

**NOMBOR DAN OPERASI
NUMBER AND OPERATIONS**

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|--|--|
| <p>1 $a^m \times a^n = a^{m+n}$</p> <p>3 $(a^m)^n = a^{mn}$</p> <p>5 $a^{\frac{m}{n}} = (a^m)^{\frac{1}{n}} = \left(a^{\frac{1}{n}}\right)^m$</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>10 $\text{Premium} = \frac{\text{Nilai muka polisi}}{\text{RMx}} \times (\text{Kadar premium per RMx})$
$\text{Premium} = \frac{\text{Face value of policy}}{\text{RMx}} \times (\text{Premium rate per RMx})$</p> <p>11 Jumlah insurans yang harus dibeli = $\left(\begin{matrix} \text{Peratusan} \\ \text{ko insurans} \end{matrix}\right) \times \left(\begin{matrix} \text{Nilai boleh} \\ \text{insurans harta} \end{matrix}\right)$
$\text{Amount of required insurance} = \left(\begin{matrix} \text{Percentage of} \\ \text{co-insurance} \end{matrix}\right) \times \left(\begin{matrix} \text{Insurable value} \\ \text{of property} \end{matrix}\right)$</p> | <p>2 $a^m \div a^n = a^{m-n}$</p> <p>4 $a^{\frac{1}{n}} = \sqrt[n]{a}$</p> <p>6 $a^{\frac{m}{n}} = \sqrt[n]{a^m} = \left(\sqrt[n]{a}\right)^m$</p> <p>8 Nilai matang / <i>Maturity value</i>,
$MV = P \left(1 + \frac{r}{n}\right)^{nt}$</p> |
|--|--|

**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 = $\frac{\text{Jumlah jarak}}{\text{Jumlah masa}}$
$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$</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 $m = -\frac{\text{pintasan } y}{\text{pintasan } x}$
$m = -\frac{\text{y intercept}}{\text{x intercept}}$</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 = $\pi d = 2 \pi r$
Circumference of circle = $\pi d = 2 \pi r$
- 4 Luas bulatan = πr^2
Area of circle = πr^2
- 5 $\frac{\text{Panjang lengkok}}{2\pi r} = \frac{\theta}{360^\circ}$
 $\frac{\text{Arc length}}{2\pi r} = \frac{\theta}{360^\circ}$
- 6 $\frac{\text{Luas sektor}}{\pi r^2} = \frac{\theta}{360^\circ}$
 $\frac{\text{Area of sector}}{\pi r^2} = \frac{\theta}{360^\circ}$
- 7 Luas layang = $\frac{1}{2} \times$ hasil darab panjang dua pepenjuru
Area of kite = $\frac{1}{2} \times$ *product of the length 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 two parallel sides* \times *height*
- 9 Luas permukaan silinder = $2\pi r^2 + 2\pi rh$
Surface area of cylinder = $2\pi r^2 + 2\pi rh$
- 10 Luas permukaan kon = $\pi r^2 + \pi rs$
Surface area of cone = $\pi r^2 + \pi rs$
- 11 Luas permukaan sfera = $4\pi r^2$
Surface area of sphere = $4\pi r^2$
- 12 Isi padu prisma = luas keratan rentas \times tinggi
Volume of prism = *area of cross section* \times *height*
- 13 Isi padu silinder = $\pi r^2 h$
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 = $\frac{1}{3} \times$ luas tapak \times tinggi
Volume of pyramid = $\frac{1}{3} \times$ base area \times height
- 17 Faktor skala, $k = \frac{PA'}{PA}$
Scale factor, k = $\frac{PA'}{PA}$
- 18 Luas imej = $k^2 \times$ luas objek
Area of image = $k^2 \times$ 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, $\sigma^2 = \frac{\sum(x-\bar{x})^2}{N} = \frac{\sum x^2}{N} - \bar{x}^2$
- 4 Varians / Variance, $\sigma^2 = \frac{\sum f(x-\bar{x})^2}{\sum f} = \frac{\sum fx^2}{\sum f} - \bar{x}^2$
- 5 Sisihan piawai / Standard deviation, $\sigma = \sqrt{\frac{\sum(x-\bar{x})^2}{N}} = \sqrt{\frac{\sum X^2}{N} - \bar{x}^2}$
- 6 Sisihan piawai / Standard deviation, $\sigma = \sqrt{\frac{\sum f(x-\bar{x})^2}{\sum f}} = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2}$
- 7 $P(A) = \frac{n(A)}{n(S)}$
- 8 $P(A') = 1 - P(A)$

- 6 Diberi $5r^2 = 3t + 4s$. Ungkapkan t dalam sebutan r dan s .
Given $5r^2 = 3t + 4s$. Express t in term of r and s .

A $t = \frac{5r^2 + 4s}{3}$

C $t = \frac{5r^2}{3} - 4s$

B $t = \frac{5r^2 - 4s}{3}$

D $t = \frac{4s}{3} - 5r^2$

- 7 Pernyataan di bawah adalah songsangan bagi suatu implikasi.
The statement below is the inverse of an implication.

Jika $k + 4 \neq 9$, maka $k \neq 5$
If $k + 4 \neq 9$, then $k \neq 5$

Antara berikut yang manakah adalah kontrapositif bagi songsangan tersebut?
Which of the following is the contrapositive of the inverse?

- A Jika $k = 5$, maka $k + 4 = 9$
If $k = 5$, then $k + 4 = 9$
- B Jika $k + 4 = 5$, maka $k = 9$
If $k + 4 = 5$, then $k = 9$
- C Jika $k + 4 = 9$, maka $k = 5$
If $k + 4 = 9$, then $k = 5$
- D Jika $k \neq 5$, maka $k + 4 \neq 9$
If $k \neq 5$, then $k + 4 \neq 9$
- 8 Diberi bahawa s berubah secara langsung dengan punca kuasa dua t dan secara songsang dengan u . Jika $s = 8$ apabila $t = 36$ dan $u = 3$, ungkapkan s dalam sebutan t dan u .
Given that s varies directly with the square root of t and inversely with u . If $s = 8$ when $t = 36$ and $u = 3$, express s in terms of t and u .

