

MODUL PERKEMBANGAN PEMBELAJARAN 3

MATEMATIK SPM

1449/1

Kertas 1

Ogos 2019

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

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.*

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 = $\frac{\text{distance travelled}}{\text{time taken}}$

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

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

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

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

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

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

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

SHAPES 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
 $= (n - 2) \times 180^\circ$

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

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

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

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

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

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

$$15 \quad \text{Area of image} = k^2 \times \text{area of object}$$
$$\text{Luas imej} = k^2 \times \text{luas objek}$$

Answer **all** questions
Jawab semua soalan

- 1 Round off 0.027849 correct to three significant figures.
Bundarkan 0.027849 betul kepada tiga angka bererti.

- A 0.027
- B 0.028
- C 0.0278
- D 0.0279

2 $\frac{36\,000}{6 \times 10^{-4}} =$

- A 6×10^8
- B 6×10^7
- C 6×10^{-1}
- D 0.6×10^7

- 3 A motorcycle moved at a speed of 120 km h^{-1} . Find the distance, in m, travelled by motorcycle in 90 minutes.
Sebuah motosikal bergerak pada kelajuan 120 km j^{-1} , Cari jarak, dalam m, yang dilalui oleh motosikal itu dalam 90 minit.

- A 1.08×10^7
- B 1.08×10^4
- C 1.8×10^5
- D 3×10^5

- 4 Express $5(5^2 + 2 \times 5)$ as a number in base five.
 Ungkapkan $5(5^2 + 2 \times 5)$ sebagai suatu nombor dalam asas lima.

- A 1002_5
 B 1020_5
 C 1200_5
 D 3020_5

- 5 Diagram 1 shows a regular hexagon $PQRSTU$ and a quadrilateral $TVWU$.
 STV is a straight line.
 Rajah 1 menunjukkan sebuah heksagon sekata $PQRSTU$ dan sebuah sisi Empat $TVWU$. STV ialah garis lurus.

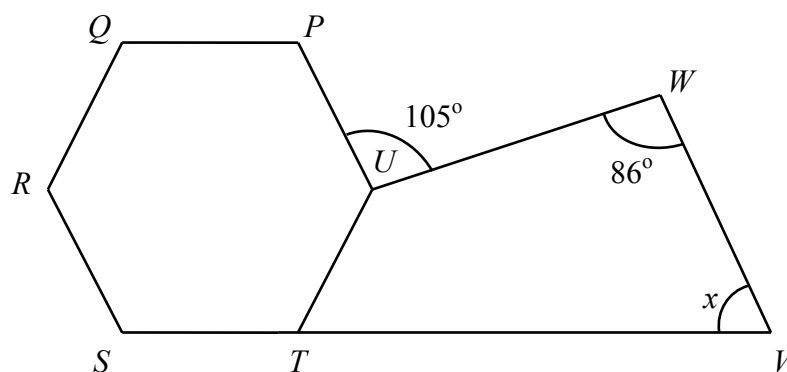


Diagram 1

Rajah 1

Calculate the value of x .

Hitung nilai x .

- A 94°
 B 79°
 C 65°
 D 45°

6 $11011_2 + 1110_2 =$

- A 101001_2
 B 101101_2
 C 110001_2
 D 111001_2

7 Diagram 2 shows an isosceles triangle MPQ , HSP and KPM are straight lines.

Rajah 2 menunjukkan sebuah segi tiga sama kaki MPQ , HSP dan KPM ialah garis lurus.

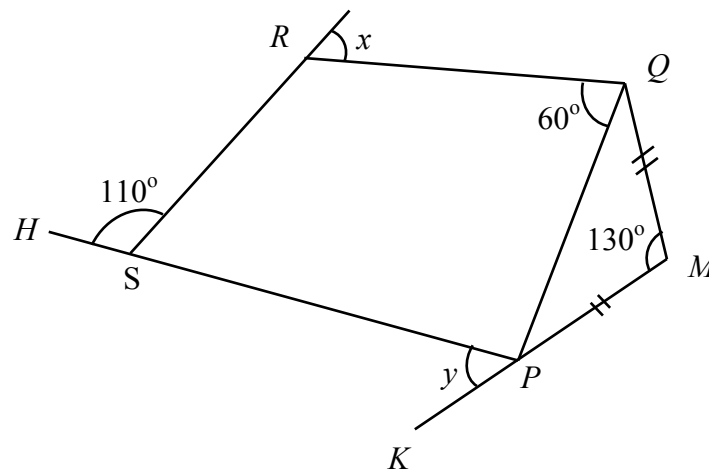


Diagram 2

Rajah 2

Find the value of $x + y$.

Cari nilai $x + y$.

- A 105°
 B 115°
 C 125°
 D 135°

- 8 Diagram 3 shows the tangents QR and SR touch the circle PQS at point Q and point S respectively.

Rajah 3 menunjukkan tangen QR dan SR menyentuh bulatan PQS masing-masing pada titik Q dan titik S .

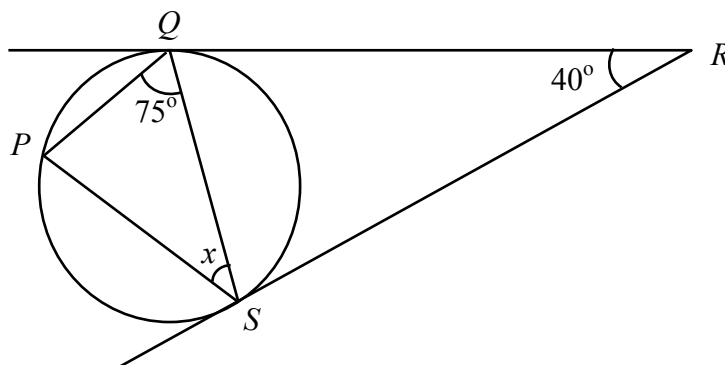


Diagram 3

Rajah 3

Find the value of x .

