

1449/1
MATEMATIK
Kertas 1
November 2022
 $1\frac{1}{2}$ jam



SEKOLAH MENENGAH KEBANGSAAN TAMAN PONGLIMA
34000 TAIPING

PEPERIKSAAN PERCUBAAN SPM
TAHUN 2022

MATEMATIK

Kertas 1

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Kertas soalan ini mengandungi **40 soalan** dalam dwibahasa.
2. Jawab **semua** soalan.
3. Jawab setiap soalan dengan menghitamkan ruangan yang betul pada kertas jawapan objektif. Hitamkan **satu** ruangan sahaja bagi setiap soalan.
4. Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
5. Satu senarai rumus disediakan di halaman 2, 3 dan 4.
6. Anda dibenarkan menggunakan kalkulator saintifik.

RUMUS MATEMATIK MATHEMATICAL FORMULAE

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

The following formulae may be helpful in answering the questions. The symbols given are the ones commonly used.

OMBOR DAN OPERASI NUMBER AND OPERATIONS

- | | |
|--|--|
| <p>1 $a^m \times a^n = a^{m+n}$</p> <p>3 $(a^m)^n = a^{m \cdot n}$</p> <p>5 $a^{\frac{m}{n}} = (a^{\frac{1}{n}})^m = (a^{\frac{1}{n}})^m$</p> <p>7 Faedah mudah / <i>Simple interest</i>, $I = Prt$</p> <p>9 Jumlah bayaran balik / <i>Total repayment</i>, $A = P + Prt$</p> | <p>2 $a^m \div a^n = a^{m-n}$</p> <p>4 $a^{\frac{1}{n}} = \sqrt[n]{a}$</p> <p>6 $a^{\frac{m}{n}} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$</p> <p>8 Nilai matang/<i>Maturity value</i>, $M = P \left(1 + \frac{r}{n}\right)^{nt}$</p> |
|--|--|

10
$$\text{Premium} = \frac{\text{Nilai muka polisi}}{\text{RMx}} \times (\text{Kadar premium per RMx})$$

$$\text{Premium} = \frac{\text{Face value of policy}}{\text{RMx}} \times (\text{Premium rate per RMx})$$

11
$$\text{Jumlah insurans yang harus dibeli} = \left(\frac{\text{Peratusan ko-insurans}}{\text{ko-insurans}} \right) \times \left(\frac{\text{Nilai boleh insurans harta}}{\text{insurans harta}} \right)$$

$$\text{Amount of required insurance} = \left(\frac{\text{Percentage of co-insurance}}{\text{co-insurance}} \right) \times \left(\frac{\text{Insurable value of property}}{\text{of property}} \right)$$

PERKAITAN DAN ALGEBRA RELATIONSHIP AND ALGEBRA

- | | |
|--|---|
| <p>1 Jarak / <i>Distance</i> = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$</p> <p>3 Laju Purata = $\frac{\text{Jumlah jarak}}{\text{Jumlah masa}}$</p> <p>$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$</p> <p>5 $A^{-1} = \frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$</p> | <p>2 Titik Tengah / <i>midpoint</i> $(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$</p> <p>4 $m = \frac{y_2 - y_1}{x_2 - x_1}$</p> <p>6 $m = -\frac{\text{pintasan-y}}{\text{pintasan-x}}$</p> <p>$m = -\frac{\text{y-intercept}}{\text{x-intercept}}$</p> |
|--|---|

SUKATAN DAN GEOMETRI
MEASUREMENT AND GEOMETRY

- 1 Teorem Pythagoras / *Pythagoras Theorem* $c^2 = a^2 + b^2$

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

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

- 4 Luas bulatan = πj^2
Area of circle = πr^2

- 5
$$\frac{\text{Panjang lengkok}}{2\pi j} = \frac{\theta}{360^\circ}$$

$$\frac{\text{Arc length}}{2\pi r} = \frac{\theta}{360^\circ}$$

- 6
$$\frac{\text{Luas sektor}}{\pi j^2} = \frac{\theta}{360^\circ}$$

$$\frac{\text{Area of sector}}{\pi r^2} = \frac{\theta}{360^\circ}$$

- 7 Luas layang = $\frac{1}{2} \times$ hasil darab panjang dua pepenjuru
Area of kite = $\frac{1}{2} \times$ *product of two diagonals*