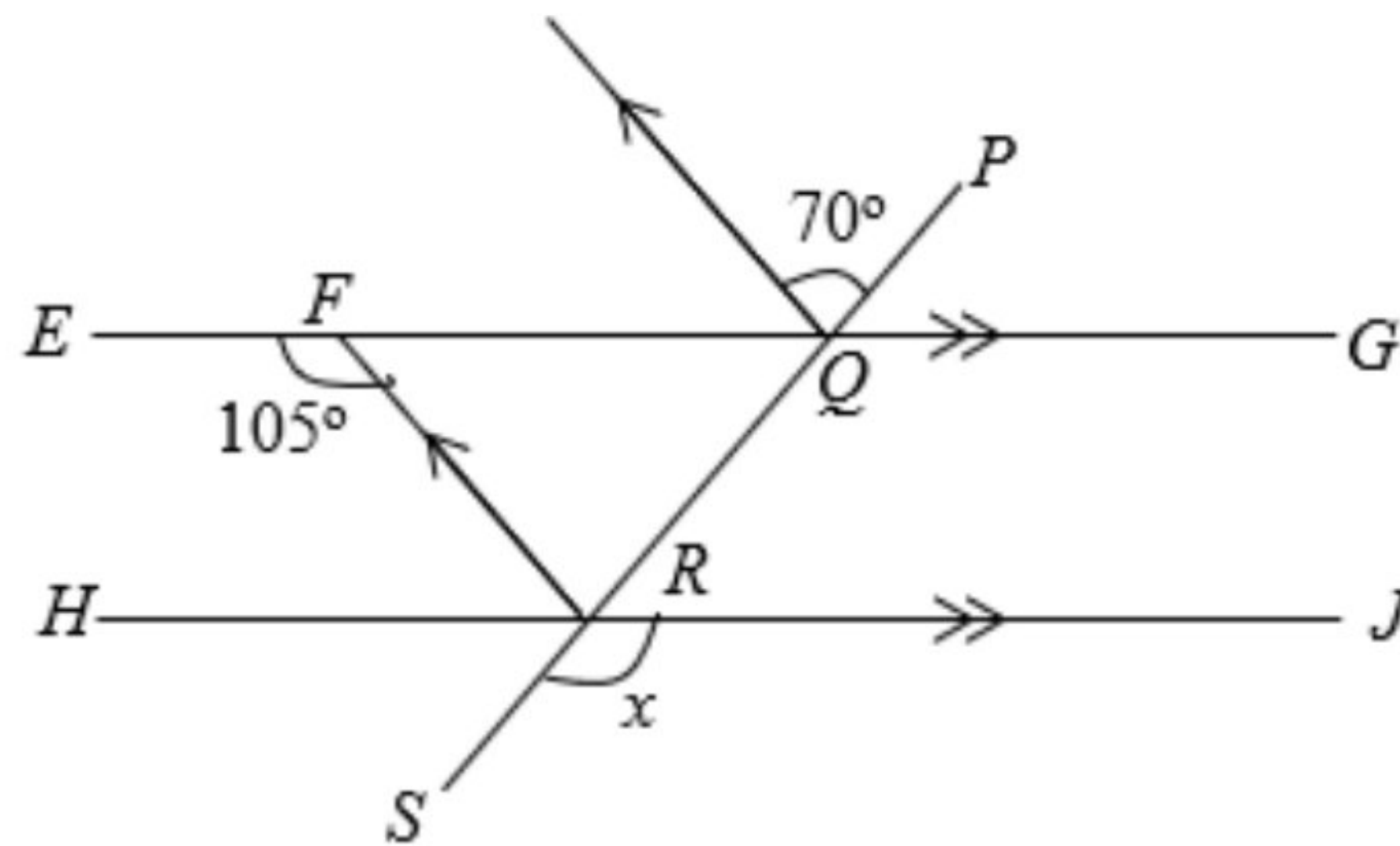
A $s = 4\sqrt{tu}$

C $s = 6\sqrt{tu}$

B $s = \frac{2\sqrt{t}}{u}$

D $s = \frac{4\sqrt{t}}{u}$

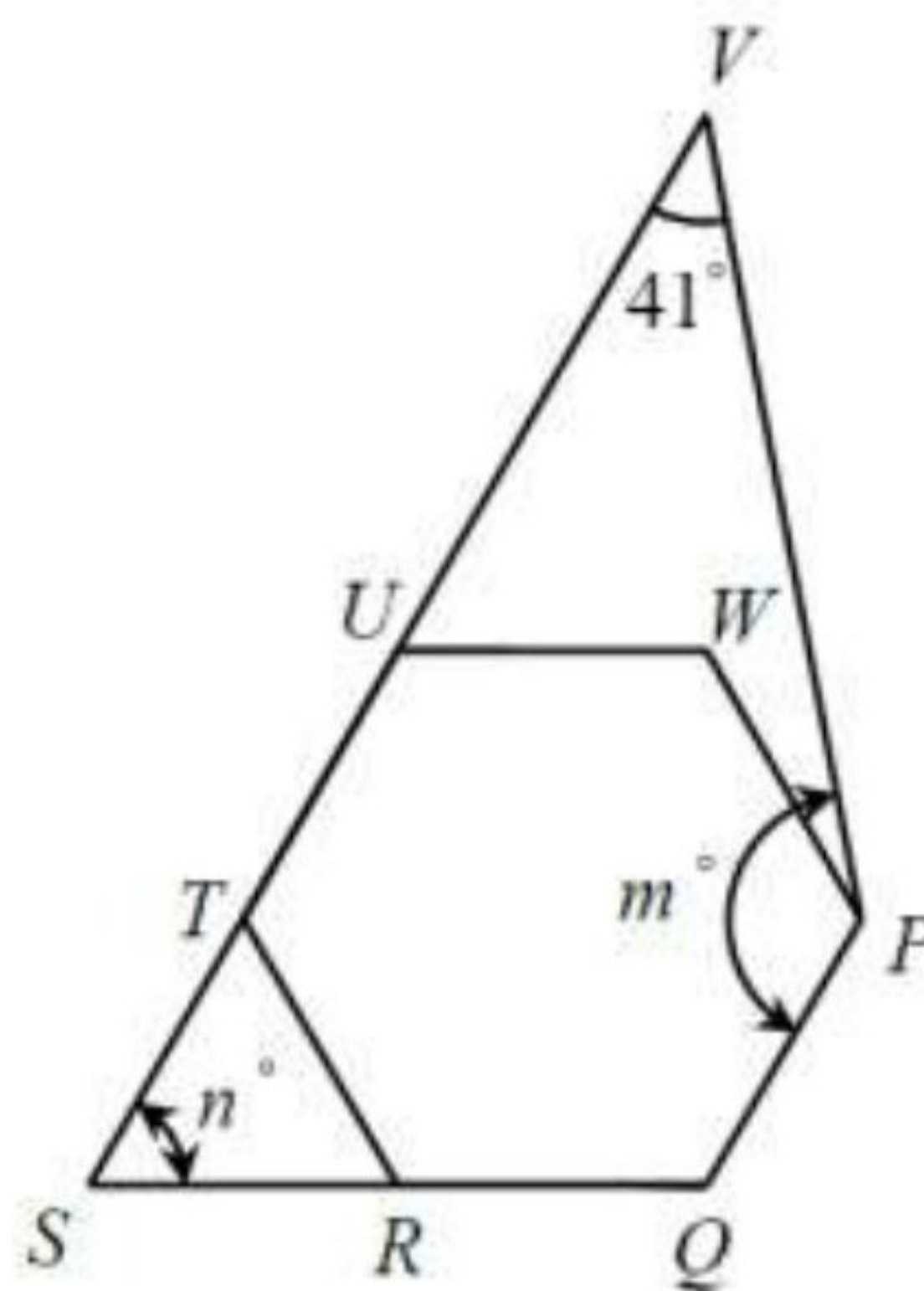
- 9 Dalam Rajah 1, $PQRS$, $EFQG$ dan HRJ ialah garis lurus.
In Diagram 1, $PQRS$, $EFQG$ and HRJ are straight lines.