Cari nilai x .

- A 25°
- B 30°
- C 35°
- D 40°

- 9 Diagram 4 shows seven points on square grids. P' is the image of P under a translation.

Rajah 4 menunjukkan tujuh titik pada grid segi empat sama. P' ialah imej bagi P di bawah satu translasi.

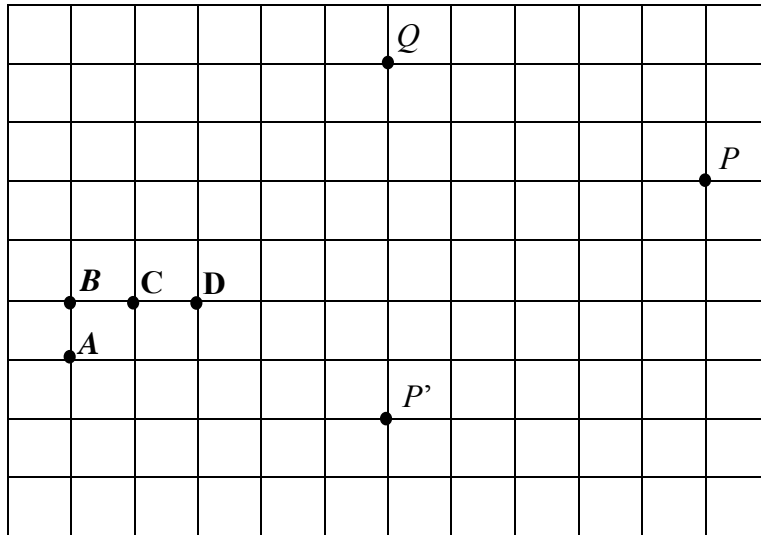


Diagram 4

Rajah 4

Which of the points **A**, **B**, **C** or **D**, is the image of point Q under the same translation?

*Antara titik **A**, **B**, **C** dan **D**, yang manakah imej bagi titik Q di bawah translasi yang sama?*

- 10 Diagram 5 shows five triangles *P*, *A*, *B*, *C* and *D* drawn on square grids.
Rajah 5 menunjukkan lima segitiga *P*, *A*, *B*, *C* and *D* dilukis pada grid segiempat sama.

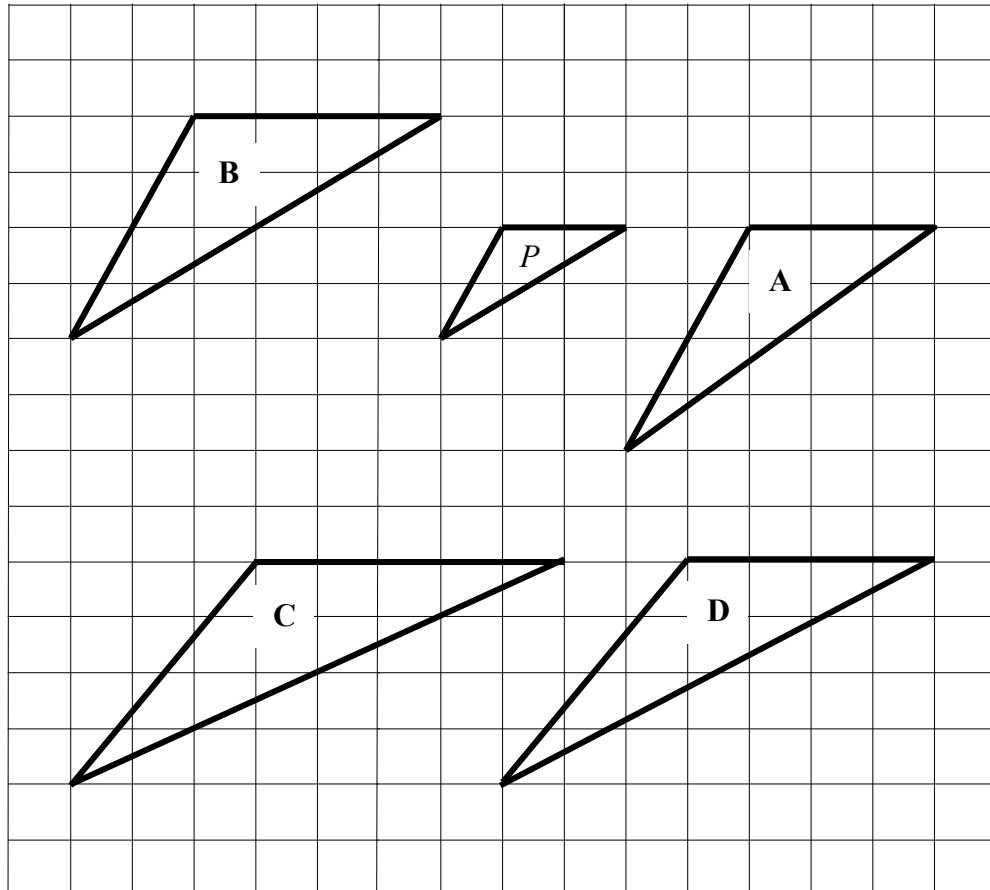


Diagram 5

Rajah 5

Which of triangle *A*, *B*, *C* or *D*, is the image of triangle *P* under an enlargement with a scale factor of 2 ?

