PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH CAWANGAN MELAKA

PEPERIKSAAN PENGESANAN
SIJIL PELAJARAN MALAYSIA 2007

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 arahan di halaman 2

Kertas soalan ini mengandungi 26 halaman bercetak

INFORMATION FOR CANDIDATES

1. *This question paper consists of 40 questions*
2. *Answer* **all** *questions*
3. *Each question is followed by four choices of answers* **A, B, C** *and* **D**.
4. *Answer each question by blackening the correct space on the answer sheet.*
5. *Blacken only* **one** *space for each question.*
6. *If you wish to change your answer, erase the blackened mark that you have done. Then blacken the space for the new answer.*
7. *The diagrams in the questions provided are not drawn to scale unless stated.*
8. *A list of formulae is provided on pages 3 to 6.*
9. *You may use a non-programmable scientific calculator.*

MAKLUMAT UNTUK CALON

1. *Kertas soalan ini mengandungi 40 soalan.*
2. *Jawab* **semua** *soalan*
3. *Setiap soalan diikuti dengan empat pilihan jawapan* **A, B, C** *dan* **D**.
4. *Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.*
5. *Bagi setiap soalan hitamkan* **satu** *ruangan sahaja.*
6. *Sekiranya anda hendak menukarkan jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.*
7. *Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.*
8. *Satu senarai rumus disediakan di halaman 3 hingga 6.*
9. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*

MATEMATICAL FORMULAE

This following formulae are helpful in answering the questions. The symbols given are commonly used

RELATIONS

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 $= \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

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

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

10 Mean $= \frac{\text{sum of (midpoint of interval} \times \text{frequency)}}{\text{sum of frequencies}}$

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

12 Pythagoras Theorem
$c^2 = a^2 + b^2$

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

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

Rumus-rumus berikut boleh membantu anda menjawab soalan. Simbol-simbol yang diberi adalah yang biasa digunakan.

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

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

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

10 $\text{Min} = \frac{\text{hasil tambah (titik tengah selang x kekerapan)}}{\text{hasil tambah kekerapan}}$

11 $\text{Min} = \frac{\text{hasil tambah nilai data}}{\text{bilangan data}}$

12 Teorem Pithagoras
$c^2 = a^2 + b^2$

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

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

SHAPES AND SPACE

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

2 Circumference of circle = $\pi d = 2\pi r$

3 Area of circle = πr^2

4 Curved surface area of cylinder = $2\pi rh$

5 Surface area of sphere = $4\pi r^2$

6 Volume of right prism = cross sectional area × length

7 Volume of cylinder = $\pi r^2 h$

8 Volume of cone = $\frac{1}{3}\pi r^2 h$

9 Volume of sphere = $\frac{4}{3}\pi r^3$

10 Volume of right pyramid = $\frac{1}{3}$ × base area × height

11 Sum of interior angles of polygon = $(n-2) \times 180^\circ$

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

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

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

15 Area of image = k^2 × area of object

Answer **all** questions

(Jawab **semua** soalan)

1 Round off 0.0594 correct to one significant figure.
(*Bundarkan 0.0594 betul kepada satu angka bererti*)

A 0.056

B 0.06

C 0.10

D 0.1

2 $7.93 \times 10^4 \times 1.29 \times 10^3 =$

A 1.023×10^{-8}

B 1.023×10^7

C 1.023×10^8

D 1.023×10^{12}

3 The length of a carpet is 8.5 m. Its width is 530 cm. The area, in m^2, of the carpet is

(*Panjang sebidang permaidani ialah 8.5 m. Lebarnya 530 cm. Luas permaidani ini dalam m^2 ialah*)

A 4.505×10^1

B 4.505×10^2

C 4.505×10^3

D 4.505×10^4

4 Convert 215_8 to a number in base 2
(*Tukar 215_8 kepada suatu nombor dalam asas 2*)

A 10000010_2

B 10001010_2

C 10001100_2

D 10001101_2

5 $110_2 + 101_2 =$

A 1110_2

B 1101_2

C 1011_2

D 1111_2

6 In Diagram 1, PQRSTU is a regular hexagon. The value of x^o is
(*Dalam Rajah 1,* PQRSTU *ialah sebuah heksagon sekata. Nilai* x^o *ialah*)