- 8 Luas trapezium = $\frac{1}{2} \times$ hasil tambah dua sisi selari $\times$ tinggi
Area of trapezium = $\frac{1}{2} \times$ *sum of parallel sides* $\times$ *height*

- 9 Luas permukaan silinder = $2\pi j^2 + 2\pi jt$
Surface area of cylinder = $2\pi r^2 + 2\pi rh$

- 10 Luas permukaan kon = $\pi j^2 + \pi js$
Surface area of cone = $\pi r^2 + \pi rs$

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

- 12 Isi padu prisma = luas keratan rentas $\times$ tinggi
Volume of prism = *cross sectional area* $\times$ *height*

- 13 Isi padu silinder = $\pi j^2 t$
Volume of cylinder = $\pi r^2 h$

- 14 Isi padu kon = $\frac{1}{3}\pi j^2 t$
Volume of cone = $\frac{1}{3}\pi r^2 h$
- 15 Isi padu sfera = $\frac{4}{3}\pi j^3$
Volume of sphere = $\frac{4}{3}\pi r^3$
- 16 Isi padu piramid = $\frac{1}{3} \times \text{luas tapak} \times \text{tinggi}$
Volume of pyramid = $\frac{1}{3} \times \text{base area} \times \text{height}$
- 17 Faktor skala, $k = \frac{PA'}{PA}$
Scale factor, k = $\frac{PA'}{PA}$
- 18 Luas imej = $k^2 \times \text{luas objek}$
Area of image = $k^2 \times \text{area of object}$

STATISTIK DAN KEBARANGKALIAN STATISTICS AND PROBABILITY

- 1 Min / Mean, $\bar{x} = \frac{\sum x}{N}$
- 2 Min / Mean, $\bar{x} = \frac{\sum fx}{\sum f}$
- 3 Varians / Variance, $\sigma^2 = \frac{\sum x^2}{N} - \bar{x}^2 = \frac{\sum (x - \bar{x})^2}{N}$
- 4 Varians / Variance, $\sigma^2 = \frac{\sum fx^2}{\sum f} - \bar{x}^2 = \frac{\sum f(x - \bar{x})^2}{\sum f}$
- 5 Sisihan piawai / Standard deviation, $\sigma = \sqrt{\frac{\sum x^2}{N} - \bar{x}^2} = \sqrt{\frac{\sum (x - \bar{x})^2}{N}}$
- 6 Sisihan piawai / Standard deviation, $\sigma = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2} = \sqrt{\frac{\sum f(x - \bar{x})^2}{\sum f}}$
- 7 $P(A) = \frac{n(A)}{n(S)}$
- 8 $P(A') = 1 - P(A)$

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

1. Antara yang berikut, pilih langkah pengiraan yang betul bagi
From the following, choose the correct calculation step for

$$5(-3 + 10) \times 2.4 \div \frac{3}{4}$$

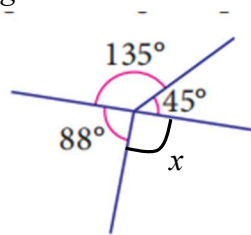
A $5(-7) \times 3.2$

B $35 \times 2.4 \times \frac{3}{4}$

C $35 \times 2.4 \times \frac{4}{3}$

D -35×3.2

2. Rajah 1 menunjukkan beberapa garis lurus,
Diagram 1 shows several straight lines.



Rajah 1
Diagram 1

Hitung nilai x.
Calculate the value of x.

A 85°

B 92°

C 95°

D 100°

3. Selesaikan:
Solve:

$$4x - 2 \leq 10$$

A $x \leq 8$

B $x \leq 4$

C $x \leq 3$

D $x \geq 2$

4. $(3x + 5y) + (8x - y - 9) =$

A $11x + 4y - 9$

B $8x + 6y - 9$

C $3x - 4y - 9$

D $8x - 6y - 3$

5. Selesaikan,
Solve,

$$\frac{2x + 13}{5} = 7$$

A 20

B -20

C -11

D 11

16. $(k^2 \times 2k^6)^2 =$

A $2k^8$

B $2k^{12}$

C $4k^{16}$

D $4k^{24}$

17. Rajah 6 menunjukkan harga jual dan wang pendahuluan sebuah telefon pintar.

Diagram 6 shows the selling price and down payment of a smartphone.