Antara segitiga A, B, C dan D, yang manakah imej bagi segitiga P di bawah suatu pembesaran dengan faktor skala 2 ?

- 11 Diagram 6 shows a rhombus $PQRS$.
Rajah 6 menunjukkan sebuah rombus PQRS.

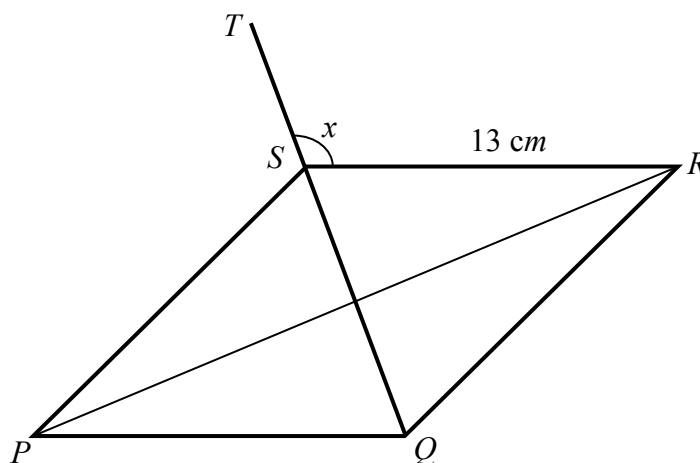


Diagram 6

Rajah 6

It is given that QST is a straight line and $QS = 10\text{ cm}$.

Find the value of $\tan x^\circ$.

Diberi bahawa QST ialah garis lurus dan QS = 10 cm.

Carikan nilai $\tan x^\circ$.

- A $\frac{5}{13}$
B $\frac{13}{12}$
C $-\frac{5}{12}$
D $-\frac{12}{5}$

- 12 Diagram 7 shows the graph $y = \sin x$
Rajah 7 menunjukkan graf $y = \sin x$