Rajah 1 / Diagram 1

Cari nilai x .
Find the value of x .

- | | | | |
|----------|----|----------|-----|
| A | 35 | C | 125 |
| B | 75 | D | 145 |
- 10 Dalam Rajah 2, $PQRTUW$ ialah heksagon sekata. $STUV$ dan SRQ ialah garis lurus.
In Diagram 2, $PQRTUW$ is a regular hexagon. $STUV$ and SRQ are straight lines.



Rajah 2 / Diagram 2

Hitung nilai $m + n$.
Calculate the value of $m + n$.

- | | | | |
|----------|-----|----------|-----|
| A | 140 | C | 199 |
| B | 169 | D | 219 |

- 11 Permudahkan :
Simplify :

$$\frac{p^4 \times (16p^8)^{\frac{1}{4}}}{q^{-3}}$$

- A $2p^3q^{-3}$ C $16p^3q^{-3}$
B $2p^6q^3$ D $16p^6q^3$

- 12 Sebuah kotak mengandungi tiga batang pen biru, lima batang pen merah dan sebatang pen hitam. Dua batang pen dipilih dari kotak secara rawak satu per satu tanpa pemulangan. Hitung kebarangkalian bahawa kedua-dua batang pen yang dipilih adalah berwarna sama.

A box contains three blue pens, five red pens and one black pen. Two pens are selected from the box at random one by one without replacement. Calculate the probability that the two selected pens are the same color.

- A $\frac{26}{72}$ C $\frac{34}{72}$
B $\frac{27}{72}$ D $\frac{35}{72}$

- 13 Berikut merupakan jenis akaun simpanan yang mungkin dipunyai oleh seorang peniaga runcit kecuali

The following are the types of savings accounts that might had by a retailer except

- A Akaun simpanan
Saving account C Akaun semasa
Current account
B Akaun simpanan tetap
Fixed deposit account D Akaun bank
Bank account

- 14 Aminah ingin menandatangani RM20 000 ke dalam akaun simpanan tetap selama 2 tahun.

Pelan 1: Kadar faedah tahunan 3% dan dikompaun setiap 3 bulan.

Pelan 2: Kadar faedah tahunan 3.2% dan dikompaun setiap 6 bulan.

Berapakah perbezaan faedah yang didapati antara kedua-dua pelan tersebut?

Aminah wishes to deposit RM20 000 in a fixed deposit account for 2 years.

Plan 1: Annual interest rate 3% and compounded every 3 months.

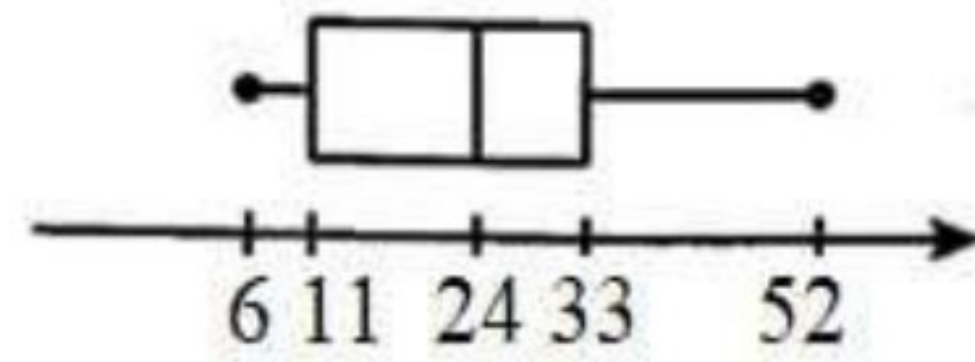
Plan 2: Annual interest rate 3.2% and compounded every 6 months.

What is the different of interest earned between the two plans?

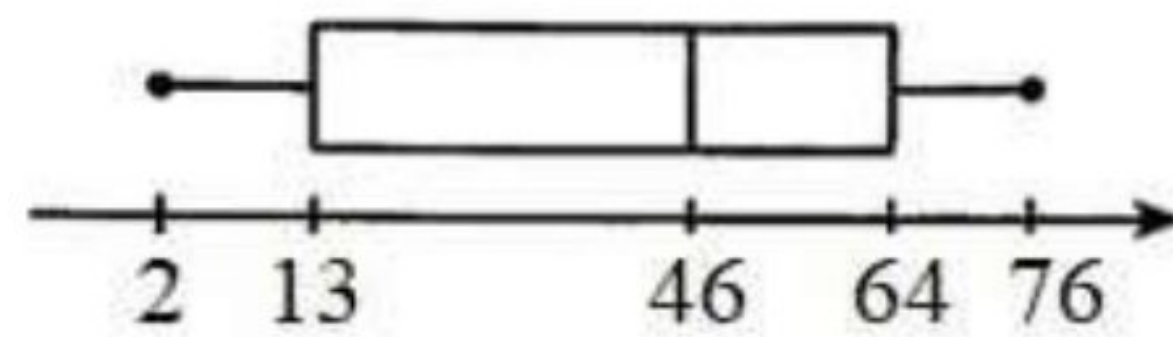
- A RM79.07 C RM1 231.98
B RM800.00 D RM1 311.05

- 20** Dalam suatu set data, julat dan julat antara kuartil masing-masing ialah 52 dan 33. Antara plot kotak yang berikut, yang manakah mewakili maklumat diberi?
In a set of data, the range and the interquartile range are 52 and 33 respectively. Which of the following box plot represents the given information?