RM3 650	
Wang pendahuluan Down payment	RM200
Kadar faedah setahun Interest rate per annum	3.8%
Tempoh bayaran Loan period	2 tahun 2 years

Rajah 6 / Diagram 6

Sani ingin membeli telefon itu. Dia membayar wang pendahuluan dan bakinya dibayar secara ansuran bulanan. Berapakah jumlah faedah yang perlu dibayar oleh Sani?

Sani wants to buy the smartphone. He makes the down payment and the balance is paid in monthly instalments. What is the total interest to be paid by Sani?

A RM 131.10

B RM 157.10

C RM 262.20

D RM 285.20

18. Jadual 2 di bawah menunjukkan bilangan ketidakhadiran 20 orang murid pada bulan September tahun 2021. Hitung varians bagi bilangan hari murid tidak hadir.

Table 2 below shows the number of absentees of 20 students in the September of 2021. Calculate the variance for the number of days students were absent.

Bilangan hari/ Number of day	1	2	3	4	5
Bilangan murid/ Number of students	3	5	8	2	2

Jadual 2 / Table 2

A 1.13

B 1.29

C 1.75

D 2.75

19. Sebanyak 7 dari 20 alat ujian pengesanan COVID-19 dalam sebuah kotak adalah didapati rosak. Dua alat ujian pengesanan COVID-19 di ambil secara rawak daripada kotak tersebut. Hitung kebarangkalian bahawa kedua-dua alat ujian pengesanan itu dalam keadaan elok.

7 out of 20 COVID-19 test kit in a box are damage. Two COVID-19 test kit are randomly chosen from the box. Calculate the probability of both of the test kits are in good condition.

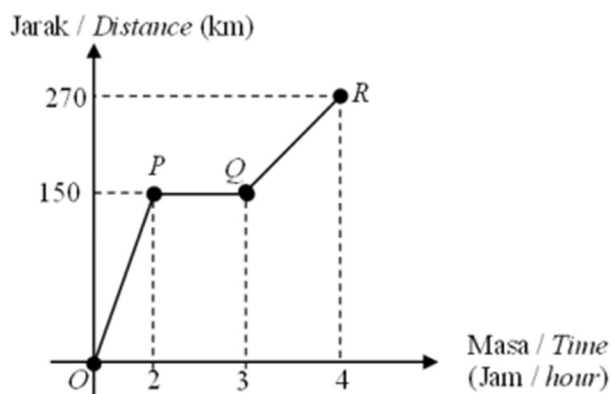
A $\frac{39}{95}$

B $\frac{39}{100}$

C $\frac{1}{20}$

D $\frac{169}{400}$

20. Rajah 7 menunjukkan graf jarak-masa perjalanan Habib sejauh 270 km.
Diagram 7 shows the distance-time graph Habib for a distance of 270 km.



Rajah 7 / Diagram 7

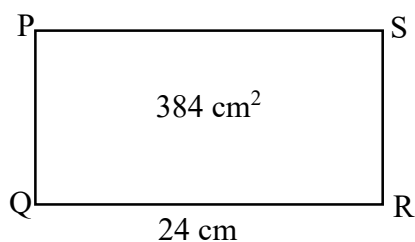
Tentukan tempoh masa dalam keadaan pegun dan laju perjalanan dalam tempoh 2 jam yang pertama.

Determine the period of time at rest and the speed of travel in the first 2 hours.

- | | |
|---|---|
| A 2 jam , 75 kmj^{-1}
2 hour , 75 kmh^{-1} | B 1 jam , 75 kmj^{-1}
1 hour , 75 kmh^{-1} |
| C 2 jam , 150 kmj^{-1}
2 hour , 150 kmh^{-1} | D 1 jam , 150 kmj^{-1}
1 hour , 150 kmh^{-1} |

21. Rajah 8 menunjukkan, PQRS ialah lukisan berskala bagi sebidang tanah berbentuk segi empat tepat mengikut skala 1 : 100 000.

Diagram 8 shows, PQRS is the scale drawing of a rectangular plot of land according to a scale of 1: 100 000.



