

SULIT
1449/1
Matematik
Kertas 1
September
2007
 $1\frac{1}{4}$ jam

1449/1



PEPERIKSAAN PERCUBAAN SPM TAHUN 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 di bahagian atas adalah dalam bahasa Inggeris. Soalan di bahagian bawah adalah yang sepadan dalam bahasa Melayu.
3. Calon dikehendaki membaca maklumat di halaman 2.

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Kertas soalan ini mengandungi 22 halaman bercetak

INFORMATION FOR CANDIDATES

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

MAKLUMAT UNTUK CALON

1. *Kertas soalan ini mengandungi 40 soalan.*
2. *Jawab **semua** soalan.*
3. *Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.*
4. *Bagi setiap soalan hitamkan satu ruangan sahaja.*
5. *Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.*
6. *Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan*
7. *Satu senarai rumus disediakan di halaman 3 hingga 4.*
8. *Subuah buku sifir matematik empat angka disediakan.*
9. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.*

MATHEMATICAL FORMULAE

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

ones commonly used.

RELATIONS

$$1 \quad a^m \times a^n = a^{m+n}$$

$$2 \quad a^m \div a^n = a^{m-n}$$

$$3 \quad (a^m)^n = a^{mn}$$

$$4 \quad A^{-1} = \frac{1}{ad-bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$$

$$5 \quad P(A) = \frac{n(A)}{n(S)}$$

$$6 \quad P(A') = 1 - P(A)$$

$$7 \quad \text{Distance} = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

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

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

$$10 \quad \text{Mean} = \frac{\text{sum of data}}{\text{number of data}}$$

$$11 \quad \text{Min} = \frac{\text{sum of (class mark} \times \text{frequency)}}{\text{sum of frequencies}}$$

12 Pythagoras Theorem

$$c^2 = a^2 + b^2$$

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

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

SHAPES AND SPACE

- 1 Area of trapezium $= \frac{1}{2} \times \text{sum of parallel sides} \times \text{height}$
- 2 Circumference $= \pi d = 2\pi r$
- 3 Area of circle $= \pi r^2$
- 4 Curved surface area of cylinder $= 2\pi rh$
- 5 Surface area of sphere $= 4\pi r^2$
- 6 Volume of right prism $= \text{cross sectional} \times \text{length}$
- 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 $= \frac{1}{3} \times \text{base area} \times \text{height}$
- 11 Sum of interior angles of a 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 $= k^2 \times \text{area of object.}$

Answer **all** question*Jawab semua soalan.*

1. Round off 73 900 correct to two significant figures.

Bundarkan 73 900 betul kepada dua angka bererti.

- A 74
- B 740
- C 73 000
- D 74 000

- 2 $3.4 \times 10^5 - 47\,000 =$

- A 2.93×10^5
- B 8.1×10^4
- C 2.93×10^9
- D 8.1×10^5

- 3 $\frac{0.082 \times 7000}{(0.2)^2} =$

- A 1.435×10^4
- B 1.435×10^5
- C 2.87×10^2
- D 2.87×10^3

- 4 The number of residents in two districts is 3 700 000 and 290 000 respectively. Find the difference in the number of residents in two districts.

Bilangan penduduk di dua buah daerah masing-masing ialah 3 700 000 orang dan 290 000 orang. Hitung beza antara bilangan penduduk kedua-dua daerah itu.

- A 3.41×10^5
- B 3.41×10^6
- C 0.341×10^5
- D 34.1×10^6

5. What is the value of the digit 3, in base ten, in the number 43201_5 .

Apakah nilai bagi digit 3, dalam asas sepuluh, dalam nombor 43201_5 .

- A 125
- B 375
- C 500
- D 1900

6 $101011_2 + 111_2 =$

- A 110000_2
- B 111000_2
- C 110010_2
- D 110011_2

7

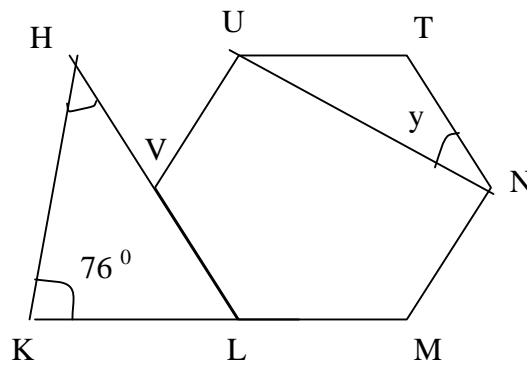


DIAGRAM 1

Diagram 1, LMNTUV is a regular hexagon. KLM and HVL are straight lines. Find the value of $x + y$.