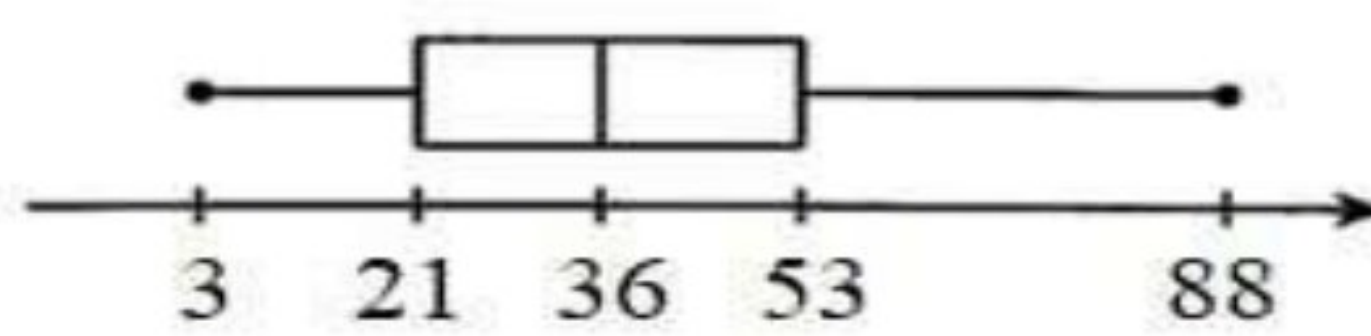
A



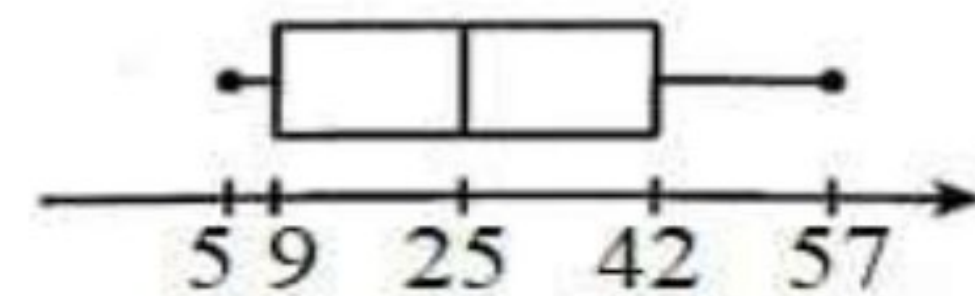
B



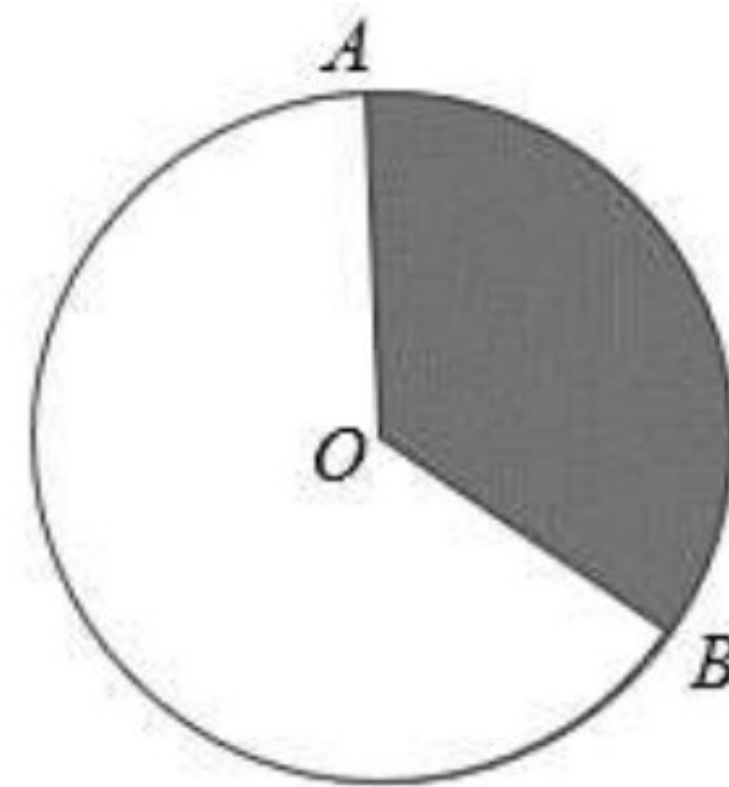
C



D



- 21** Rajah 4 menunjukkan sebuah bulatan berpusat di O dengan diameter 98 cm. Diberi luas sektor minor AOB ialah 2829.75 cm^2 .
Diagram 4 shows a circle with centre O with diameter 98 cm. Given the area of minor sector AOB is 2829.75 cm^2 .