Rajah 8 / Diagram 8

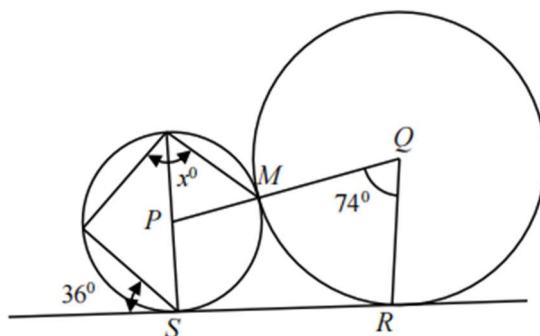
Cari panjang sebenar, dalam km, yang diwakili oleh RS.

Find the actual length, in km, represented by RS.

- | | |
|--------|--------|
| A 0.16 | B 16 |
| C 160 | D 1600 |

22. Rajah 9 menunjukkan dua bulatan dengan pusat P dan Q bersentuh di M . SR adalah tangen sepunya kepada kedua-dua bulatan masing-masing di S dan R .

Diagram 9 shows two circles with centres P and Q touching at M . SR is the common tangents to the circle at S and R respectively.



Rajah 9 / Diagram 9

Cari nilai x .

Find the value of x .

A 72

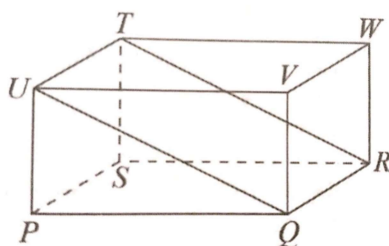
B 81

C 89

D 110

23. Rajah 10 menunjukkan sebuah kuboid.

Diagram 10 shows a cuboid.



Rajah 10 / Diagram 10

Antara berikut, yang manakah normal kepada satah PQRS?

Which of the following is a normal to the plane PQRS?

A TQ

B QU

C RS

D WR

24. Diberi bahawa $P = \{\text{faktor bagi } 16\}$ dan $Q = \{\text{nombor perdana yang kurang daripada } 15\}$. Senaraikan semua unsur bagi $P \cup Q$.

Given that $P = \{\text{factors of } 16\}$ and $Q = \{\text{prime numbers less than } 15\}$.

List all the elements of $P \cup Q$.

A $\{1, 2, 3, 4, 8, 16\}$

B $\{2, 3, 5, 7, 8, 11, 18\}$

C $\{2, 3, 4, 5, 7, 11, 13, 16\}$

D $\{1, 2, 3, 4, 5, 7, 8, 11, 13, 16\}$

29. Pengurus sebuah gedung pakaian mempunyai beberapa sasaran bagi pekerja jualannya.

The manager of a clothing store has several targets for his sales employees.

Pada bulan Mac jumlah masa, t yang digunakan untuk mengira inventori Gedung selebih-lebihnya 6 jam.

In March the total time, t used to calculate the store inventory was a maximum of 6 hours.

Jumlah jualan minimum sebulan dalam RM, x , ialah 19 000.

The minimum sales volume per month in RM, x , is 19 000.

Bina dua ketaksamaan linear berdasarkan situasi tersebut.

Construct two linear inequality based on the situation.

A $t \leq 6$, $x \geq 19\,000$

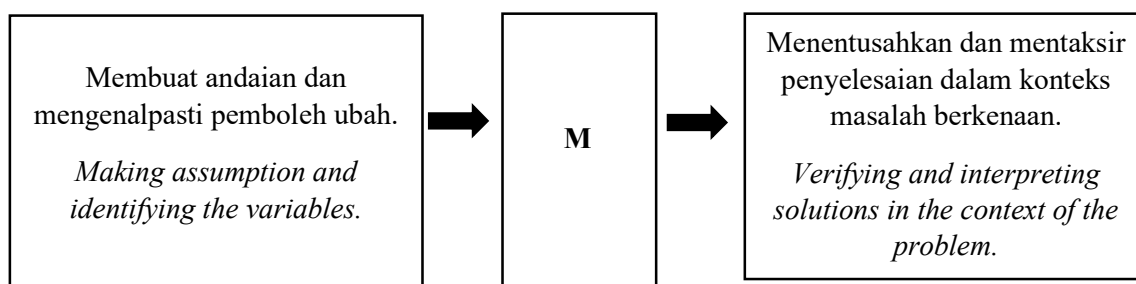
B $t \geq 6$, $x \leq 19\,000$

C $t > 6$, $x < 19\,000$

D $t > 6$, $x > 19\,000$

30. Rajah 12 menunjukkan sebahagian proses permodelan matematik yang tidak lengkap.

Diagram 12 shows part of the incomplete mathematical modelling process.