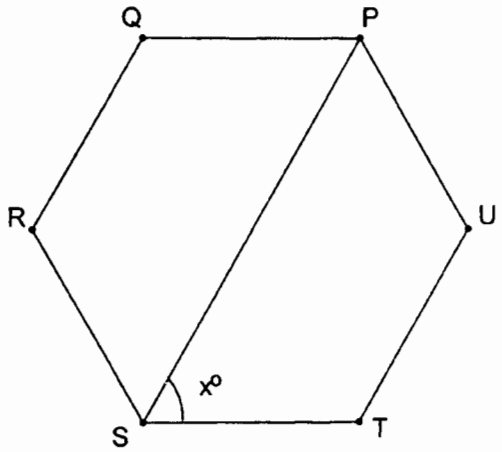


DIAGRAM 1

(*Rajah* 1)

A 60^o

B 90^o

C 120^o

D 150^o

7

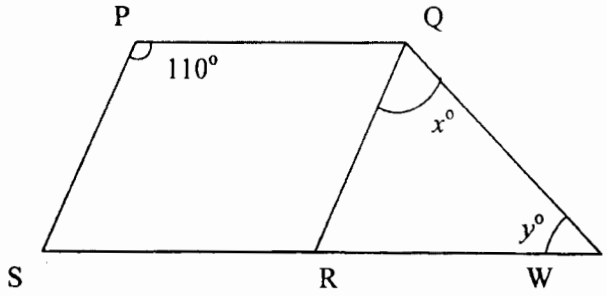


DIAGRAM 2
(*Rajah* 2)

In Diagram 2, PQRS is a rhombus and SRW is a straight line.

The value of $x^o + y^o$ is

(*Dalam Rajah* 2, PQRS *ialah sebuah rombus dan* SRW *ialah suatu garis lurus. Nilai* $x^o + y^o$ *ialah*)

A 70^0

B 110^0

C 130^0

D 150^0

8 In Diagram 3, FED is a tangent to the circle at E and BC = BE. Find x^o.
(*Dalam Rajah* 3, FED *ialah tangen kepada bulatan di* E *dan* BC = BE. *Cari* x^o.)

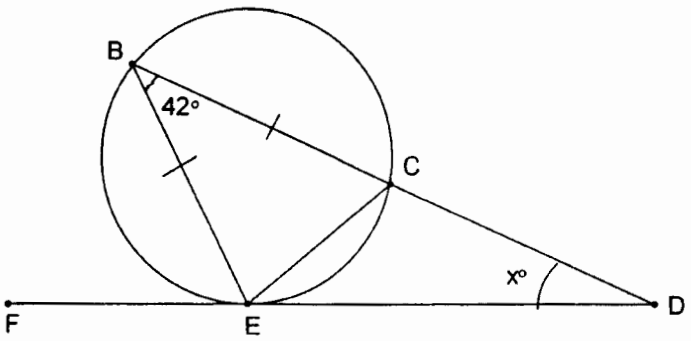


DIAGRAM 3
(*Rajah* 3)

A 27^0

B 36^0

C 42^0

D 60^0

9

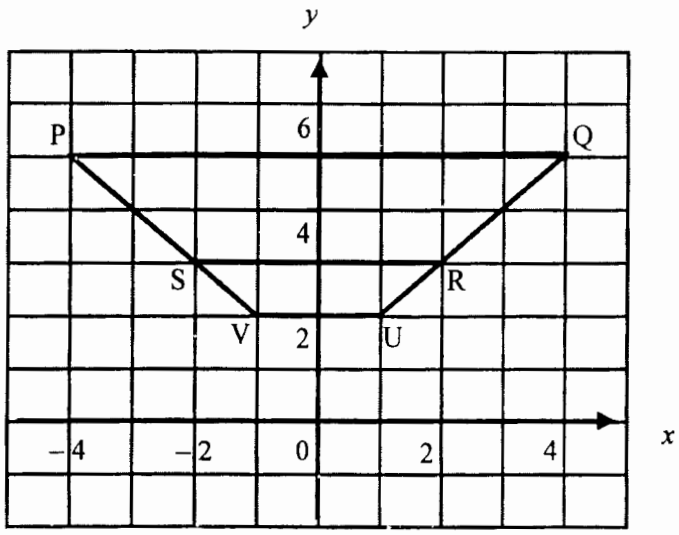


DIAGRAM 4
(*Rajah* 4)