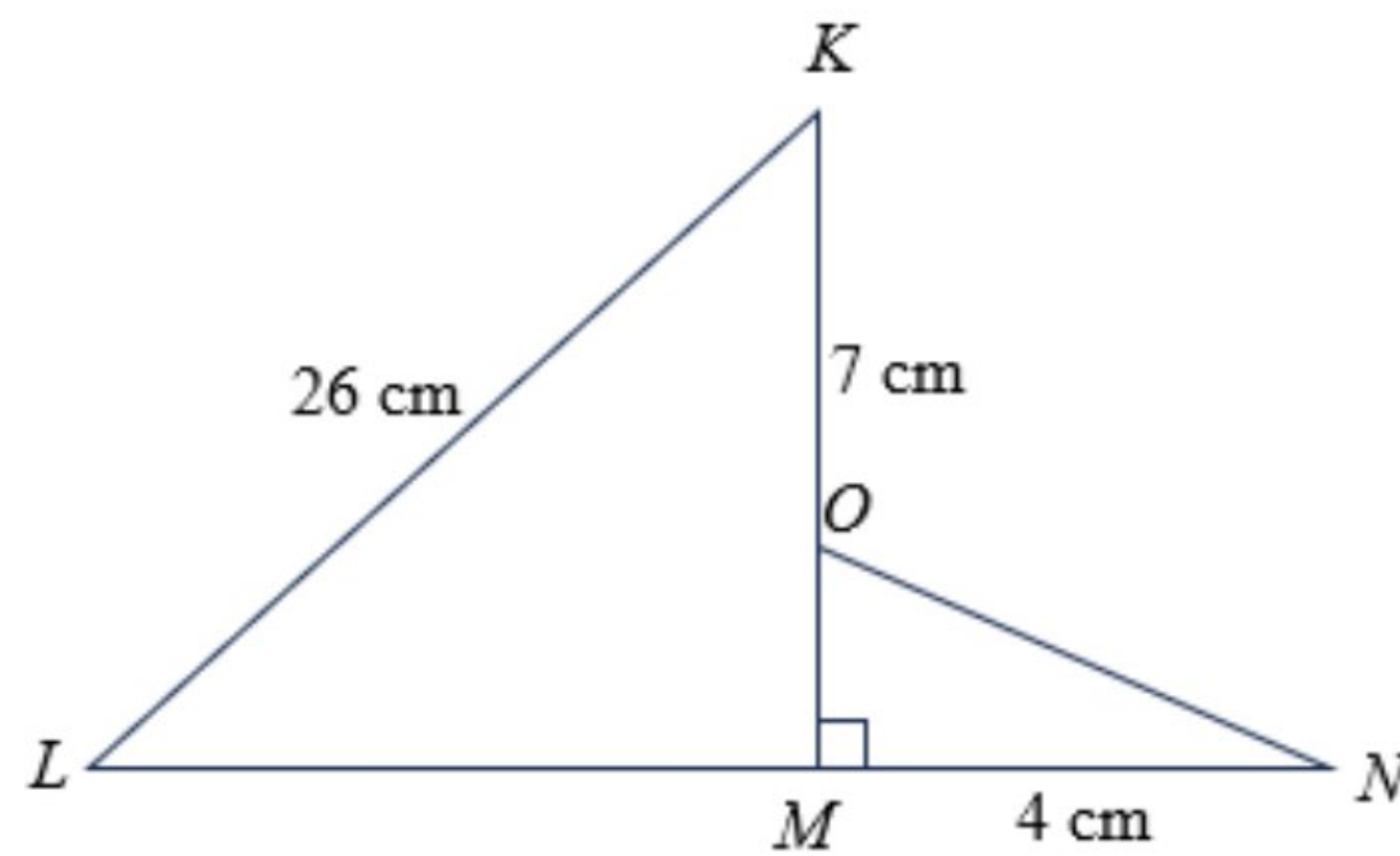


Rajah 4 / Diagram 4

Cari sudut major AOB .*Find the major angle AOB .*[Guna / Use $\pi = \frac{22}{7}$]

- | | | | |
|----------|-----|----------|-----|
| A | 120 | C | 225 |
| B | 135 | D | 310 |

- 22 Dalam Rajah 5 di bawah, KLM dan MNO ialah dua buah segi tiga bersudut tegak.
In Diagram 5 below, KLM and MNO are right-angle triangles.



Rajah 5 / Diagram 5

Diberi kos $KLM = \frac{12}{13}$, hitung panjang ON , dalam cm.

Given $\cos KLM = \frac{12}{13}$, calculate the length of ON , in cm.

- | | | | |
|----------|---|----------|----|
| A | 3 | C | 10 |
| B | 5 | D | 24 |
- 23 Diberi $\xi = \{x : x \text{ ialah integer } 1 \leq x \leq 20\}$.
 Set $R = \{x : x \text{ ialah nombor perdana}\}$.
 Set $S = \{x : x \text{ ialah faktor bagi } 20\}$.
 Senaraikan semua unsur bagi $R \cap S'$.

Given that $\xi = \{x : x \text{ is an integer } 1 \leq x \leq 20\}$.

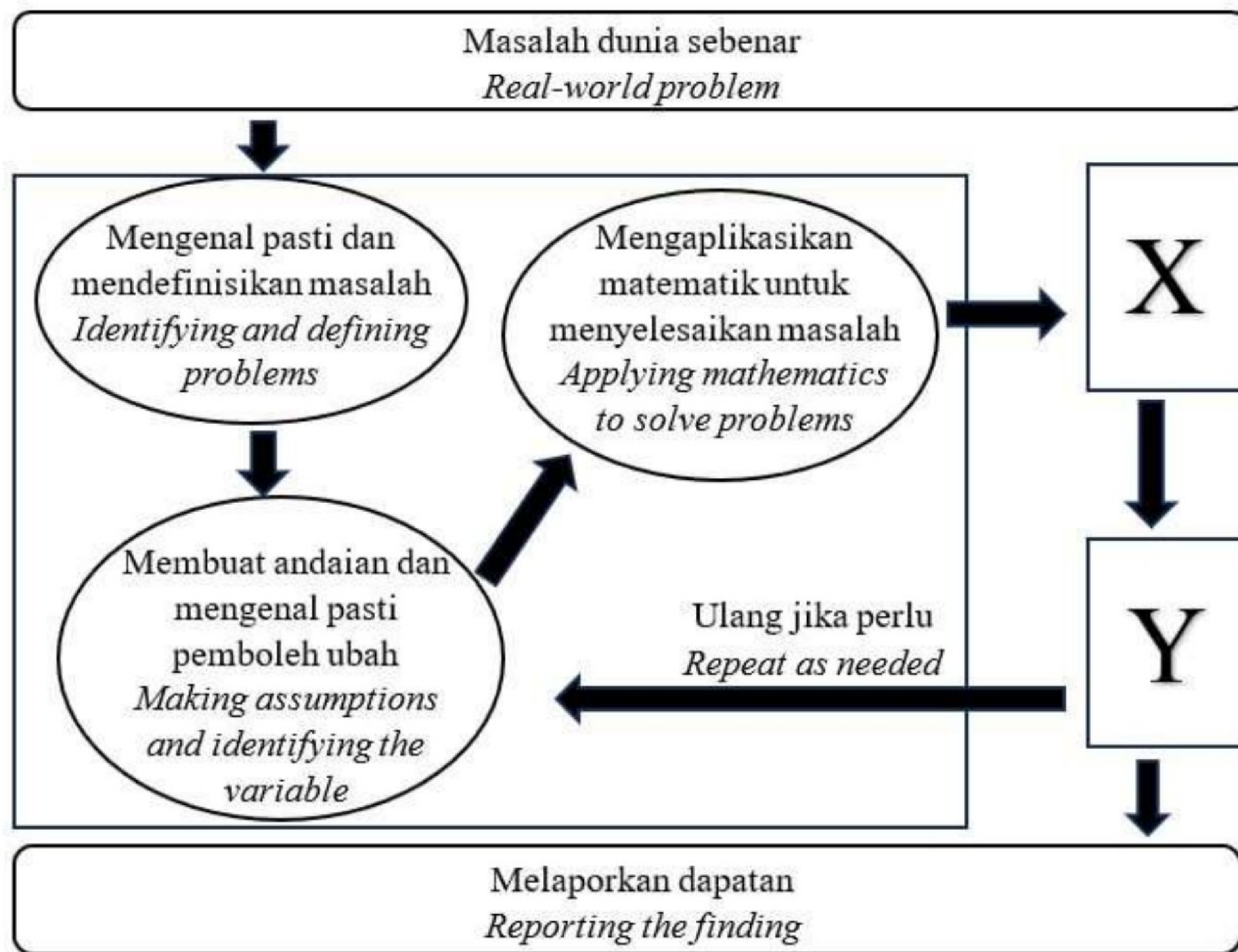
Set $R = \{x : x \text{ is a prime number}\}$.