Rajah 1, LMNTUV ialah sebuah heksagon sekata. KLM dan HVL ialah garis lurus. Cari nilai bagi $x + y$.

- A 64°
- B 74°
- C 104°
- D 106°

8

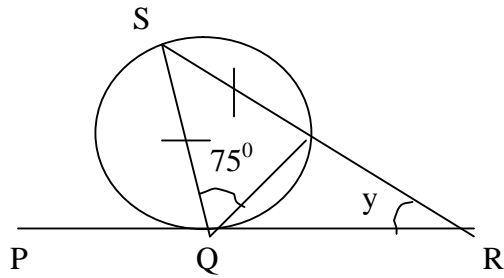


DIAGRAM 2

In diagram 2, PQR is the tangent to the circle at Q.
Find the value of y .

*Dalam rajah 2, PQR ialah tangen kepada bulatan di Q.
Cani nilai y .*

- A 30°
- B 45°
- C 55°
- D 75°

9 Diagram 3 shows seven points on a square grid. L is the image of K under a reflection.

Rajah 3 menunjukkan tujuh titik pada grid segi empat sama. L ialah imej bagi K di bawah satu pantulan.

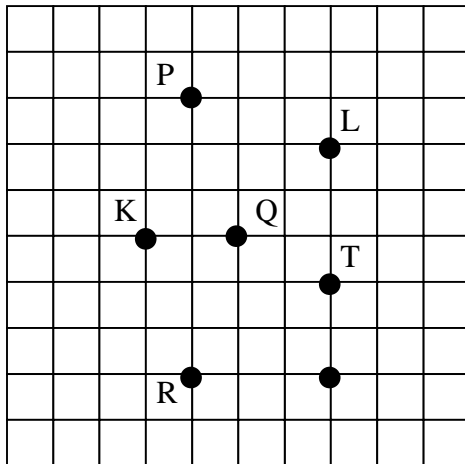


DIAGRAM 3

The axis of reflection is the straight line that joins P and

Paksi pantulan itu ialah garis lurus yang menyambungkan P dengan

- A Q
- B R
- C S
- D T

- 10 Diagram 4 shows points plotted on a Cartesian plane.

Rajah 4 menunjukkan beberapa titik pada suatu satah cartesian.

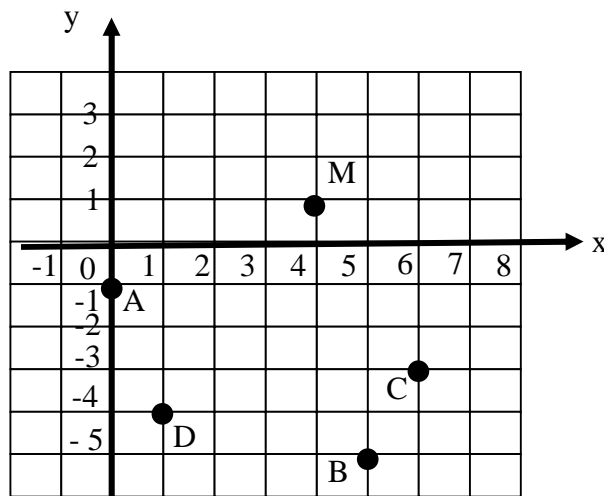


DIAGRAM 4

Which of the point, **A**, **B**, **C** or **D**, is the image of point M under an anticlockwise rotation of 270° about the centre $(3, -2)$?

Antara titik **A**, **B**, **C** or **D**, yang manakah imej bagi titik M di bawah putaran 270° lawan arah jam pada pusat $(3, -2)$?

- 11 Given that $\tan \theta = 0.4453$ and $180^\circ \leq \theta \leq 360^\circ$, find the value of θ .

Diberi $\tan \theta = 0.4453$ dan $180^\circ \leq \theta \leq 360^\circ$, cari nilai θ .

