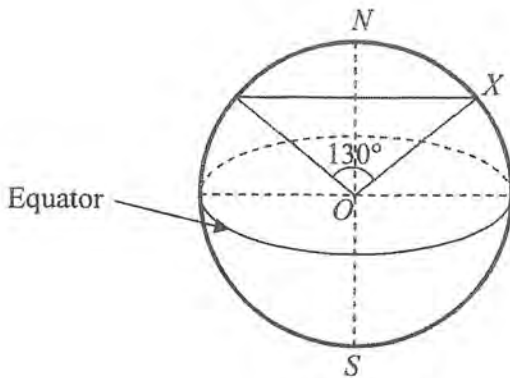


Diagram 10

Rajah 10

Find the latitude of X .

Cari latitud X .

- A 25° N
- B 40° N
- C 50° N
- D 65° N

19 $(2-x)^2 - x(x+2) =$

A $2(2-x)$

B $2(1-2x)$

C $2(3-2x)$

D $2(2-3x)$

20 Express $\frac{3h}{4} - \frac{h^2-2}{4h}$ as a single fraction in its simplest form.

Ungkapkan $\frac{3h}{4} - \frac{h^2-2}{4h}$ sebagai satu pecahan tunggal dalam bentuk termudah.

A $\frac{h^2+1}{2h}$

B $\frac{h^2-1}{2h}$

C $\frac{h^2+1}{8h}$

D $\frac{h^2-1}{8h}$

21 Given that $\frac{p}{q} - 3 = p$, express p in terms of q .

Diberi bahawa $\frac{p}{q} - 3 = p$, ungkapkan p dalam sebutan q .

A $p = \frac{3}{1-q}$

B $p = \frac{3q}{1-q}$

C $p = \frac{3}{1+3q}$

D $p = \frac{3}{1+2q}$

- 22 Given that $5 - 2(3 - 2q) = \frac{6q + 1}{3}$, calculate the value of q .

Diberi bahawa $5 - 2(3 - 2q) = \frac{6q + 1}{3}$, hitungkan nilai q .

A $\frac{2}{3}$

B $\frac{2}{5}$

C $\frac{1}{3}$

D $\frac{1}{6}$

- 23 Simplify :

Ringkaskan:

$$3h^2 \times 5h \div h^{-4}$$

A $8h^{-1}$

B $8h^7$

C $15h^{-1}$

D $15h^7$

- 24 Find the value of $\left(2\frac{10}{27}\right)^{\frac{2}{3}}$.

Cari nilai $\left(2\frac{10}{27}\right)^{\frac{2}{3}}$.

A $\frac{8}{9}$

B $\frac{4}{3}$

C $\frac{16}{9}$

D $\frac{16}{3}$

- 25 List all the integers x which satisfy both the inequalities

$$\frac{x}{2} - 1 < 3 \text{ and } -3x + 5 \leq -7.$$

Senaraikan semua integer x yang memuaskan kedua-dua ketaksamaan

$$\frac{x}{2} - 1 < 3 \text{ dan } -3x + 5 \leq -7.$$

- A 5, 6, 7
 B 4, 5, 6, 7
 C 5, 6, 7, 8
 D 4, 5, 6, 7, 8

- 26 The line graph in Diagram 11 shows the number of tourist who visit Melaka for period of 6 months.

Graf garis dalam Rajah 11 menunjukkan bilangan pelancong yang melawat Melaka dalam tempoh 6 bulan.

Number of tourist

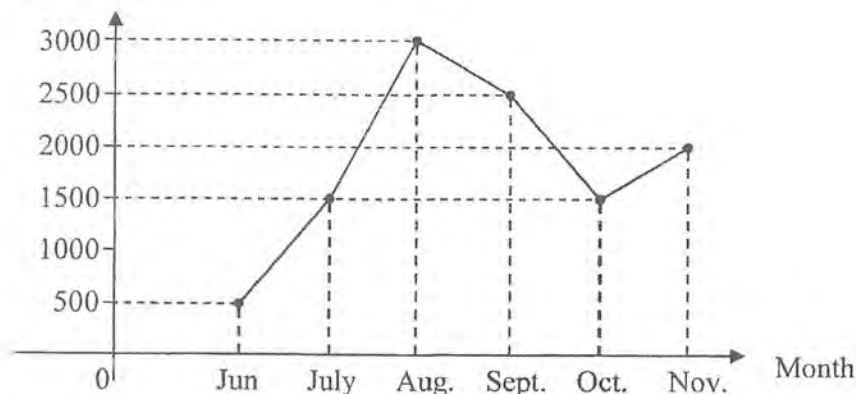


Diagram 11

Rajah 11

The mode is

Mod ialah

- A 1 500
 B 1 750
 C 1 833
 D 3 000

- 27 Table 1 shows the time taken using the phone by a group of students.