Rajah 12 / Diagram 12

Antara yang berikut, yang manakah menunjukkan proses M?

Which of the following shows the process M?

- A Mengaplikasikan matematik untuk menyelesaikan masalah.
Applying mathematics to solve problems.
- B Mengenal pasti dan mendefinisikan masalah.
Identifying and defining the problems.
- C Membentuk persamaan matematik dalam konteks dunia sebenar.
Forming mathematical equation in real-world contexts.
- D Memurnikan model matematik.
Refining the mathematical model.

31. Ogif di bawah menunjukkan umur bagi sekumpulan murid.
Ogive below shows the age of a group of students.



Cari median umur.
Find the median of the age.

- A 24.5
 B 25.5
 C 26.5
 D 27.5
32. Diberi bahawa $p \propto q^2r$, ungkapkan p dalam sebutan q dan r jika $p = 15$ apabila $q = 5$ dan $r = 3$.
Given that $p \propto q^2r$, express p in terms of q and r if $p = 15$ when $q = 5$ and $r = 3$

- A $p = \frac{1}{5}qr^2$
 B $p = 5q^2r$
 C $p = q^2r$
 D $p = \frac{1}{5}q^2r$

33. Encik Hadif menerima pendapatan aktif sebanyak RM4 000, dan pendapatan pasif sebanyak RM1 000 dalam sebulan. Encik Hadif juga mempunyai perbelanjaan tetap sebanyak RM1850 dan perbelanjaan tidak tetap sebanyak RM750 sebulan. Hitung aliran tunai bulanan Encik Hadif.
Mr. Hadif receives an active income of RM4 000, and a passive income of RM1 000 in a month. Mr. Hadif also has a fixed expense of RM1 850 and a non -fixed expense of RM750 per month. Calculate Mr. Hadif's monthly cash flow.

- A RM 2400
 B – RM 2400
 C RM 400
 D – RM 400

34. Diberi bahawa $3Q + \begin{bmatrix} 2 & 4 \\ 6 & -3 \end{bmatrix} = \begin{bmatrix} 8 & 10 \\ 6 & 12 \end{bmatrix}$

It is given that $3Q + \begin{bmatrix} 2 & 4 \\ 6 & -3 \end{bmatrix} = \begin{bmatrix} 8 & 10 \\ 6 & 12 \end{bmatrix}$

Cari matriks Q .

Find of matrix Q .

A $\begin{bmatrix} 6 & 6 \\ 0 & 9 \end{bmatrix}$

B $\begin{bmatrix} 6 & 6 \\ 0 & 15 \end{bmatrix}$

C $\begin{bmatrix} 2 & 2 \\ 0 & 5 \end{bmatrix}$

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

35. Puan Lisa memiliki sebuah rumah banglo yang mempunyai nilai boleh insurans sebanyak RM 500 000. Rumah tersebut diinsuranskan dengan insurans kebakaran yang memperuntukkan ko-insurans 70% daripada nilai boleh insurans. Jika rumah Puan Lisa hangus terbakar, berapakah nilai pampasan yang akan diterima oleh Puan Lisa?

Mrs Lisa has a bungalow house with an insurable value of more than RM 500 000. The house is insured using a fire insurance that allocates co-users 70% of the insurable value. If Mrs Lisa's house burns down, how much compensation will Mrs Lisa receive?