Set $S = \{x : x \text{ is a factor of } 20\}$.

List all elements of $R \cap S'$.

- | | |
|----------|---|
| A | $\{2, 5\}$ |
| B | $\{3, 7, 11, 13, 17, 19\}$ |
| C | $\{1, 2, 3, 4, 5, 7, 10, 11, 13, 17, 19, 20\}$ |
| D | $\{2, 3, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19\}$ |

24 Rajah 6 menunjukkan ringkasan proses permodelan.
 Diagram 6 shows the simplified modelling process.



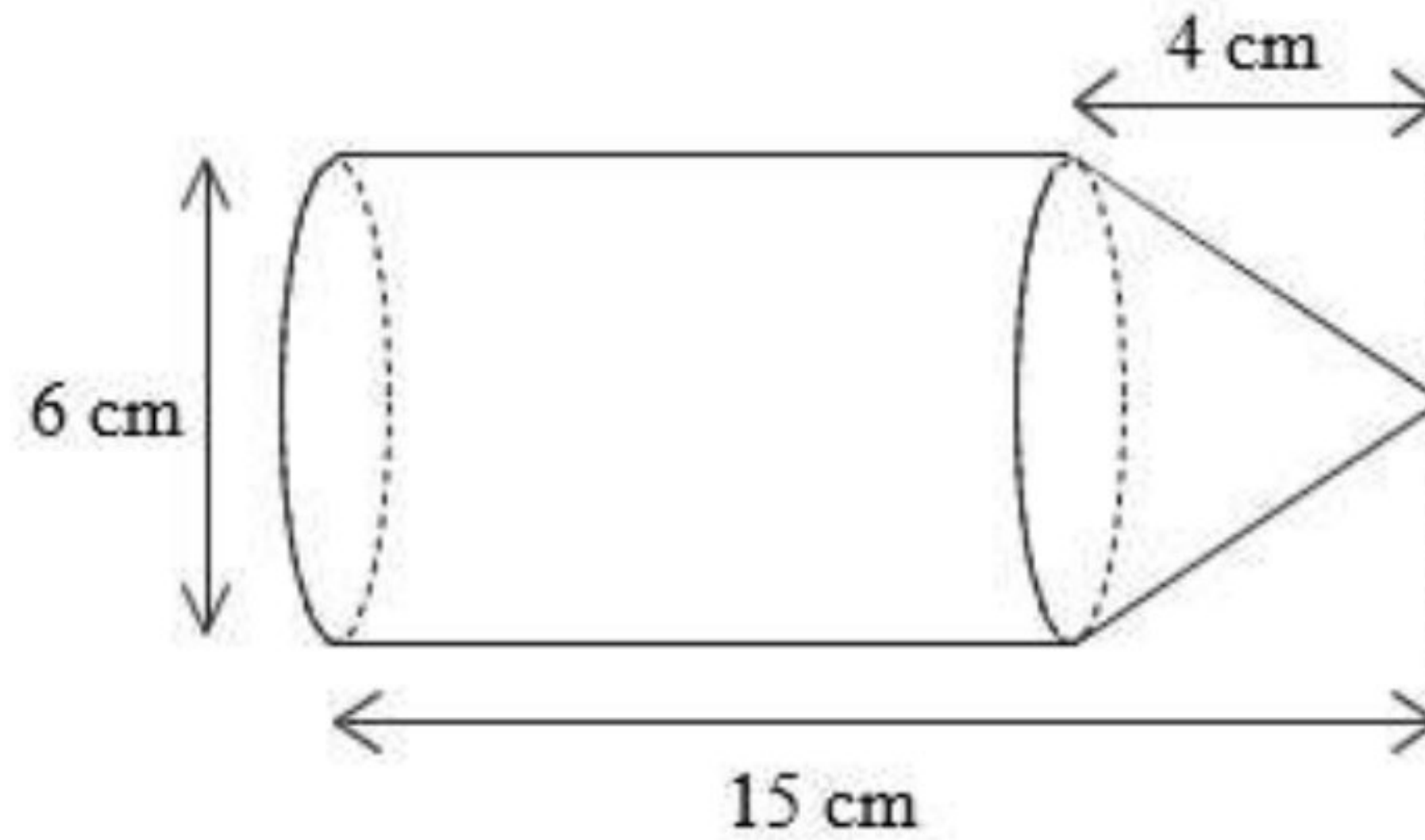
Rajah 6 / Diagram 6

Apakah X dan Y?
 What is X and Y?

	X	Y
A	Menjalankan ujikaji atau eksperimen. <i>Conduct a trial or experiment.</i>	Justifikasikan hasil dapatan. <i>Justify the findings.</i>
B	Justifikasikan hasil dapatan. <i>Justify the findings.</i>	Menjalankan ujikaji atau eksperimen. <i>Conduct a trial or experiment.</i>
C	Menentukan dan mentafsir penyelesaian dalam konteks masalah berkenaan. <i>Verifying and interpreting solution in context of the problem.</i>	Memurnikan model matematik. <i>Refining the mathematical model.</i>
D	Memurnikan model matematik. <i>Refining the mathematical model.</i>	Menentukan dan mentafsir penyelesaian dalam konteks masalah berkenaan. <i>Verifying and interpreting solution in context of the problem.</i>

- 25 Rajah 7 menunjukkan sebuah gabungan pepejal yang terbentuk daripada cantuman sebuah silinder dan sebuah kon.

Diagram 7 shows a composite solid formed by joining a cylinder and a cone.



Rajah 7 / Diagram 7

Cari jumlah luas permukaan, dalam cm^2 , gabungan pepejal tersebut.

Find the total surface area, in cm^2 , of the composite solid.

(Guna / Use $\pi = 3.142$)

- | | | | |
|----------|--------|----------|--------|
| A | 273.35 | C | 311.06 |
| B | 282.78 | D | 339.34 |
- 26 Kira sisihan piawai bagi data berikut.
Calculate the standard deviation of the following data.

10	11	12	14	17	18	23
----	----	----	----	----	----	----

- | | | | |
|----------|-------|----------|--------|
| A | 4.276 | C | 18.285 |
| B | 4.277 | D | 18.293 |

- 27 Salina memiliki sebuah rumah di Bukit Baru. Dia menerima bil cukai pintu pada kadar 9.5%. Diberi bahawa nilai tahunan rumahnya ialah RM5 000. Hitung cukai pintu yang perlu dibayar oleh Salina untuk setiap setengah tahun.

Salina owns a residential house in Bukit Baru. She receives property assessment tax bill at a rate of 9.5%. It is given that the annual value of her house is RM5 000. Calculate the property assessment tax payable by Salina for each half-year.

- | | | | |
|---|----------|---|----------|
| A | RM225.00 | C | RM450.00 |
| B | RM237.50 | D | RM475.00 |

- 28 Gaji bulanan Hazim ialah RM8 545 termasuk elaun. Pada tahun 2022, dia telah mendapat bonus sebanyak sebulan gaji dan elaun-elaun berjumlah RM15 000 yang dikecualikan cukai. Dia juga menderma kepada organisasi yang diluluskan oleh kerajaan berjumlah RM1 000 dan membayar zakat secara bulanan sebanyak RM100. Diberi jumlah pelepasan yang dibenarkan ialah RM20 500. Hitung pendapatan bercukai Hazim.

Hazim's monthly salary is RM8 545 including allowances. In year 2022, he has received a bonus of one month's salary and allowances amounting to RM15 000 which are exempt from tax. He also donated to an organization approved by the government amounting to RM1 000 and pays monthly zakat of RM100. It is given that the total tax relief was RM20 500. Calculate Hazim's chargeable income.

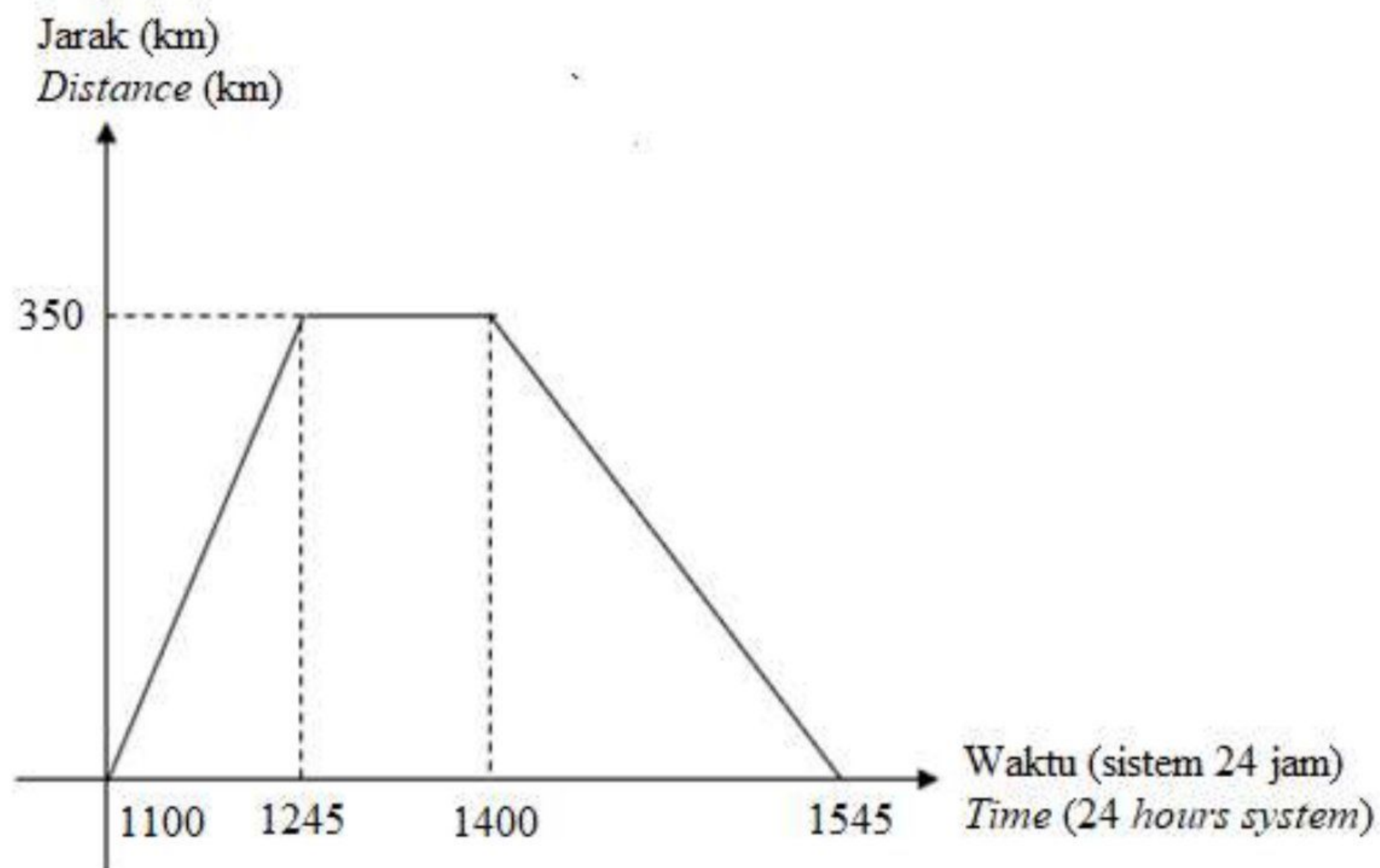
- | | | | |
|---|----------|---|----------|
| A | RM73 335 | C | RM77 852 |
| B | RM74 585 | D | RM89 585 |

- 29 Objek $M(3, 5)$ dipetakan kepada kedudukan $M'(-2, 8)$ di bawah suatu translasi. Tentukan kedudukan imej bagi $N(-1, 2)$ di bawah translasi yang sama.