Jadual 1 menunjukkan masa penggunaan telefon oleh sekumpulan pelajar.

Time (minutes)	Frequency
1–3	20
4–6	15
7–9	6
10–12	15
13–15	4

Table 1

Jadual 1

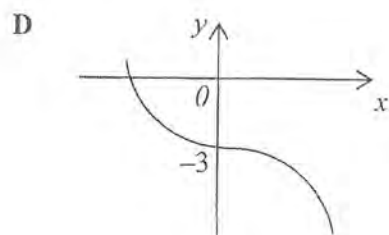
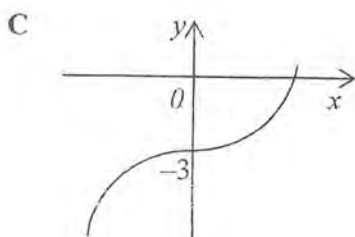
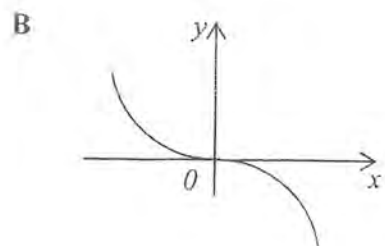
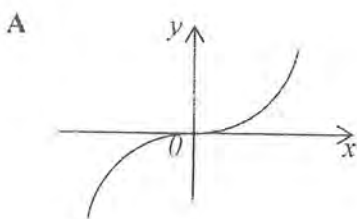
State the modal class.

Nyatakan kelas mod.

- A 1–3
- B 4–6
- C 7–9
- D 13–15

- 28 Which of the following graphs represents $y = -3x^3$?

Manakah antara graf berikut mewakili $y = -3x^3$?



- 29 It is given that the universal set $\xi = \{x: 5 \leq x \leq 12, x \text{ is an integer}\}$,
 $P = \{x : x \text{ is a factor of } 12\}$, and $Q = \{x : x \text{ is a number multiple of } 3\}$.
 List all the elements of set $P \cap Q$.

*Diberi bahawa set semesta $\xi = \{x: 5 \leq x \leq 12, x \text{ ialah suatu integer}\}$,
 $P = \{x : x \text{ ialah faktor } 12\}$, dan $Q = \{x : x \text{ ialah nombor gandaan } 3\}$.
 Senaraikan semua unsur bagi set $P \cap Q$.*

- A { 9 }
 B { 6, 12 }
 C { 6, 9, 12 }
 D { 5, 7, 10, 11 }

- 30 Diagram 12 is a Venn diagram which shows set P , set Q and set R .

Rajah 12 ialah gambar rajah Venn yang menunjukkan set P , set Q dan set R .

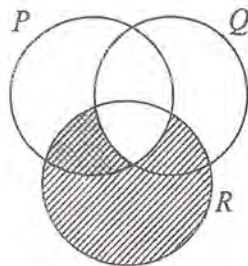


Diagram 12

Rajah 12

Given that $\xi = P \cup Q \cup R$. The shaded region in the Venn diagram represents the set

Diberi bahawa $\xi = P \cup Q \cup R$. Kawasan berlorek dalam gambar rajah Venn itu mewakili set

- A $P \cap Q \cap R$
 B $(P \cap Q)' \cap R$
 C $P \cap Q' \cup R$
 D $P \cap (Q \cap R)'$

- 31 Diagram 13 shows a Venn Diagram with the universal set $\xi = \{ \text{students of SMK Taman Universiti} \}$,
 set $M = \{ \text{members of the Mathematics Society} \}$ and
 set $S = \{ \text{members of the Science Society} \}$.

Rajah 13 menunjukkan gambar rajah Venn dengan set semesta $\xi = \{ \text{pelajar SMK Taman Universiti} \}$,
 set $M = \{ \text{ahli Persatuan Matematik} \}$ dan
 set $S = \{ \text{ahli Persatuan Sains} \}$.

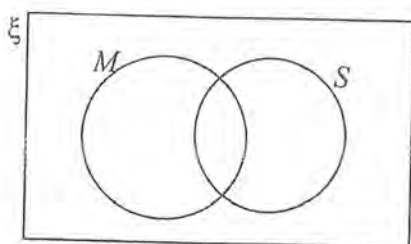


Diagram 13

Rajah 13

It is given that $n(M) = 200$, $n(S) = 340$ and $n(M \cap S) = 56$.
 There are 98 students who do not join any above societies.
 Find the number of students in SMK Taman Universiti.

Diberi bahawa $n(M) = 200$, $n(S) = 340$ dan $n(M \cap S) = 56$.
 Terdapat 98 orang pelajar tidak menyertai mana-mana persatuan di atas.
 Cari bilangan pelajar di SMK Taman Universiti.

- A 428
- B 484
- C 526
- D 582

34 In class five Beta, 8 of the students are girls. A student is chosen at random from the class. The probability of choosing a girl is $\frac{1}{5}$.

A group of 6 girls enter class five Beta . A student is chosen at random from the class.

State the probability that the student is a girl.

Dalam kelas lima Beta, 8 daripada pelajarnya ialah perempuan. Seorang pelajar dipilih secara rawak daripada kelas itu. Kebarangkalian memilih seorang perempuan ialah $\frac{1}{5}$.

Sekumpulan 6 orang pelajar perempuan memasuki kelas lima Beta. Seorang pelajar dipilih secara rawak daripada kelas itu.

Nyatakan kebarangkalian pelajar itu ialah perempuan.

A $\frac{3}{20}$

B $\frac{4}{23}$

C $\frac{7}{23}$

D $\frac{7}{20}$

- 35 Diagram 16 shows 7 labelled cards in a box.

Rajah 16 menunjukkan 7 keping kad berlabel dalam sebuah kotak.

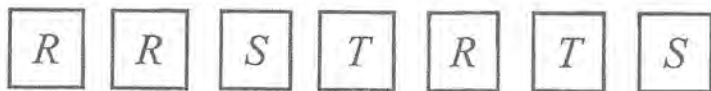


Diagram 16

Rajah 16

A few cards labelled with letter T and two cards labelled with letter R are added to the box. A card is picked at random from the box.

The probability that a card labelled with letter R is chosen is $\frac{1}{3}$.

Find the number of cards labelled with letter T .

Beberapa kad berlabel T dan dua kad berlabel R dimasukkan ke dalam kotak itu. Sekeping kad dipilih secara rawak daripada kotak itu.

Kebarangkalian sekeping kad berlabel R dipilih ialah $\frac{1}{3}$.

Cari bilangan kad berlabel T .

- A 4
- B 6
- C 8
- D 10

- 36 It is given that y varies directly as x^2 , and that $y = 12$ when $x = 2$.
Calculate the value of y when $x = \frac{2}{3}$.

Diberi bahawa y berubah secara langsung dengan x^2 , dan $y = 12$ apabila $x = 2$.

Hitung nilai y apabila $x = \frac{2}{3}$.

- A 2
- B 4
- C $\frac{4}{3}$
- D $\frac{8}{3}$

- 37 P varies inversely as the cube of Q . Given that the constant is k , express P in terms of k and Q .

P berubah secara songsang dengan kuasa tiga Q . Diberi bahawa k ialah pemalar, nyatakan P dalam sebutan k dan Q .

A $P = kQ^{\frac{1}{3}}$

B $P = \frac{k}{Q^{\frac{1}{3}}}$

C $P = kQ^3$

D $P = \frac{k}{Q^3}$

- 38 Table 2 shows two sets of values of r , s and t which satisfy $r \propto \frac{1}{st}$.

Jadual 2 menunjukkan dua set nilai r , s dan t yang memuaskan $r \propto \frac{1}{st}$.

r	2	n
s	8	$\frac{1}{2}$
t	3	12

Table 2

Jadual 2

Calculate the value of n .

Hitungkan nilai n .

A $\frac{1}{2}$

B $\frac{1}{8}$

C 8

D 2

$$39 \quad \begin{pmatrix} 4 & 7 \\ -2 & 5 \end{pmatrix} - 3 \begin{pmatrix} -1 & 3 \\ -2 & 0 \end{pmatrix} =$$

A $\begin{pmatrix} 1 & -2 \\ -8 & 5 \end{pmatrix}$

B $\begin{pmatrix} 1 & 4 \\ -8 & 5 \end{pmatrix}$

C $\begin{pmatrix} 7 & -2 \\ -8 & 5 \end{pmatrix}$

D $\begin{pmatrix} 7 & -2 \\ 4 & 5 \end{pmatrix}$

40 Given that $\begin{pmatrix} 5 & k \\ 3 & -1 \end{pmatrix} \begin{pmatrix} 3 \\ 2 \end{pmatrix} = \begin{pmatrix} 11 \\ 7 \end{pmatrix}$, calculate the value of k .

Diberi bahawa $\begin{pmatrix} 5 & k \\ 3 & -1 \end{pmatrix} \begin{pmatrix} 3 \\ 2 \end{pmatrix} = \begin{pmatrix} 11 \\ 7 \end{pmatrix}$, hitung nilai k .

A -4

B $\frac{13}{3}$

C -2

D $\frac{3}{2}$

END OF QUESTION PAPER

KERTAS SOALAN TAMAT