A RM 150 000

B RM 200 000

C RM 350 000

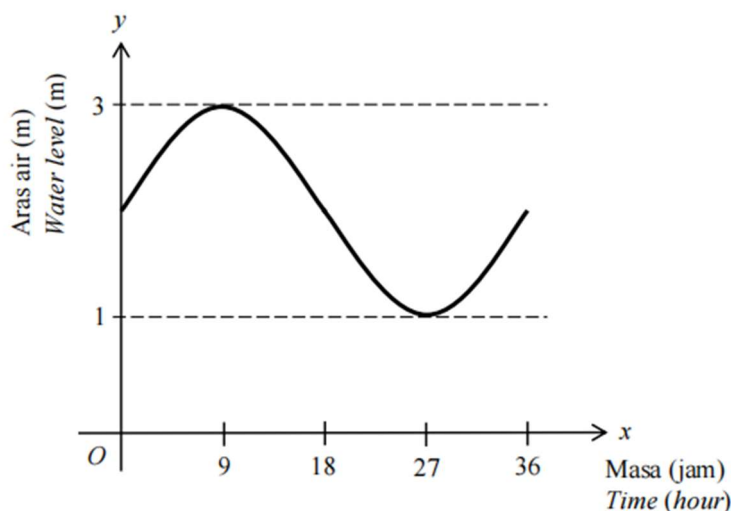
D RM 500 000

36. Rajah 13 menggambarkan aras air yang direkodkan di sebuah pelabuhan. Diberi y mewakili aras air, dalam meter, dan x mewakili masa, dalam jam.

Nyatakan fungsi trigonometri bagi graf tersebut dalam bentuk $y = a \sin bx + c$.

Diagram 13 depicts the water level recorded at a port. It is given that y represents the water level, in metre, and x represents time, in hours.

State the trigonometric function of the graph in the form of $y = a \sin bx + c$.



Rajah 13 / Diagram 13

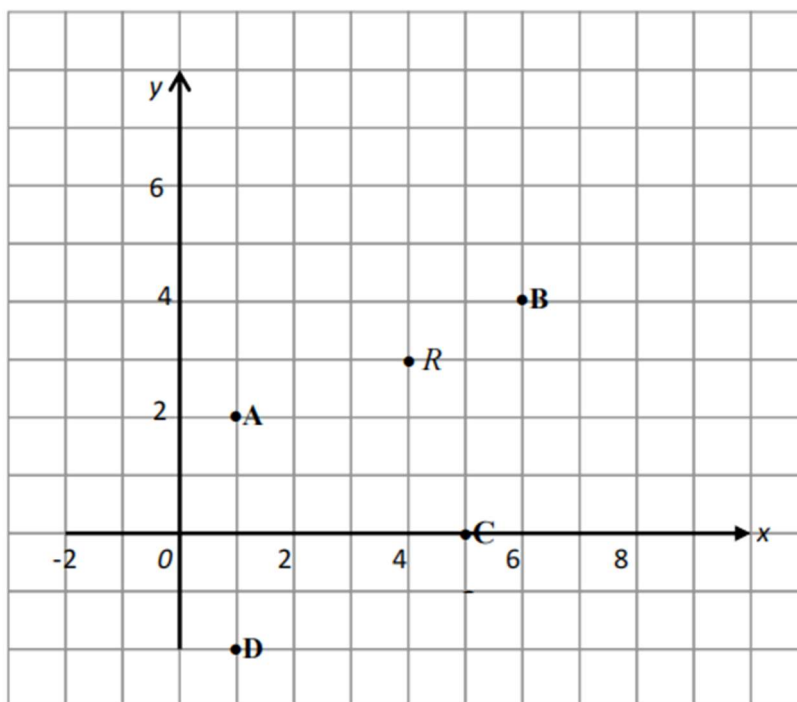
A $y = 2 \sin 10x + 1$

B $y = 2 \sin 9x + 1$

C $y = \sin 10x + 2$

D $y = \sin 9x + 2$

40. Dalam Rajah 14, menunjukkan titik-titik yang di plot pada satah Cartes.
In the Diagram 14, shows points plotted on Cartesian plane.



Rajah 14 / Diagram 14

Tentukan samada titik **A**, **B**, **C** atau **D** merupakan imej bagi titik **R** di bawah putaran 90° lawan arah jam pada pusat $(3, 1)$.

*Determine which of the point, **A**, **B**, **C** or **D**, is the image of point **R** under a 90° anticlockwise rotation about the centre $(3, 1)$.*

KERTAS SOALAN TAMAT

Disediakan oleh,

.....
 FAKHRAIH BINTI SULAIMAN
 GURU SUBJEK MATEMATIK

Disemak oleh,

.....
 ZURITA BINTI ZAINUDDIN
 KETUA PANITIA MATEMATIK

Disahkan oleh,

.....