Object $M(3, 5)$ is mapped onto position $M'(-2, 8)$ under a translation. Determine the position of image for $N(-1, 2)$ under the same translation.

- | | | | |
|---|------------|---|-----------|
| A | $(-6, 5)$ | C | $(4, -1)$ |
| B | $(-6, -1)$ | D | $(4, 5)$ |

- 35 Rajah 10 menunjukkan graf jarak-masa bagi pergerakan sebuah lori.
Diagram 10 shows the distance-time graph for the movement of a lorry.



Rajah 10 / Diagram 10

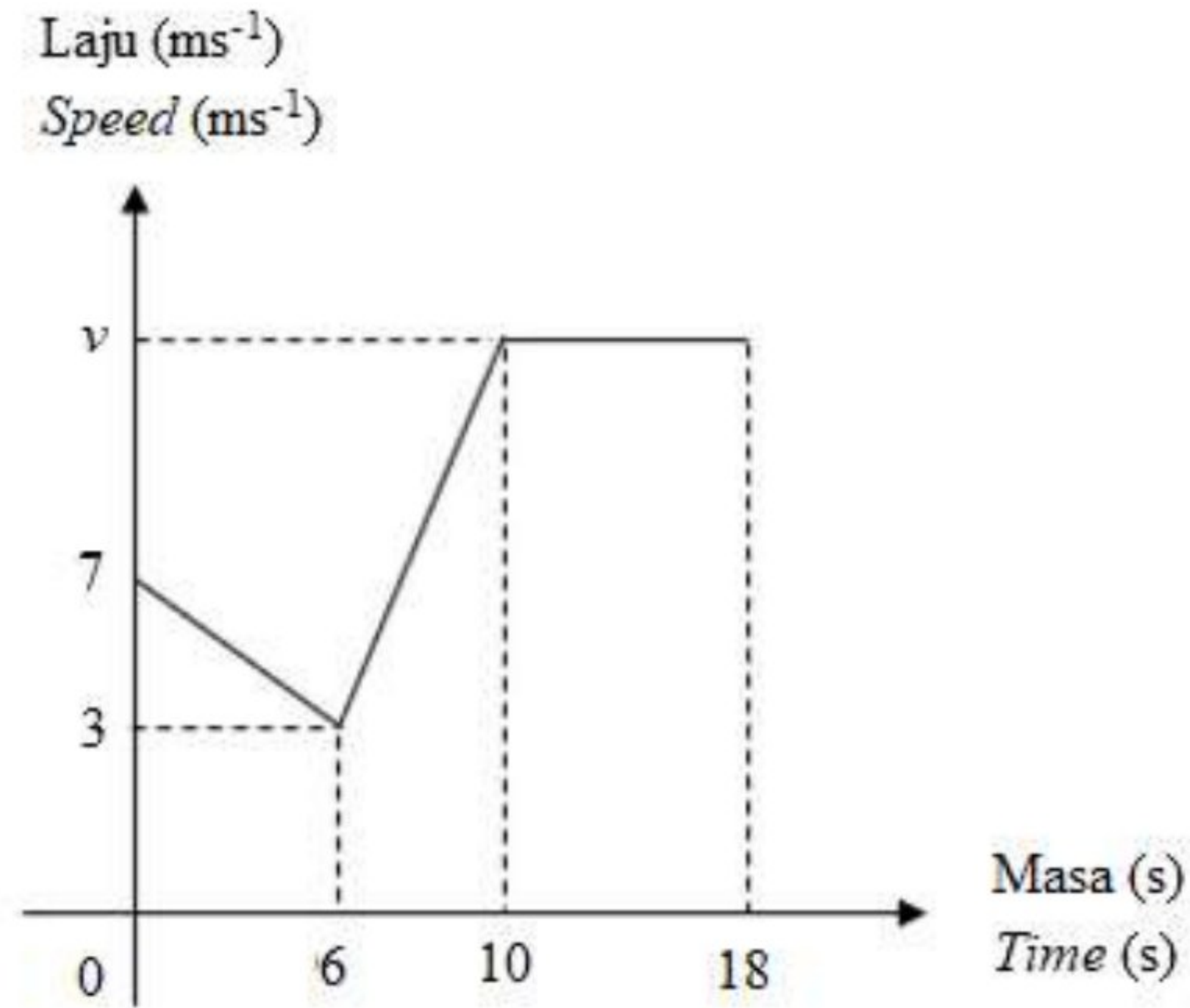
Nyatakan tempoh masa, dalam jam, lori itu berhenti.
State the duration of time, in hour, the lorry stopped.

- A 1.15 jam / hours C 1.35 jam / hours
 B 1.25 jam / hours D 2 jam / hours
- 36 Jumlah pendapatan Encik Jack dan isterinya adalah sebanyak RM12 600. Mereka mempunyai tiga orang anak dan mereka ingin menyimpan dana pendidikan anak-anak mereka sebanyak RM250 000 dalam tempoh 15 tahun bermula sekarang. Berapakah jumlah minimum yang perlu disimpan setiap bulan?
The total income of Encik Jack and his wife is RM12 600 a month. They have three children and they want to save their children's education fund of RM250 000 within 15 years from now. What is the minimum amount to save each month?

- A RM1 340 C RM1 380
 B RM1 360 D RM1 400

Selamat mengulangkaji dari telegram@soalanpercubaanspm

- 37 Rajah 11 menunjukkan graf laju-masa bagi satu zarah dalam tempoh 18 saat.
Diagram 11 shows speed-time graph of a particle within 18 seconds.



Rajah 11 / *Diagram 11*

Hitung nilai v jika jumlah jarak yang dilalui oleh zarah itu semasa laju seragam ialah 72 m.

Calculate the value of v if the total distance travelled by the particle during uniform speed is 72 m.

- | | | | |
|----------|---|----------|---|
| A | 6 | C | 8 |
| B | 7 | D | 9 |
- 38 Diberi $\tan x = -1.732$ and $0^\circ \leq x \leq 360^\circ$. Cari dua nilai yang mungkin bagi x .
Given $\tan x = -1.732$ and $0^\circ \leq x \leq 360^\circ$. Find two possible values of x .

- | | | | |
|----------|----------------------------------|----------|-----------------------------------|
| A | 60° dan / and 120° | C | 120° dan / and 300° |
| B | 60° dan / and 240° | D | 240° dan / and 300° |