In Diagram 4, PQRS is the image of SRUV under an enlargement. The centre of enlargement and its scale factor are

(*Dalam Rajah* 4, PQRS *ialah imej kepada* SRUV *di bawah pembesaran. Pusat dan faktor skala pembesaran ialah*)

	Centre of Enlargement (*Pusat Pembesaran*)	Scale factor (*Faktor skala*)
A	(0, 0)	2
B	(0, 0)	$\frac{1}{2}$
C	(1, 0)	2
D	(0, 1)	2

10

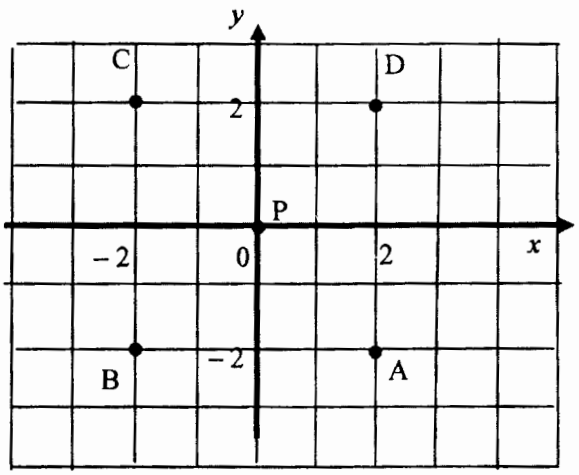


DIAGRAM 5
(*Rajah* 5)

In Diagram 5, which of the point, A, B, C or D is the image of P under a reflection in the line $x = 1$ followed by a translation $\begin{pmatrix} 0 \\ -2 \end{pmatrix}$?

(*Dalam Rajah* 5, *titik manakah* A, B, C atau D *merupakan imej kepada* P *di bawah pantulan pada garis* $x = 1$ *diikuti oleh translasi* $\begin{pmatrix} 0 \\ -2 \end{pmatrix}$?)

11 In Diagram 6, PQRS is a straight line. The length, in cm, of PQR is
(*Dalam Rajah* 6, PQRS *ialah satu garis lurus. Panjang sisi* PQR, *dalam cm, ialah*)

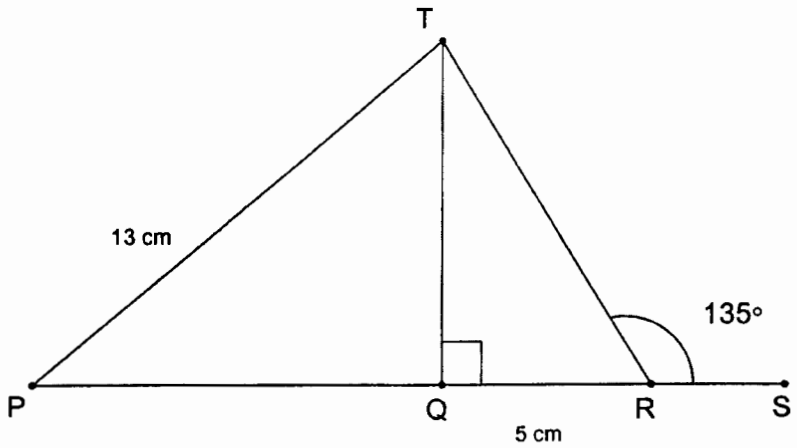


DIAGRAM 6
(*Rajah* 6)

A 8
B 12
C 17
D 18

12 Given $\tan x = 1.483$ and $90^\circ \leq x \leq 360^\circ$, find the value of x.
(*Diberi* $\tan x = 1.483$ *dan* $90^\circ \leq x \leq 360^\circ$, *cari nilai bagi* x)