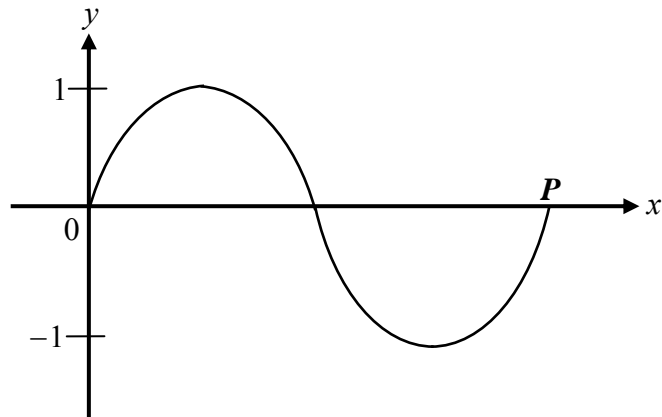


Diagram 7

Rajah 7

Find the value of P

Cari nilai P

- A 90°
- B 180°
- C 270°
- D 360°

13

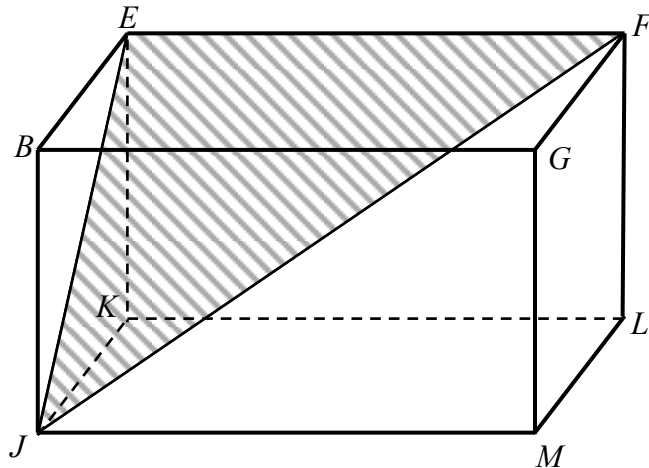


Diagram 8

Rajah 8

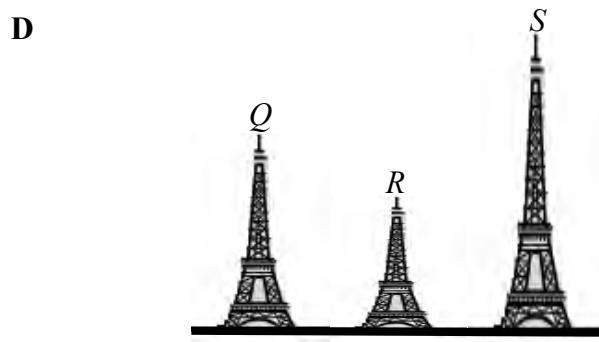
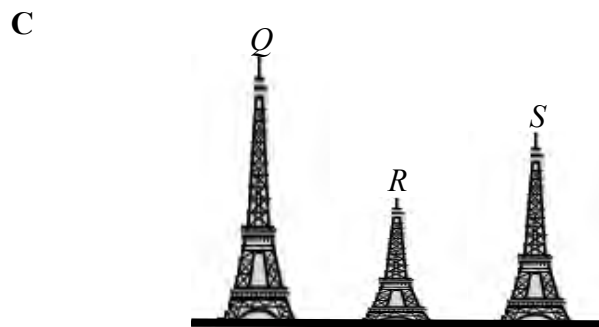
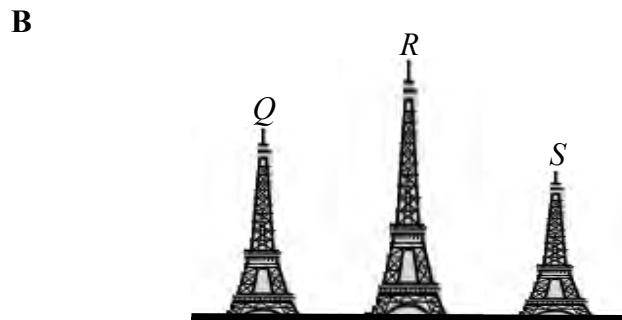
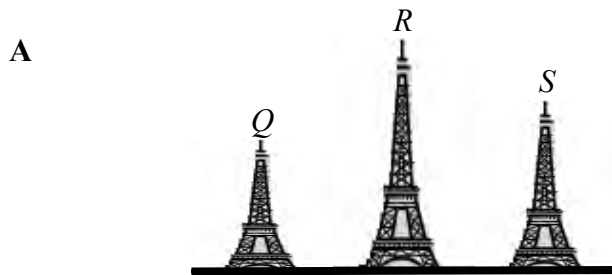
Diagram 8 shows a cuboid with a horizontal base $JKLM$. The angle between the plane EFJ and the base $EFLK$ is

Rajah 8 menunjukkan sebuah kuboid dengan tapak segiempat tepat $JKLM$ yang mengufuk. Sudut antara satah EFJ dengan satah $EFLK$ ialah

- A $\angle EJK$
- B $\angle JEK$
- C $\angle JFL$
- D $\angle KFJ$

- 14 Nureen makes an observation from the top of tower S . She observe the top of tower Q at an angle of elevation and observes the top of tower R at an angle of depression. The diagram which represents the three towers is

Nureen sedang membuat pemerhatian dari puncak menara S . Dia memerhatikan puncak menara Q dengan suatu sudut dongakan dan memerhatikan puncak menara R dengan suatu sudut tunduk. Rajah yang mewakili tiga menara itu ialah



- 15 Diagram 9 shows a platform and a tower standing on a horizontal ground.
Rajah 9 menunjukkan sebuah dataran dan sebuah menara terletak pada suatu tanah mengufuk.

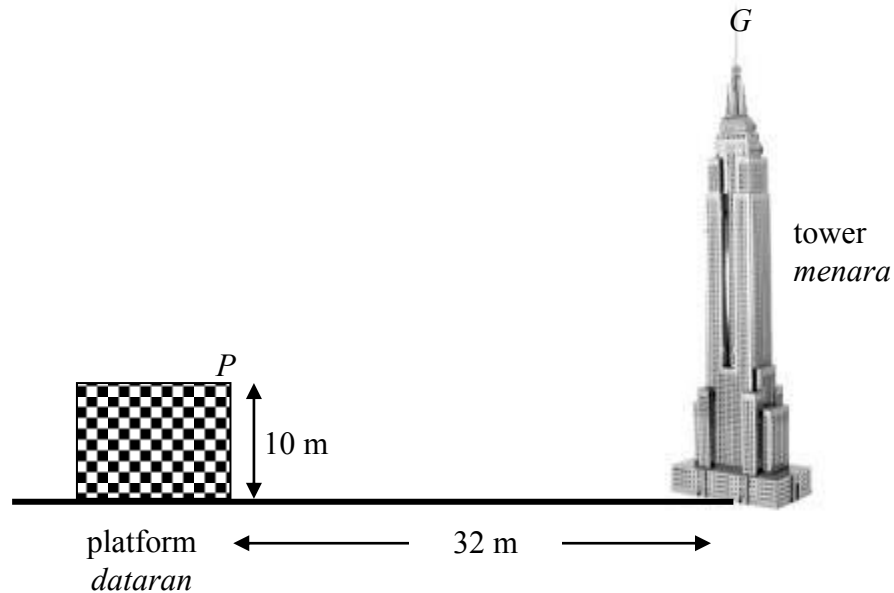


Diagram 9

Rajah 9

The angle of elevation of the top of the tower, G from P is 26° .

Calculate the height, in m, of the tower.

Sudut dongakan puncak menara G dari P ialah 26° .

Hitung tinggi, dalam m, menara itu

- A 15.61
- B 25.61
- C 65.61
- D 75.61

- 16 In Diagram 10, M, P, Q and R are points on a horizontal plane. P is due north of M and the bearing of R from M is 130° .

Dalam Rajah 10, titik-titik M, P, Q dan R terletak pada satah mengufuk. P terletak di utara M dan bearing R dari M ialah 130° .

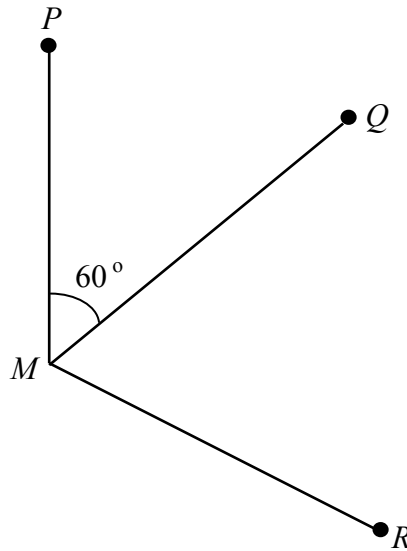


Diagram 10

Rajah 10

Find the bearing of M from R .