- A 156°
- B 204°
- C 246°
- D 336°

- 12 Diagram 5 shows the graph of $y = -\sin \theta$. The value of θ is

Rajah 5 menunjukkan graf $y = \sin \theta$. Nilai θ ialah

- A 90°
 B 180°
 C 270°
 D 360°

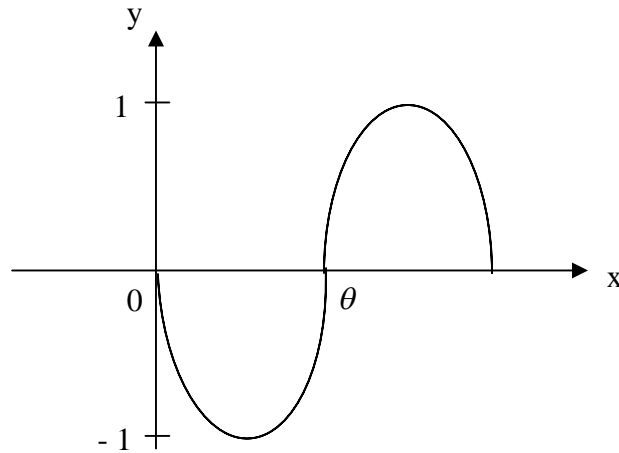


DIAGRAM 5

- 13 Given that $\tan x = \frac{24}{7}$, find the value of $\sin x - \cos x$.

Diberi $\tan x = \frac{24}{7}$, cari nilai bagi $\sin x - \cos x$.

- A $\frac{17}{25}$
 B $\frac{24}{25}$
 C $\frac{7}{25}$
 D $-\frac{24}{25}$

14

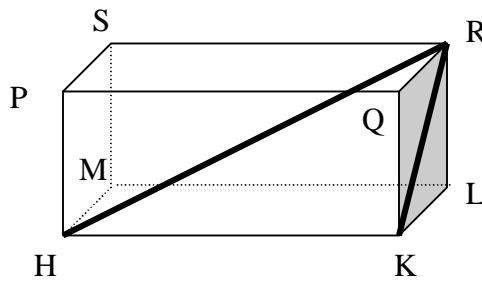


DIAGRAM 6

Diagram 6 shows a cuboid. Name the angle between the planes HRK and HKLM.

Rajah 6 menunjukkan sebuah kuboid. Namakan sudut di antara satah HRK dengan HKLM.

- A $\angle PHQ$
- B $\angle PLM$
- C $\angle QKL$
- D $\angle RKL$

15

Diagram 7, P, Q and R are three points on horizontal ground. PT and RS are two vertical poles. The angle of elevation of T from Q is 50° whereas the angle of depression of Q from S is 43° . Find the distance, in m, between the two poles.

Rajah 7, P, Q dan R ialah tiga titik pada satah mengufuk. PT dan RS ialah dua batang tiang tegak. Sudut dongakan puncak T dari Q ialah 50° manakala sudut tunduk puncak Q dari S ialah 43° . Hitung jarak, dalam m, di antara dua batang tiang tegak.

- A 3.4
- B 6.4
- C 9.8
- D 11.8

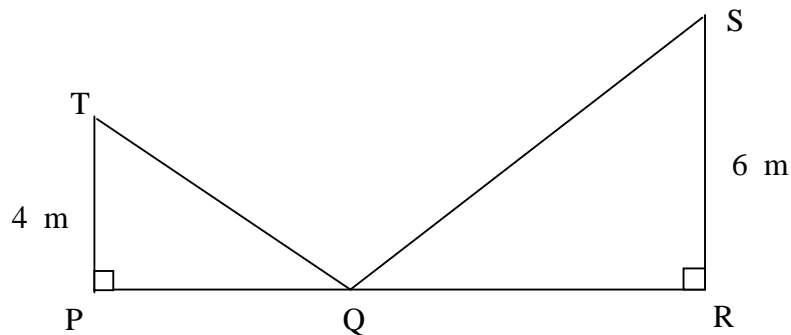


DIAGRAM 7

- 16 Diagram 8 shows two vertical poles, AB and CD, on a horizontal plane. The angle of depression of vertex C from vertex A is 35° and $AB=2CD$.

Rajah 8 menunjukkan dua batang tiang tegak, AB dan CD, yang terletak pada permukaan mengufuk.

Sudut tunduk puncak C dari puncak A ialah 35° dan $AB=2CD$.