A 124°
B 214°
C 236°
D 304°

13

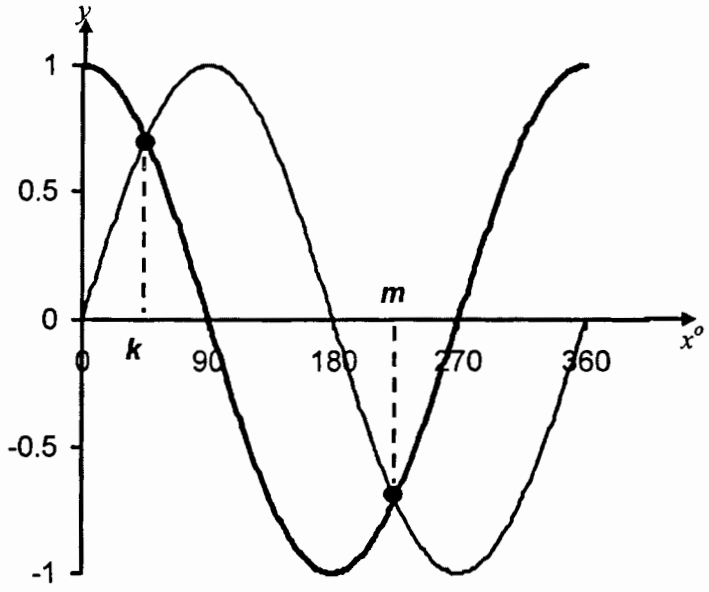


DIAGRAM 7

(*Rajah* 7)

Diagram 7 shows the graphs of $y = \sin x$ and $y = \cos x$. The value of $m - k$ is

(*Rajah 7 menunjukkan graf bagi* $y = \sin x$ *dan* $y = \kos x$. *Nilai bagi* $m - k$ *ialah*)

A 45°

B 180°

C 225°

D 270°

14 From Diagram 8, V is vertically above D. State the angle between the line VB and the base ABCD.

(*Dalam Rajah* 8, V *adalah tegak di atas* D. *Nyatakan sudut di antara garis* VB *dan tapak* ABCD)

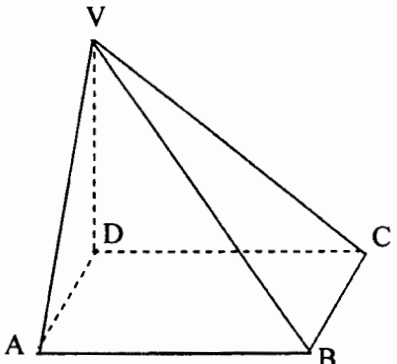


DIAGRAM 8
(*Rajah* 8)

A ∠ VBD

B ∠ VBA

C ∠ BVD

D ∠ BVA

15

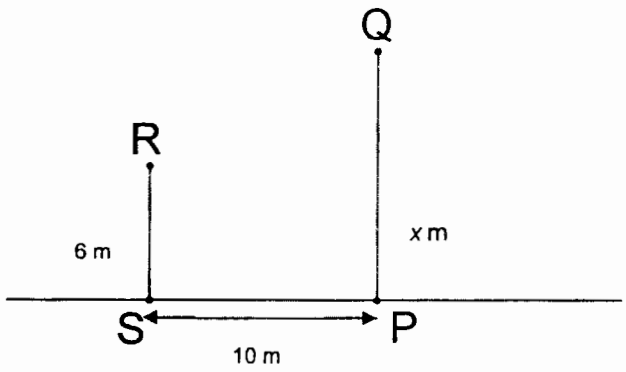


DIAGRAM 9

(*Rajah* 9)

In Diagram 9, RS and QP are two vertical poles standing on horizontal ground. The angle of elevation of Q from R is 42°. Calculate the value of x.

(*Dalam Rajah* 9, RS *dan* PQ *ialah dua batang tiang tegak yang terletak pada tanah mengufuk. Sudut dongakan* Q *dari* R *ialah* 42°. *Hitung nilai* x.)

A 13.4

B 15.0

C 17.1

D 20.9

16 G(40° N, 115° E) and H are two points on the surface of the Earth. GH is the diameter of the parallel of latitude. Find the longitude of H.