Cari bearing M dari R .

- A 050°
- B 070°
- C 290°
- D 310°

$$17 \quad \frac{6rs}{3-s} \div \frac{2rs+4s}{9-s^2}$$

$$A \quad \frac{3r(3-s)}{r+2}$$

$$B \quad \frac{3r(3+s)}{r+2}$$

$$C \quad \frac{r+2}{3r(3+s)}$$

$$D \quad \frac{r+2}{3r(3-s)}$$

18

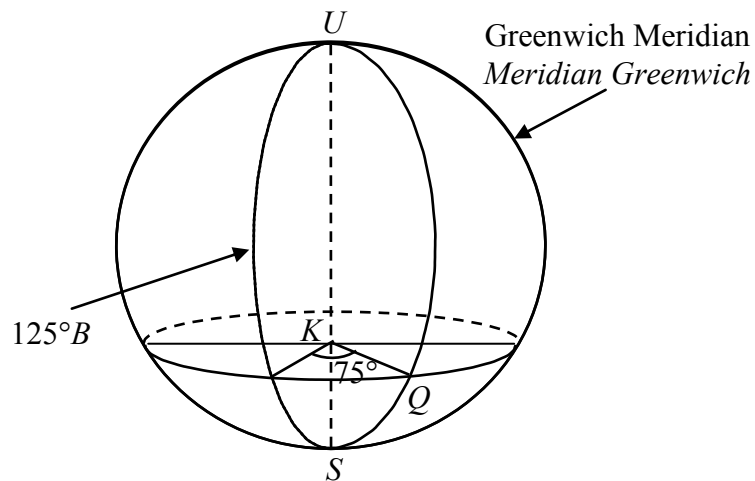


Diagram 11

Rajah 11

The longitude of point Q is

Longitud titik Q ialah

$$A \quad 50^\circ B$$

$$B \quad 50^\circ T$$

$$C \quad 105^\circ T$$

$$D \quad 160^\circ B$$

SULIT

19 Express $\frac{p-3}{2} - \frac{2p+1}{6}$ as a single fraction in its simplest form.

Ungkapkan $\frac{p-3}{2} - \frac{2p+1}{6}$ sebagai satu pecahan tunggal dalam bentuk termudah.

A $\frac{p-10}{6}$

B $\frac{p-8}{6}$

C $\frac{p-4}{6}$

D $\frac{p-2}{6}$

20 Given that $\frac{3}{2}mn - m = 2nk$, express n in terms of m and k .

Diberi bahawa $\frac{3}{2}mn - m = 2nk$, ungkapkan n dalam sebutan m dan k .

A $n = \frac{m}{3m - k}$

B $n = \frac{m}{3m - 4k}$

C $n = \frac{2m}{3m - 4k}$

D $n = \frac{2m}{3m - 2k}$

21 Solve the linear equation $\frac{3(2p - 1)}{3 - p} = 4$.

Selesaikan persamaan linear bagi $\frac{3(2p - 1)}{3 - p} = 4$.

A $\frac{13}{7}$

B $\frac{5}{3}$

C $\frac{3}{2}$

D $\frac{13}{10}$

22 Simplify :

Ringkaskan :

$$\left(\frac{1}{4}\right)^{-4x} \times 512 = 2^{-x}$$

A -3

B -1

C $\frac{9}{7}$

D $\frac{9}{5}$

- 23 Which of the following satisfies the inequalities $\frac{x}{3} - 1 \leq x$?

Antara berikut yang manakah memuaskan ketaksamaan $\frac{x}{3} - 1 \leq x$?

A $x \leq -\frac{3}{2}$

B $x \leq -2$

C $x \geq -\frac{3}{2}$

D $x \geq -2$

- 24 Adid is $(2x + 1)$ years old and Padali is three years older than Adid.

Hajar is half of Padali's age.

Which of the following inequalities is correct?

Umur Adid ialah $(2x + 1)$ tahun dan umur Padali adalah tiga tahun lebih tua daripada Adid. Umur Hajar adalah separuh daripada umur Padali.

Antara yang berikut, ketaksamaan manakah yang betul?.

A $x + 2 > 2x + 4$

B $x + 2 > 2x + 1$

C $2x + 1 > 2x + 4$

D $2x + 4 > x + 2$

- 25 Diagram 12 is an incomplete bar chart showing the number of children for some families in Taman Kuala Berang. The bar representing the number of families with two children is not shown.

Rajah 12 ialah carta palang yang tidak lengkap menunjukkan bilangan anak bagi sebilangan keluarga di Taman Kuala Berang. Palang yang mewakili bilangan keluarga yang mempunyai dua orang anak tidak ditunjukkan.