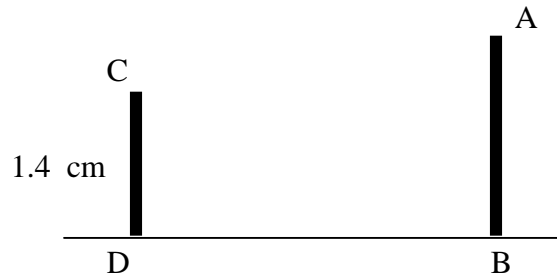


DIAGRAM 8

Find the distance of BD, in cm.

Cari panjang BD, dalam cm.

- A 1.2
 B 1.4
 C 1.6
 D 2.0
- 17 P (35° N, 40° W), Q and R are three points on the surface of the earth. PQ is a diameter of the earth. R is lies due west of Q. The difference in longitude between Q and R is 60° . The position of R is

P (35° N, 40° W), Q dan R ialah tiga titik di permukaan bumi.

PQ ialah diameter bumi. R terletak ke barat Q. Beza longitud di antara Q dengan R ialah 60° . Kedudukan R ialah

- A (35° S, 20° E)
 B (35° S, 80° E)
 C (55° S, 20° W)
 D (55° S, 80° E)

- 18 K and L (43° S, 107° E) are 2 points on the surface of the earth with KL as the diameter of the earth. The longitude of K is

K dan L (43° S, 107° E) ialah 2 titik di permukaan bumi dengan KL adalah diameter bumi. Longitud K ialah

- A 43° N
 B 137° N
 C 73° W
 D 107° W
- 19 The diagram 9 shows the positions of points P, Q and R. Find the bearing of Q from R.

Rajah 9 menunjukkan kedudukan titik P, Q dan R. Cari bearing Q dari R.

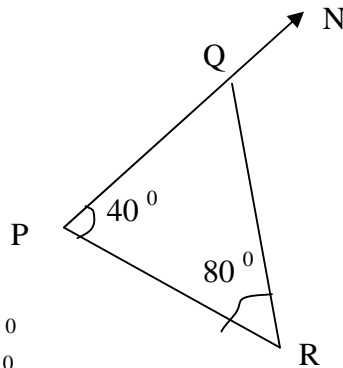


DIAGRAM 9

- A 060°
 B 120°
 C 280°
 D 300°
- 20 $2(k-3)^2 + 3 - 2k^2 =$
- A $21 - 12k$
 B $11k - 2$
 C $12k - 2$
 D $21 - 8k$

- 21 Given that $11 - 4(3 - 2k) = 23$, find the value of k .

Diberi $11 - 4(3 - 2k) = 23$, cari nilai k .

- A 12
 B 3
 C 1
 D -12

- 22 Express $\frac{4u - v}{uv} - \frac{8 - v}{2v}$ as a single fraction in its simplest form.

Ungkapkan $\frac{4u - v}{uv} - \frac{8 - v}{2v}$ sebagai pecahan tunggal dalam bentuk terendah.

- A $\frac{1}{2u}$
 B $\frac{u - 2}{2u}$
 C $\frac{u + 2}{2u}$
 D $\frac{-u - 2}{2u}$

- 23 Given that $\frac{5m - \sqrt{n}}{6} = 4$, then $n =$

Diberi $\frac{5m - \sqrt{n}}{6} = 4$, maka $n =$

- A $(5m - 24)^2$
 B $25m + 24$
 C $25m^2 - 24$
 D $\left(\frac{5}{6}m\right)^2 + 4$

24 Simplify $(2m^4n^{-1})^3 \times m^{-8}n^3$.

Permudahkan $(2m^4n^{-1})^3 \times m^{-8}n^3$.

- A $4m^2$
- B $7m^2$
- C $8m^4$
- D $16m^2n$

25 Given that $4^k = \frac{2^{10}}{16^k}$, find the value of k .

Diberi $4^k = \frac{2^{10}}{16^k}$, *cari nilai* k .

- A $\frac{3}{5}$
- B $\frac{1}{2}$
- C $\frac{3}{4}$
- D $\frac{5}{3}$

26 List all the integers x which satisfy both the inequalities $2x > -5$ and $7 - 2x \geq 5$.

Senaraikan semua integer x yang memuaskan kedua-dua ketaksamaan $2x > -5$ dan $7 - 2x \geq 5$.