(G(40° U, 115° T) *dan* H *ialah dua titik di permukaan bumi dengan keadaan* GH *ialah diameter selarian latitud sepunya. Cari longitud bagi* H)

A 65° E

B 65° W

C 115° E

D 115° W

17

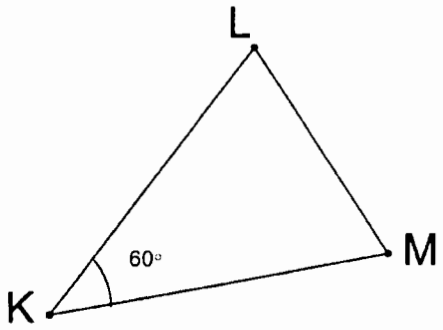


DIAGRAM 10
(*Rajah* 10)

In Diagram 10, K, L and M are three points on a horizontal surface. The bearing of L from M is 305° and the bearing of K from M is 260°.Find the bearing of K from L
(*Dalam Rajah* 10, K, L *dan* M *ialah tiga titik pada permukaan ufuk. Bearing* L *dari* M *ialah* 305° *dan bearing* K *dari* M *ialah* 260°. *Cari bearing* K *dari* L)

A 075°
B 180°
C 190°
D 200°

18 P and Q are two points on the surface of the earth. The longitudes of P and Q are 100°W and 115°E respectively.
Find the difference between the longitudes of P and Q.
(P *dan* Q *adalah dua titik yang terletak di permukaan bumi. Longitud* P *dan* Q *adalah* 100° B *dan* 115° T *masing-masing. Cari beza antara longitud* P *dan* Q)

A 15°
B 100°
C 115°
D 145°

19 Express $\frac{m+1}{5m}-\frac{2-m}{m}$ as a single fraction in its simplest form.

(*Ungkapkan* $\frac{m+1}{5m}-\frac{2-m}{m}$ *sebagai satu pecahan tunggal dalam bentuk termudah*)

A $-\frac{9}{5m}$

B $\frac{-4m-9}{5m}$

C $\frac{2m-9}{5m}$

D $\frac{6m-9}{5m}$

20 $(y-4)^2-8(2-y)$ =

A y^2

B $2y^2$

C $2y-32$

D $y^2-8y-32$

21 $4m-m(n-3)$ =

A mn

B $m-mn$

C $7m-mn$

D $3mn+3m$

22 Given that $7-2(3-x) = 3x-1$, find the value of x.

(*Diberi* $7-2(3-x) = 3x-1$, *hitungkan nilai bagi* x)

A -2

B $\frac{2}{5}$

C $\frac{1}{2}$

D 2

23 If $\frac{1}{a}+b=5$, then $a=$

(*Jika* $\frac{1}{a}+b=5$, *maka* $a=$)

A $\frac{1}{5-b}$

B $5-b$

C $\frac{1}{b-5}$

D $\frac{1}{b+5}$

24 Simplify $\frac{\left(3h^{-1}k^{\frac{1}{3}}\right)^3}{k^6}\times h^3k^2$

(*Permudahkan* $\frac{\left(3h^{-1}k^{\frac{1}{3}}\right)^3}{k^6}\times h^3k^2$)

A $\frac{9h}{k^4}$

B $\frac{27h}{k^4}$

C $\frac{27}{k^3}$

D $27hk$

25 Given that $2^x \times 16 = 2^{-1}$, find the value of x.

(Diberi $2^x \times 16 = 2^{-1}$, *hitungkan nilai bagi* x)

A -5

B -2

C 2

D 5

26 If $4x - 1 \leq 7 < x + 8$, then

(*Jika* $4x - 1 \leq 7 < x + 8$, *maka*)

A $-1 \leq x \leq 2$

B $-1 < x \leq 2$

C $0 \leq x < 2$

D $-1 \leq x < 3$

27

Score (*Markah*)	1	2	3	4	5
Number of students (*Bilangan pelajar*)	5	3	9	x	2

TABLE 1
(*Jadual* 1)

A group of students took part in a competition. Their scores are given in Table 1. If the modal score is 3, find the maximum value of x.