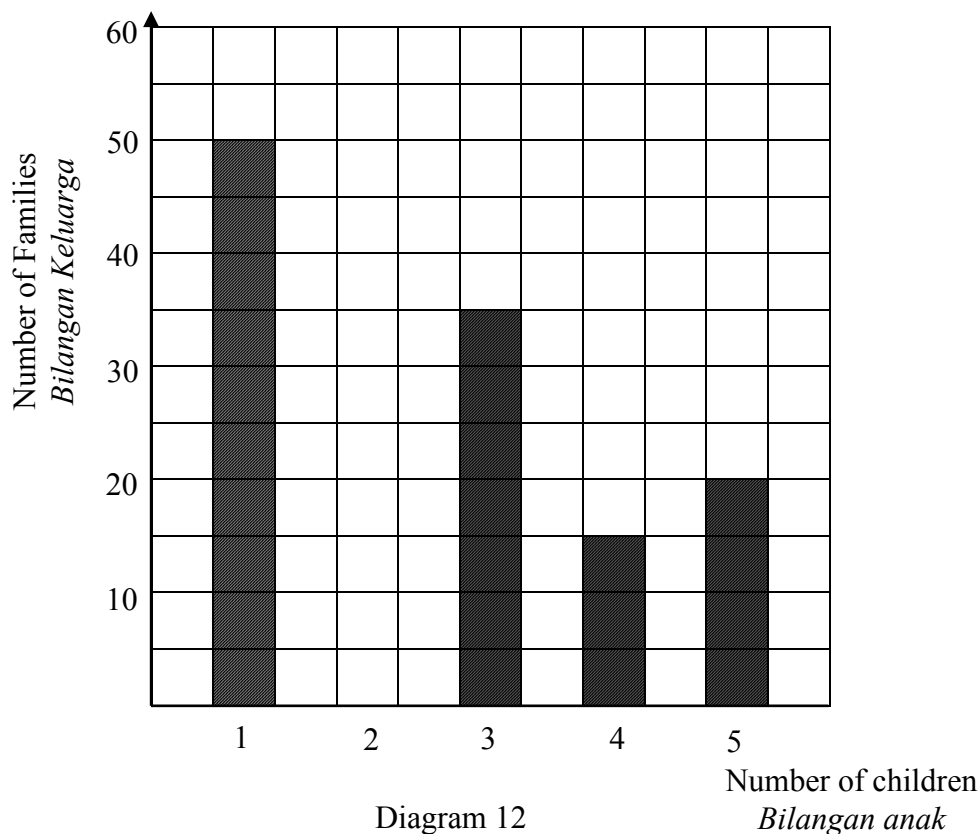


Diagram 12
Rajah 12

The number of families with four children is 10% of the total number of families. Find the ratio of the number of families with two children to the number of families with five children.

Bilangan keluarga yang mempunyai empat orang anak ialah 10% daripada jumlah semua keluarga. Cari nisbah bilangan keluarga yang mempunyai dua orang anak kepada bilangan keluarga yang mempunyai lima orang anak.

- A 2 : 3
B 3 : 2
C 3 : 5
D 5 : 3

- 26 Diagram 13 is a pie chart shows the number of cakes sold by Puan Suzana in a weekend.

Rajah 13 ialah carta pai yang menunjukkan bilangan kek yang dijual oleh Puan Suzana pada hari minggu.

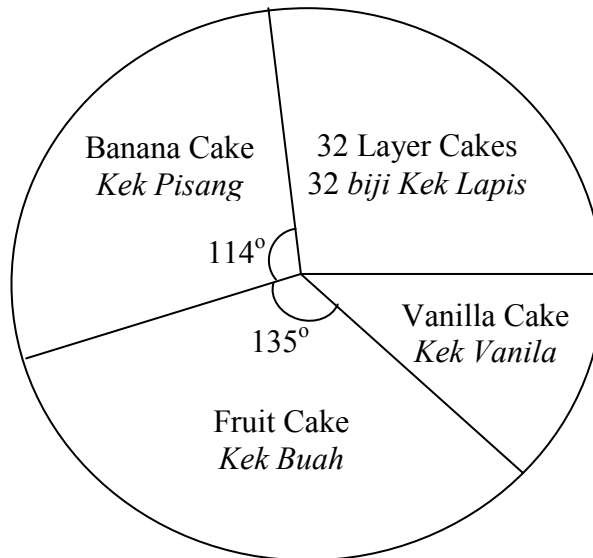


Diagram 13

Rajah 13

There are 38 banana cakes have been sold.

Calculate the difference of the highest and the lowest number of cakes been sold.

Sebanyak 38 kek pisang telah dijual.

Hitung beza jualan bilangan kek yang paling tinggi dengan bilangan kek yang paling rendah

- A 13
- B 28
- C 33
- D 40

- 27 Table 1 is a cumulative frequency table which shows the points collected by 40 participants in a competition.

Jadual 1 ialah jadual kekerapan longgokan yang menunjukkan mata yang dikumpul oleh 40 orang peserta dalam suatu pertandingan

Points <i>Mata</i>	Cumulative Frequency <i>Kekerapan Longgokan</i>
15	5
16	12
17	20
18	30
19	36
20	40

Table 1

Jadual 1

Find the mode of the data.

Cari mod bagi data itu.

- A 16
- B 17
- C 18
- D 19

- 28 Diagram 14 is a graph drawn on a Cartesian plane
Rajah 14 ialah graf yang dilukis pada satu satah Cartes.