- A $-3, -2, -1, 0$
- B $0, 1, 2, 3$
- C $-2, -1, 0, 1$
- D $-1, 0, 1, 2$

27 Diagram 10 represents two simultaneous linear inequalities on a number line.

Rajah 10 mewakili dua ketaksamaan linear serentak pada satu garis lurus.

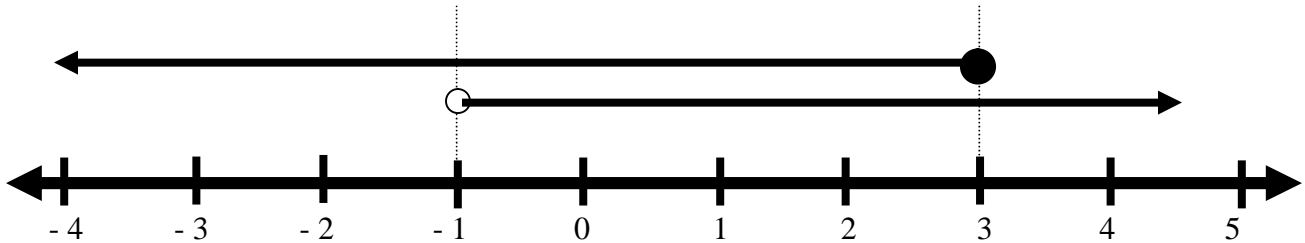


DIAGRAM 10

The inequality which represents the common value of both the inequalities is

Satu ketaksamaan yang mewakili nilai sepunya kedua-dua ketaksamaan itu ialah

- A $-1 < x \leq 3$
- B $-1 \leq x \leq 3$
- C $-1 \leq x < 3$
- D $-1 < x < 3$

28 Diagram 11 is a bar chart which shows the scores of a group of pupils in a test.

Rajah 11 ialah carta palang yang menunjukkan skor bagi sekumpulan murid dalam suatu ujian.

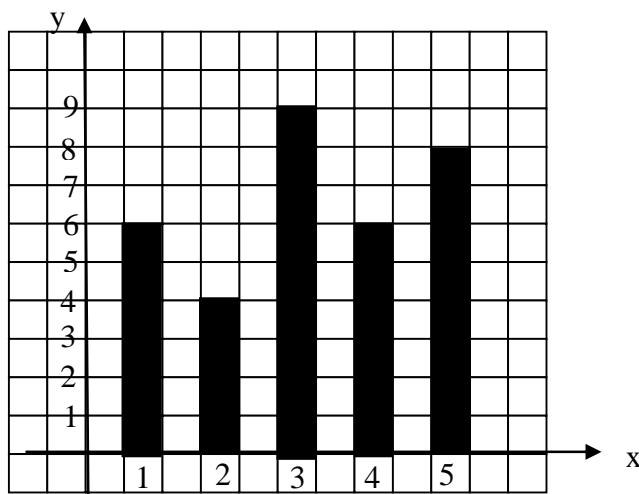


DIAGRAM 11

State the modal score.

Nyatakan skor mod.

- A 2
- B 3
- C 4
- D 9

29

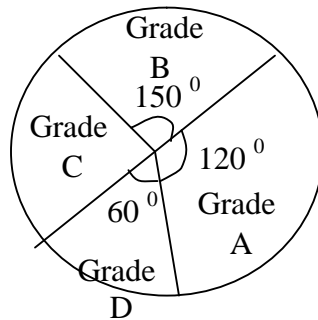


DIAGRAM 12

Diagram 12 is a pie chart showing the results of a test. Given that the number of students who obtained Grade B is 60, find the number of students who got grade C.

Carta pai di rajah 12 menunjukkan keputusan ujian. Diberi bahawa bilangan pelajar yang memperoleh gred B ialah 60, cari bilangan pelajar yang memperoleh Gred C.

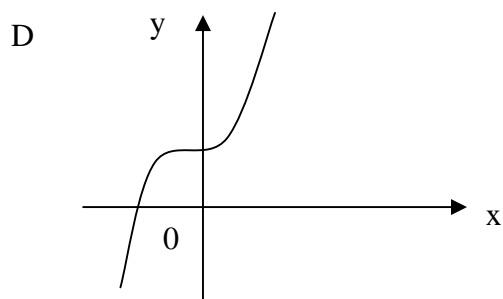
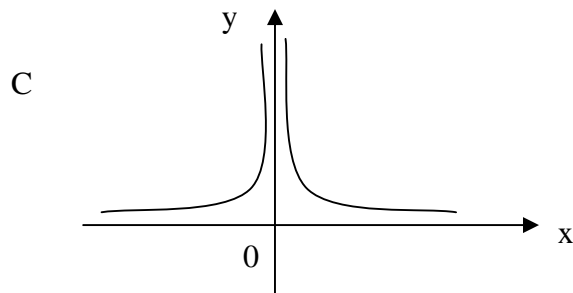
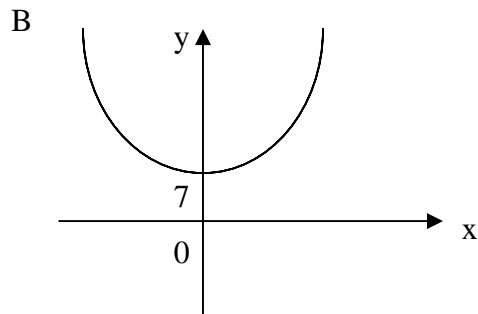
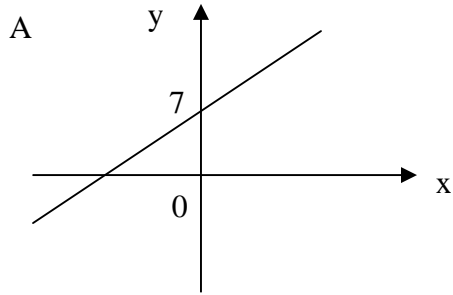
- A 48
- B 36
- C 24
- D 12

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30 Which of the following graphs represents $x^2 y = 7$?

Antara graf berikut, yang manakah mewakili graf bagi $x^2 y = 7$?



- 31 Diagram 13 is a Venn diagram that shows the number of elements of set H, set K and set L.

Rajah 13 menunjukkan sebuah gambar rajah Venn dengan bilangan unsur dalam set H, set K dan set L.

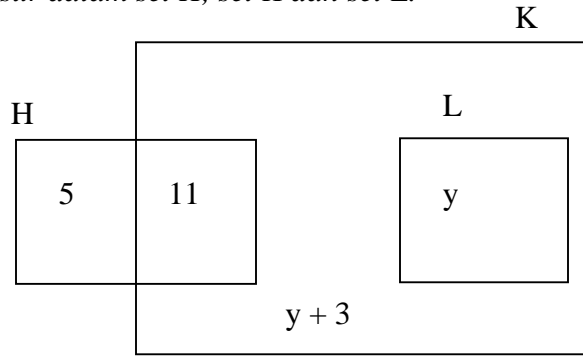


DIAGRAM 13

Given that the universal set $\xi = H \cup K \cup L$ and $n(H') = n(H \cap K)$, find the value of y .

Diberi set semesta $\xi = H \cup K \cup L$ dan $n(H') = n(H \cap K)$, cari nilai y .

- A 1
 - B 2
 - C 3
 - D 4
- 32 Diagram 14 shows a Venn diagram with the universal set, $\xi = P \cup Q \cup R$. Considering the four regions, A, B, C, and D, which of these represents the set $P' \cap R'$?

Rajah 14 menunjukkan gambar rajah Venn dengan set semesta $\xi = P \cup Q \cup R$. Antara kawasan A, B, C, dan D yang manakah mewakili set $P' \cap R'$?

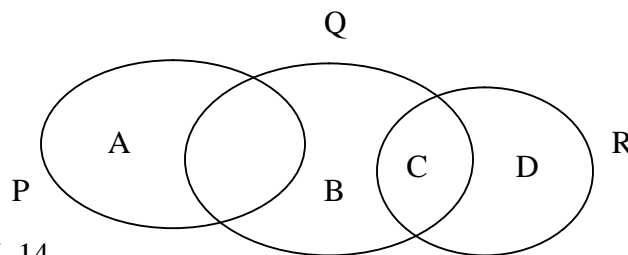


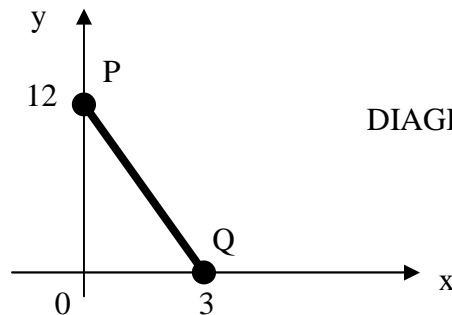
DIAGRAM 14

- 33 Given that $\xi = \{x : 20 \leq x \leq 30, x \text{ is an integer}\}$,
 set $K = \{x : x \text{ are numbers such as } x \leq 26\}$
 and set $L = \{x : x \text{ is a prime number}\}$. Find $n(K \cap L)$.

Diberi bahawa $\xi = \{x : 20 \leq x \leq 30, x \text{ ialah integer}\}$
 Set $K = \{x : x \text{ ialah nombor dengan keadaan } x \leq 26\}$
 dan set $L = \{x : x \text{ ialah nombor perdana.}\}$ Cari $n(K \cap L)$.

- A 1
 B 2
 C 3
 D 4
- 34 Diagram 15 shows a straight line PQ on a Cartesian plane.

Rajah 15 menunjukkan garis lurus PQ pada suatu satah Cartesan.



The gradient of PQ is

Kecerunan PQ ialah

- A -4
 B -3
 C 3
 D 12

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- 35 A letter is chosen at random from the word EASYMATHS. List all the possible outcomes of the event that the letter is a vowel.

*Satu huruf dipilih secara rawak daripada perkataan EASYMATHS.
Senaraikan semua kesudahan yang mungkin untuk memperoleh huruf vokal.*

A $\{E, A, S, Y, M, T, H\}$

B $\{E, A, S, M, T\}$

C $\{E, A, M, T\}$

D $\{E, A\}$

- 36 Diagram 16 shows some number cards.

Rajah 16 menunjukkan beberapa keping kad nombor.

6	13	14	27	35
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DIAGRAM 16

A card is picked at random. State the probability that an even number is picked.

Sekeping kad dipilih secara rawak. Nyatakan kebarangkalian bahawa kad yang dipilih ialah kad nombor genap.

A $\frac{2}{5}$

B $\frac{2}{3}$

C $\frac{2}{7}$

D $\frac{1}{5}$

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- 37 P varies directly as the cube root of Q. The relation between P and Q is

P berubah secara langsung dengan kuasa tiga Q. Hubungan yang mengaitkan P dan Q ialah

- A $P \propto Q^{\frac{1}{3}}$
 B $P \propto Q^3$
 C $P \propto \frac{1}{Q^{\frac{1}{3}}}$
 D $P \propto \frac{1}{Q^3}$

- 38 M varies directly as the cube of N and inversely as the square root of R. Given that the relation between M, N and R is $M = k N^p R^q$. State the value of $p + q$.

M berubah secara langsung dengan kuasa tiga N dan secara songsang dengan punca kuasa dua R. Diberi hubungan M, N dan R ialah $M = k N^p R^q$. Nyatakan nilai $p + q$.

- A 0.5
 B 1.5
 C 2.5
 D 3
- 39 Given that $\begin{pmatrix} 9 \\ 3k \end{pmatrix} + 2\begin{pmatrix} -2 \\ 5 \end{pmatrix} = \begin{pmatrix} 5 \\ 7 \end{pmatrix}$. Find the value of k.
- Diberi $\begin{pmatrix} 9 \\ 3k \end{pmatrix} + 2\begin{pmatrix} -2 \\ 5 \end{pmatrix} = \begin{pmatrix} 5 \\ 7 \end{pmatrix}$. Cari nilai k.*
- A -3
 B -2
 C -1
 D 2

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40 $\begin{pmatrix} 2 & 0 \\ 1 & 3 \end{pmatrix} \begin{pmatrix} 5 & 0 \\ 0 & -2 \end{pmatrix} =$

A $\begin{pmatrix} 10 & 0 \\ 1 & -6 \end{pmatrix}$

B $\begin{pmatrix} 10 & 0 \\ 5 & -6 \end{pmatrix}$

C $\begin{pmatrix} 5 & 0 \\ 2 & 6 \end{pmatrix}$

D $\begin{pmatrix} 10 & -1 \\ 0 & 6 \end{pmatrix}$

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END OF QUESTION PAPER
KERTAS SOALAN TAMAT