(*Sekumpulan pelajar telah mengambil bahagian dalam suatu pertandingan. Markah yang diperolehi oleh mereka adalah seperti dalam Jadual* 1. *Jika markah mod ialah 3, cari nilai maksimum bagi* x)

A 4

B 6

C 8

D 10

28 Given that set A = {1, 2, 3}, find the number of subsets of A.
(*Diberi set* A = {1, 2, 3}, *tentukan bilangan subset bagi* A)

A 3
B 6
C 7
D 8

29 Given that n(A ∩ B) = 6, n(A) = 12 and n(B) = 8, therefore n(A ∪ B) =
(*Diberi n*(A ∩ B) = 6, *n*(A) = 12 *dan n*(B) = 8, *maka n*(A ∪ B) =)

A 6
B 14
C 20
D 26

30 The Venn diagram shows set ξ , P, Q and R. The shaded region represents
(*Gambar rajah Venn menunjukkan set* ξ , P, Q *dan* R. *Rantau berlorek menunjukkan*)

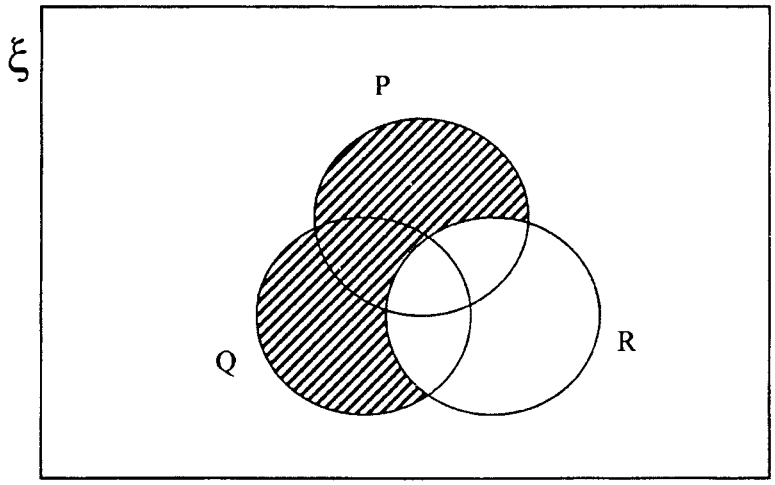
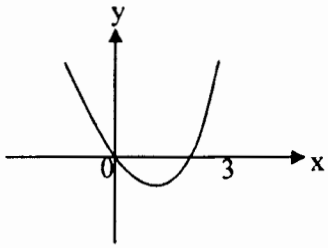


DIAGRAM 11
(*Rajah 11*)

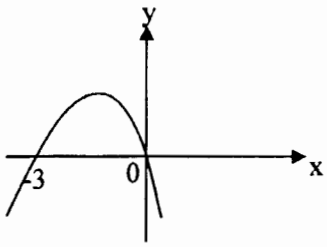
A $P \cup (Q \cap R)$
B $(P \cap Q) \cap R'$
C $(P \cup Q) \cap R'$
D $(P \cup Q)' \cap R$

31 Which of the following graphs represent $y = x(x + 3)$?
(*Graf yang manakah mewakili fungsi* $y = x(x + 3)$?)

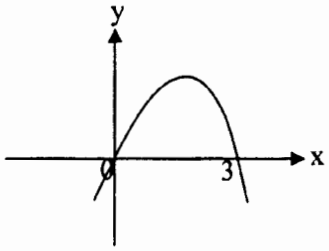
A



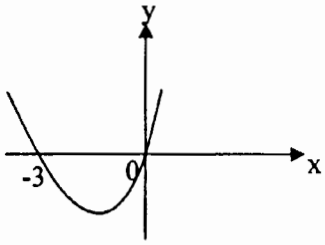
B



C



D



32 Given that $5x + 2y = 12$. Find the gradient of the straight line.

(*Diberi bahawa persamaan* $5x + 2y = 12$. *Carikan kecerunan garis lurus itu.*)

A -6

B $-\frac{5}{2}$

C $\frac{5}{2}$

D 6

33

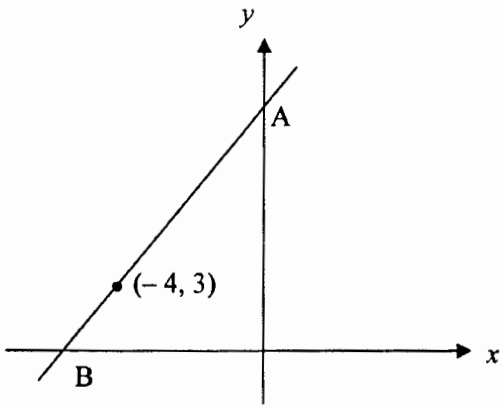


DIAGRAM 12
(*Rajah* 12)

In Diagram 12, the gradient of the straight line AB is 3. Find the y-intercept of the straight line AB.

(*Pada Rajah* 12, *kecerunan garis lurus* AB *ialah* 3. *Carikan pintasan-y bagi garis lurus AB.*)

A -5

B -4

C 3

D 15

34 There are marbles in a box, 15 of them are black and the rest are red. The probability of picking a red marble at random from the box is $\frac{2}{7}$, find the number of red marbles in the box.

(Di dalam sebuah kotak yang mengandungi guli, 15 daripadanya berwarna hitam dan baki adalah berwarna merah. Kebarangkalian mendapat sebiji guli merah secara rawak ialah $\frac{2}{7}$, carikan bilangan guli merah dalam kotak itu.)

A 6

B 15

C 21

D 35

35 The frequency table below shows the Mathematics marks of a group of students. If the probability of choosing a student who gets 50 marks and above at random is $\frac{3}{5}$, find the value of x.

(Jadual kekerapan di bawah menunjukkan markah Matematik yang diperolehi oleh sekumpulan pelajar. Jika kebarangkalian memilih seorang pelajar yang mendapat markah 50 dan ke atas secara rawak ialah $\frac{3}{5}$, cari nilai x.)

Marks *(Markah)*	0 - 39	40 - 49	50 - 59	60 - 69	70 - 79	80 - 89	90 - 99
Frequency *(Kekerapan)*	5	x	10	3	8	7	5

TABLE 2
(*Jadual* 2)

A 12

B 17

C 22

D 38

36

x	2	10
y	5	m

TABLE 3
(*Jadual* 3)

Table 3 shows the relation between the variables, x and y. If $y \propto x$, find the value of m.

(*Jadual di atas menunjukkan hubungan bagi pemboleh ubah x dan y. Jika* $y \propto x$, *carikan nilai m.*)

A $\frac{2}{5}$

B $2\frac{1}{2}$

C 4

D 25

37 Given that y varies inversely as x and $y = 6$ when $x = 3$, express y in terms of x.

(*Diberi bahawa y berubah secara songsang dengan x dan* $y = 6$ *apabila* $x = 3$, *ungkapkan y dalam sebutan x.*)

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

B $y = 2x$

C $y = \frac{18}{x}$

D $y = 18x$

38 It is given that $p \propto \frac{v}{w^2}$, and $p = 4$ when $v = 6$ and $w = 3$, calculate the value of v when $p = 3$ and $w = \frac{1}{4}$.

(Diberi $p \propto \frac{v}{w^2}$, dan $p = 4$ apabila $v = 6$ dan $w = 3$, hitungkan nilai v apabila $p = 3$ dan $w = \frac{1}{4}$.)

A $\frac{1}{32}$

B $\frac{1}{8}$

C 2

D 8

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

A $\begin{pmatrix} -12 \\ 14 \end{pmatrix}$

B $\begin{pmatrix} -12 & 14 \end{pmatrix}$

C $\begin{pmatrix} 7 \\ 14 \end{pmatrix}$

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

40 Write the following simultaneous linear equations as a matrix equation.

(*Nyatakan persamaan linear serentak berikut dalam bentuk persamaan matriks.*)

$2p + q = -5$
$5q - p = 9$

A $\begin{pmatrix} 2 & 1 \\ 5 & -1 \end{pmatrix}\begin{pmatrix} p \\ q \end{pmatrix} = \begin{pmatrix} -5 \\ 9 \end{pmatrix}$

B $\begin{pmatrix} 2 & 1 \\ 5 & -1 \end{pmatrix}\begin{pmatrix} -5 \\ 9 \end{pmatrix} = \begin{pmatrix} p \\ q \end{pmatrix}$

C $\begin{pmatrix} 2 & 1 \\ -1 & 5 \end{pmatrix}\begin{pmatrix} p \\ q \end{pmatrix} = \begin{pmatrix} -5 \\ 9 \end{pmatrix}$

D $\begin{pmatrix} 2 & 1 \\ -1 & 5 \end{pmatrix}\begin{pmatrix} -5 \\ 9 \end{pmatrix} = \begin{pmatrix} p \\ q \end{pmatrix}$

END OF QUESTION PAPER
(*KERTAS SOALAN TAMAT*)