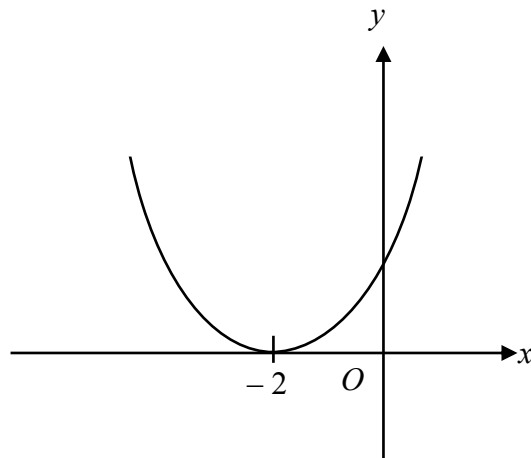


Diagram 14

Rajah 14

The equation for the graph is

Persamaan bagi graf itu ialah

- A $y = x^2 - 2$
B $y = 2 - x^2$
C $y = (x + 2)^2$
D $y = (x - 2)^2$

- 29 Diagram 15 is a Venn Diagram that shows the universal set ξ , A and B
Rajah 15 ialah Gambarajah Venn yang menunjukkan set semesta ξ , A dan B.

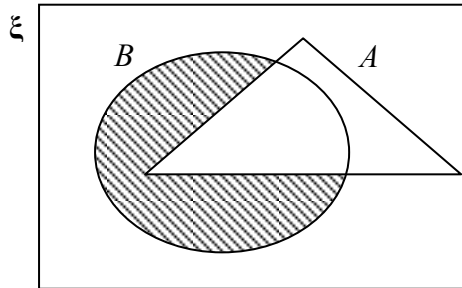


Diagram 15

Rajah 15

The shaded region represents the set

Kawasan berlorek mewakili set

- A $A' \cap B'$
- B $A' \cap B$
- C $A \cap B'$
- D $(A \cap B)'$

30 Diagram 16 shows a Venn diagram with the universal set $\xi = K \cup L \cup M$.

Rajah 16 ialah gambar rajah Venn dengan set semesta, $\xi = K \cup L \cup M$.

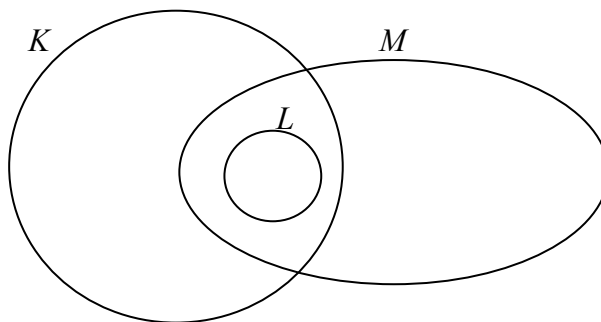


Diagram 16

Rajah 16

Which of the following statements is **not** true ?

*Antara pernyataan berikut yang manakah **tidak** benar?*

- A $(K \cap M) \subset M$
- B $(K \cap L) = L$
- C $(L \cap M) \not\subset K'$
- D $(K \cap M) \subset L$

- 31 It is given that the universal set $\xi = \{x : 1 \leq x \leq 12, x \text{ is an integer}\}$,
set $P = \{2, 3, 7, 9\}$
set $Q = \{x : x \text{ is a prime number}\}$ and
set $R = \{x : x \text{ is a multiple of } 4\}$.
The elements of the set $(P \cup R)' \cap Q$ are

Diberi bahawa set semesta $\xi = \{x : 1 \leq x \leq 12, x \text{ ialah integer}\}$,

set $P = \{2, 3, 7, 9\}$

set $Q = \{x : x \text{ ialah nombor perdana}\}$ dan

set $R = \{x : x \text{ ialah nombor gandaan } 4\}$.

Unsur-unsur bagi set $(P \cup R)' \cap Q$ ialah

- A $\{5, 11\}$
- B $\{1, 5, 11\}$
- C $\{2, 3, 9\}$
- D $\{2, 3, 11\}$

32 In Diagram 17, EF is a straight line with gradient $-\frac{1}{4}$.

Dalam Rajah 17, EF ialah garis lurus dengan kecerunan $-\frac{1}{4}$.

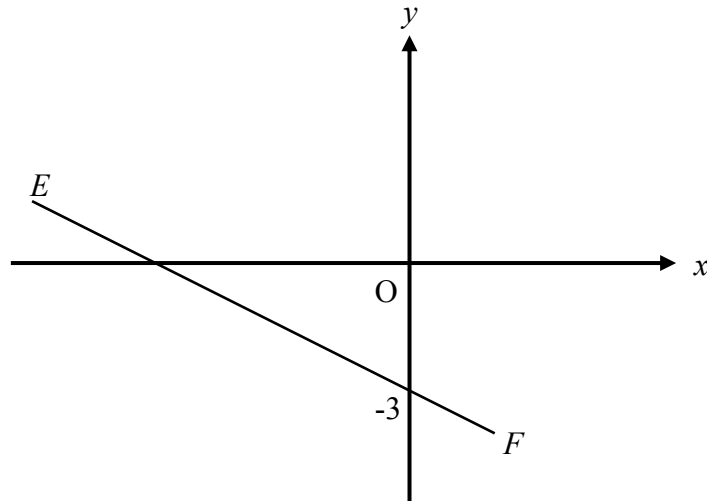


Diagram 17

Rajah 17

Find the x -intercept of the straight line EF .

Cari pintasan- x bagi garis lurus EF .

A $-\frac{1}{12}$

B $-\frac{3}{4}$

C -3

D -12

33 The gradient of the straight line $\frac{1}{2}y - x = 6$ is

Kecerunan bagi garis lurus $\frac{1}{2}y - x = 6$ ialah

A -2

B 2

C $-\frac{1}{2}$

D $\frac{1}{2}$

- 34 Diagram 18 shows two straight lines, PQ and QR , on a Cartesian plane.
Rajah 18 menunjukkan dua garis lurus PQ dan QR pada satah Cartes.

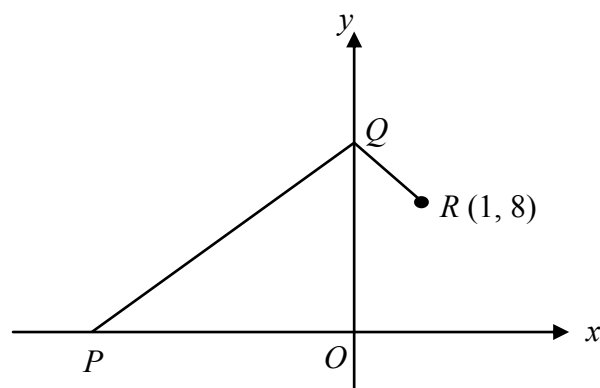


Diagram 18

Rajah 18

The gradient of QR is -4 and the distance of PQ is 15 units. Find the x -intercept of PQ .

Kecerunan QR ialah -4 dan jarak PQ ialah 15 unit. Carikan pintasan- x bagi PQ .

- A -9
- B -12
- C $-\frac{9}{4}$
- D $-\frac{15}{4}$

35 It is given that set $P = \{16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30\}$.

A number is chosen at random from set P .

Find the probability that the chosen number is **not** a prime number.

Diberi bahawa set $P = \{16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30\}$.

Satu nombor dipilih secara rawak daripada set P .

*Cari kebarangkalian bahawa nombor yang dipilih **bukan** nombor perdana.*

A $\frac{3}{15}$

B $\frac{4}{15}$

C $\frac{5}{15}$

D $\frac{11}{15}$

- 36** A box contains 150 blue beads, 300 red beads and 450 green beads. A bead is chosen at random from the box.

What is the probability that a green bead is chosen ?

Sebuah kotak mengandungi 150 manik biru, 300 manik merah dan 450 manik hijau. Sebiji manik dipilih secara rawak daripada kotak itu.

Apakah kebarangkalian bahawa manik hijau dipilih ?

A $\frac{1}{2}$

B $\frac{1}{3}$

C $\frac{1}{4}$

D $\frac{1}{6}$

37 It is given that m varies directly as the cube of p and inversely as n .

Find the relation between m , p and n .

Diberi bahawa m berubah secara langsung dengan kuasa tiga p dan secara songsang dengan n .

Cari hubungan antara m , p dan n .

A $m \propto \frac{n}{p^3}$

B $m \propto \frac{p^3}{n}$

C $m \propto \frac{n}{p^{\frac{1}{3}}}$

D $m \propto \frac{p^{\frac{1}{3}}}{n}$

- 38 Table 2 shows some values of the variables x and y . It is given that $y \propto \frac{1}{\sqrt{x}}$.

Jadual 2 menunjukkan sebahagian pembolehubah x dan y .

Diberi bahawa $y \propto \frac{1}{\sqrt{x}}$.

y	3	2
x	4	n

Table 2

Jadual 2

Calculate the value of n .

Hitungkan nilai n .

- A $\frac{9}{16}$
- B $\frac{16}{9}$
- C 6
- D 9

39 It is given that A is 2 x 2 matrix and $A^{-1} = \frac{1}{(3)(-2) - (-4)(1)} \begin{pmatrix} -2 & m \\ -1 & n \end{pmatrix}$.

Find the values of m and of n .

Diberi A ialah matriks 2 x 2 dan $A^{-1} = \frac{1}{(3)(-2) - (-4)(1)} \begin{pmatrix} -2 & m \\ -1 & n \end{pmatrix}$.

Cari nilai m dan nilai n .

A $m = 4, n = 3$

B $m = -4, n = 3$

C $m = 4, n = -3$

D $m = -4, n = -3$

40 $3 \begin{pmatrix} 1 & 3 \\ -5 & 2 \end{pmatrix} + \begin{pmatrix} -2 & -7 \\ 4 & 1 \end{pmatrix} - \frac{1}{2} \begin{pmatrix} -2 & 6 \\ 8 & -4 \end{pmatrix} =$

A $\begin{pmatrix} 0 & -1 \\ -5 & 9 \end{pmatrix}$

B $\begin{pmatrix} 0 & -1 \\ -5 & 5 \end{pmatrix}$

C $\begin{pmatrix} 2 & -1 \\ -15 & 9 \end{pmatrix}$

D $\begin{pmatrix} 2 & -1 \\ -15 & 5 \end{pmatrix}$

KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES

MAKLUMAT UNTUK CALON

1. This question paper consists of **40** questions.
Kertas peperiksaan ini mengandungi 40 soalan
2. Answer **all** questions.
Jawab semua soalan.
3. Answer each question by blackening the correct space on the objective answer sheet.
Jawab semua soalan dengan menghitamkan ruangan yang betul pada kertas jawapan objektif.
4. Blacken only **one** space for each question.
Hitamkan satu ruangan sahaja bagi setiap soalan.
5. If you wish to change your answer, erase the blackened mark that you have done.
Then blacken the space for the new answer.
*Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat.
Kemudian hitamkan jawapan yang baharu.*
6. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan
7. A list of formulae is provided on pages 2 to 4.
Satu senarai rumus disediakan di halaman 2 hingga 4.
8. You may use a scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik.