

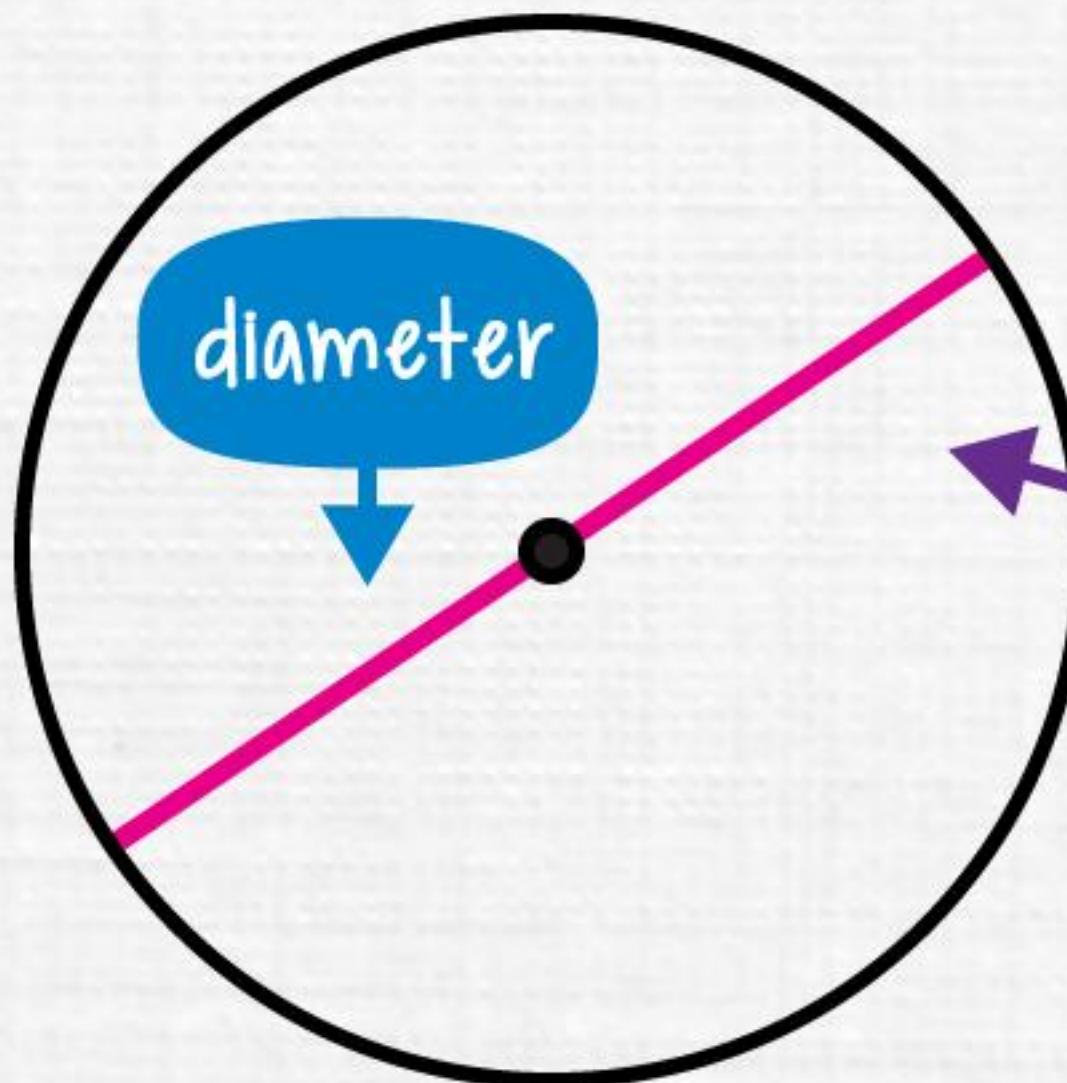
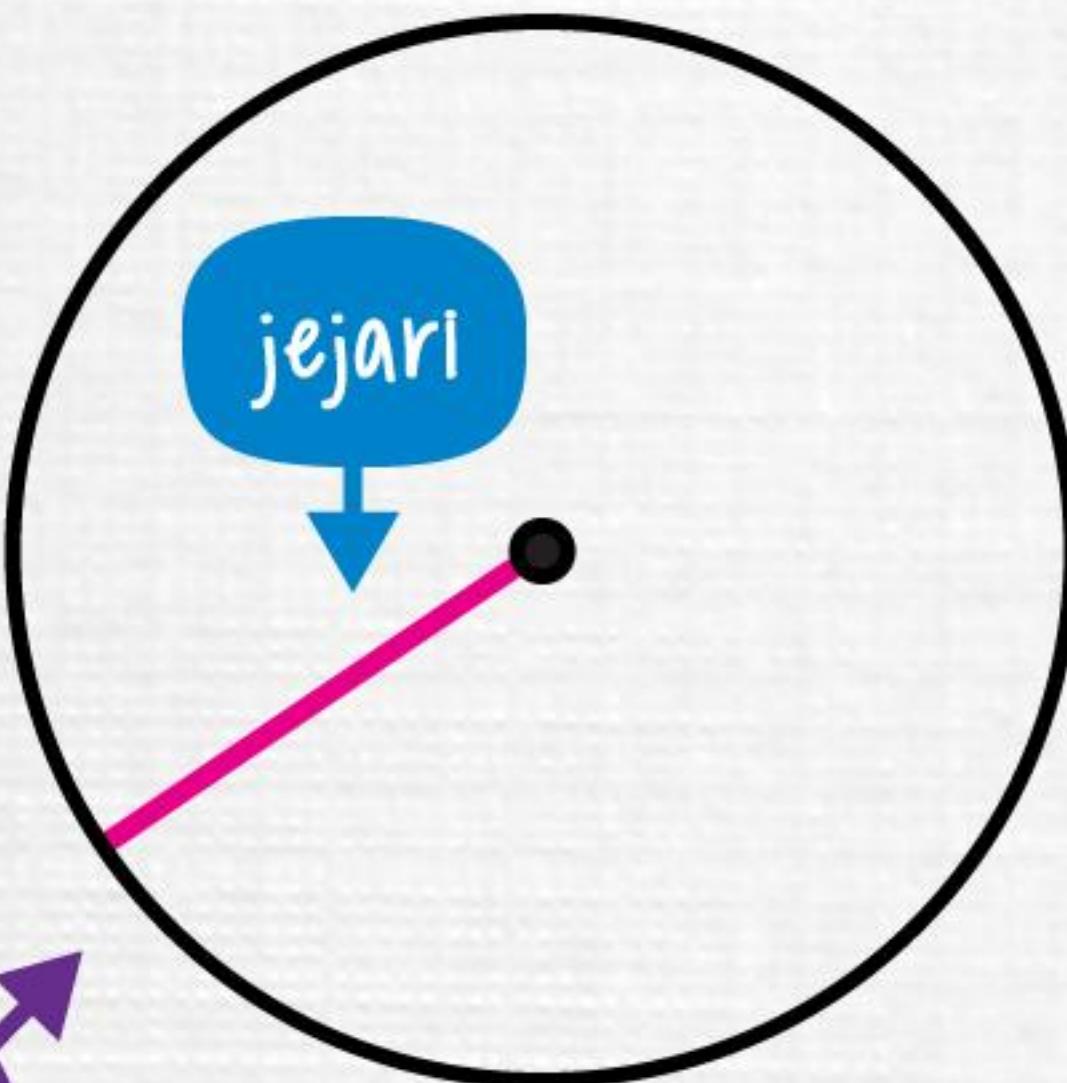
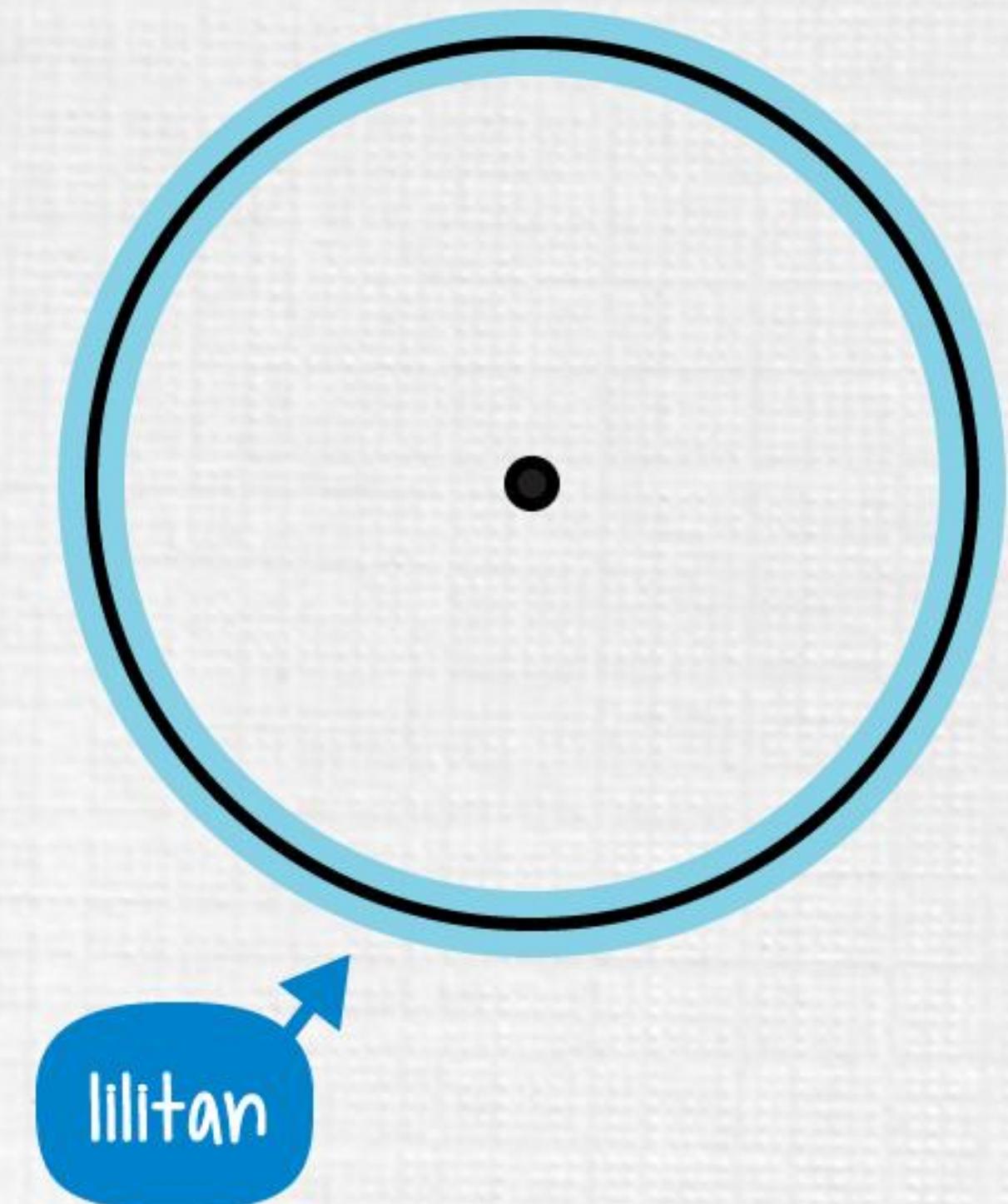
BAB 5:

BULATAN

matematik tingkatan 2

BULATAN

Bahagian Bulatan



garis lurus dari lilitan ke lilitan melalui pusat

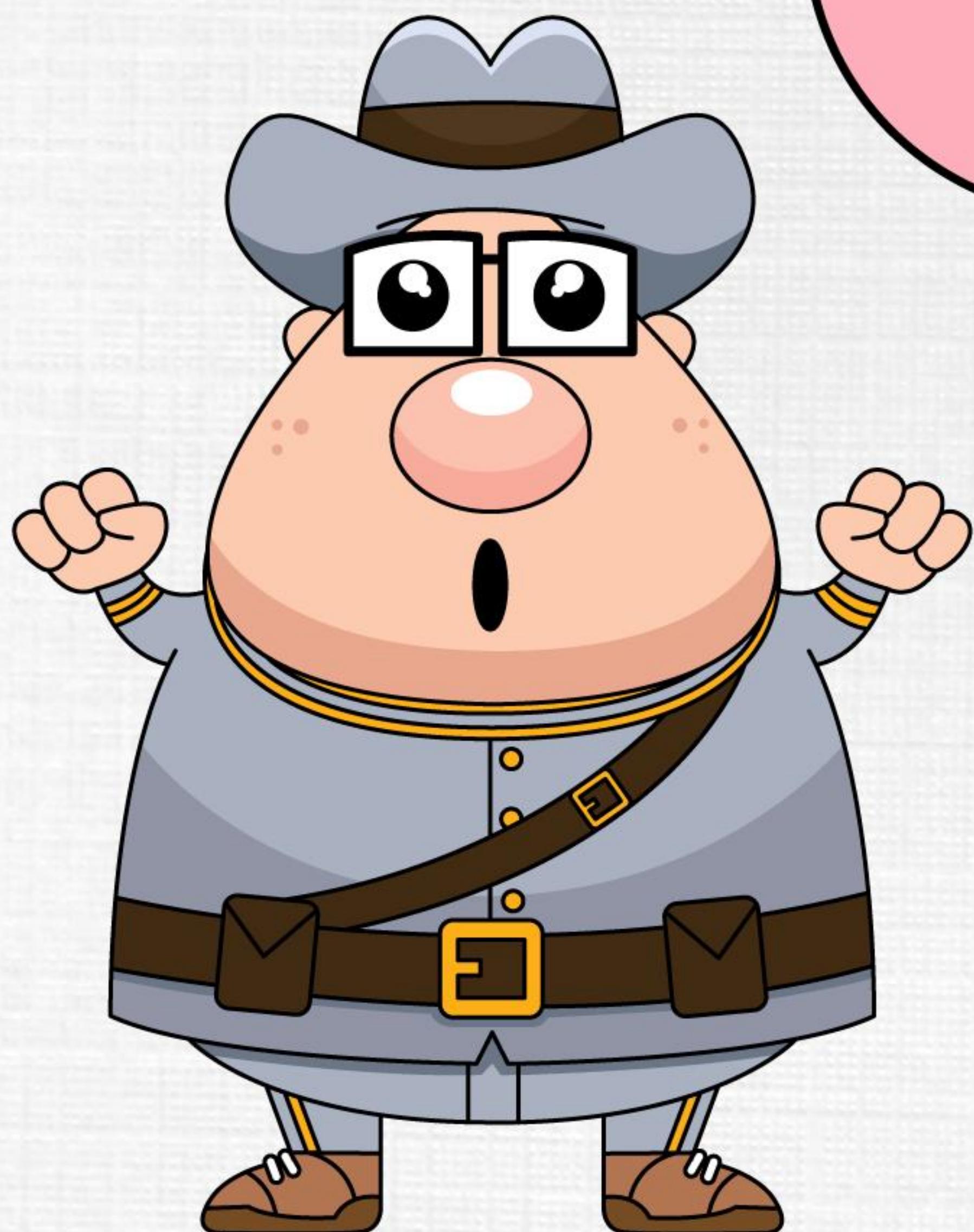
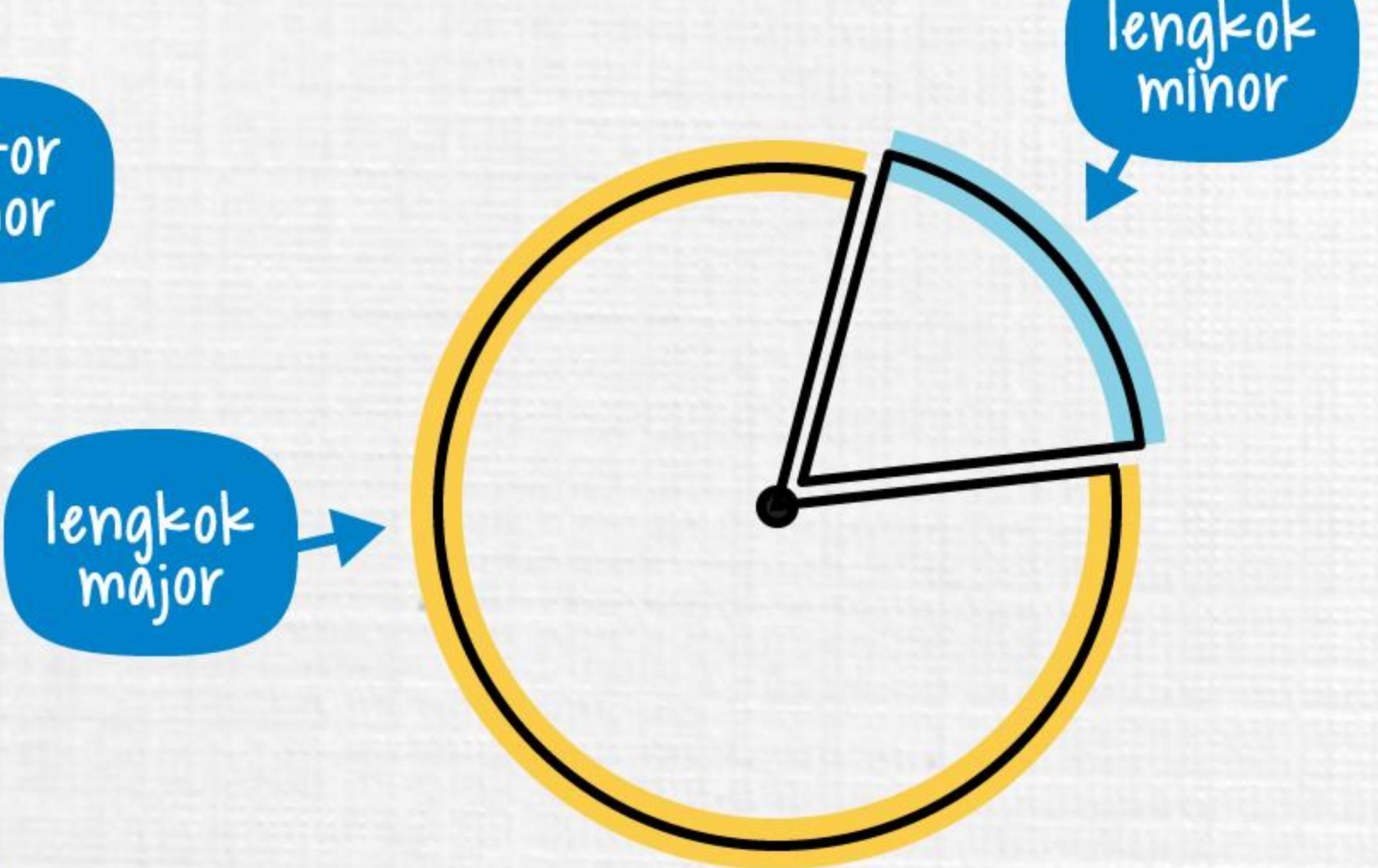
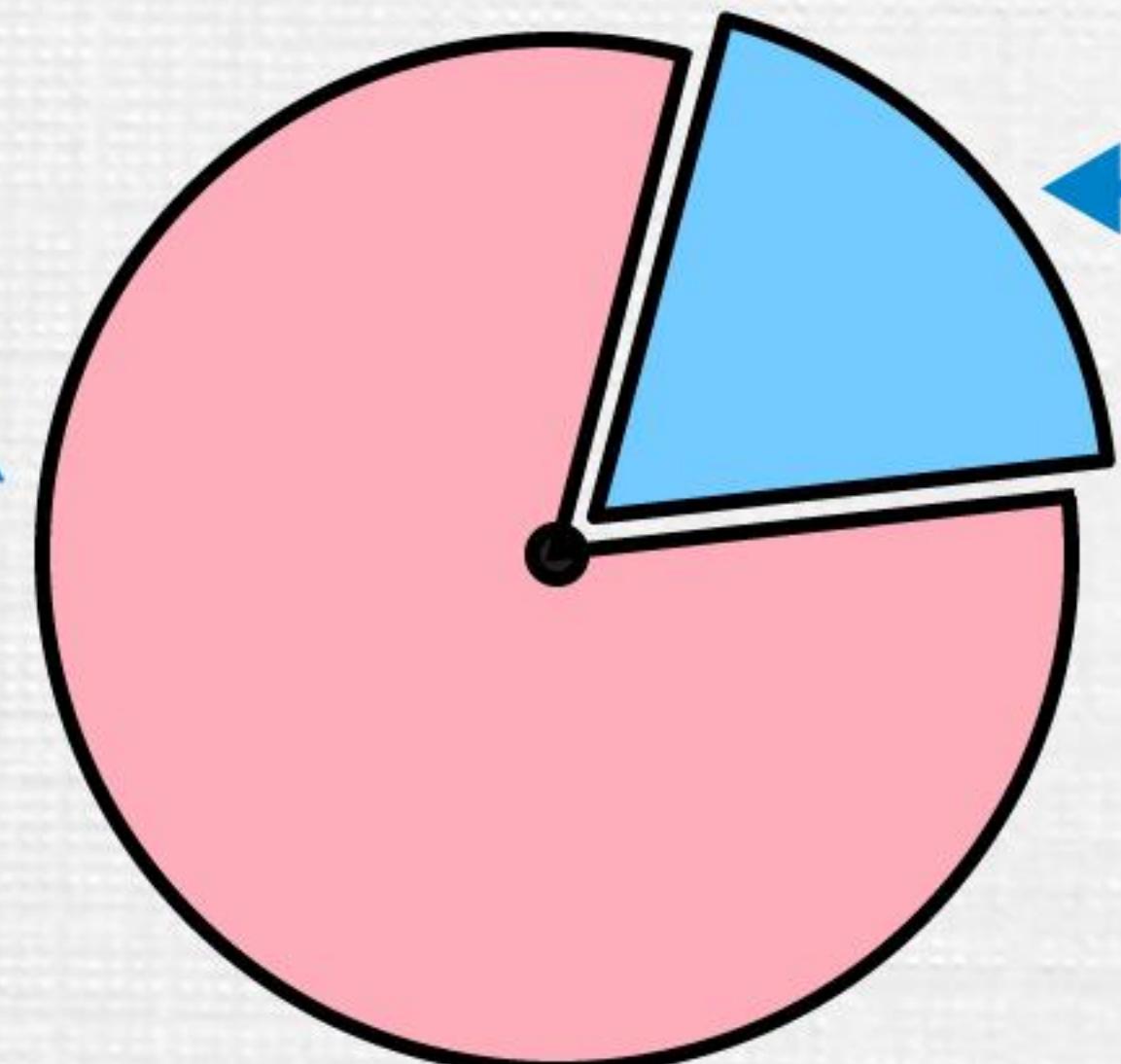
garis lurus dari pusat ke lilitan

sektor major

sektor minor

lengkok major

lengkok minor

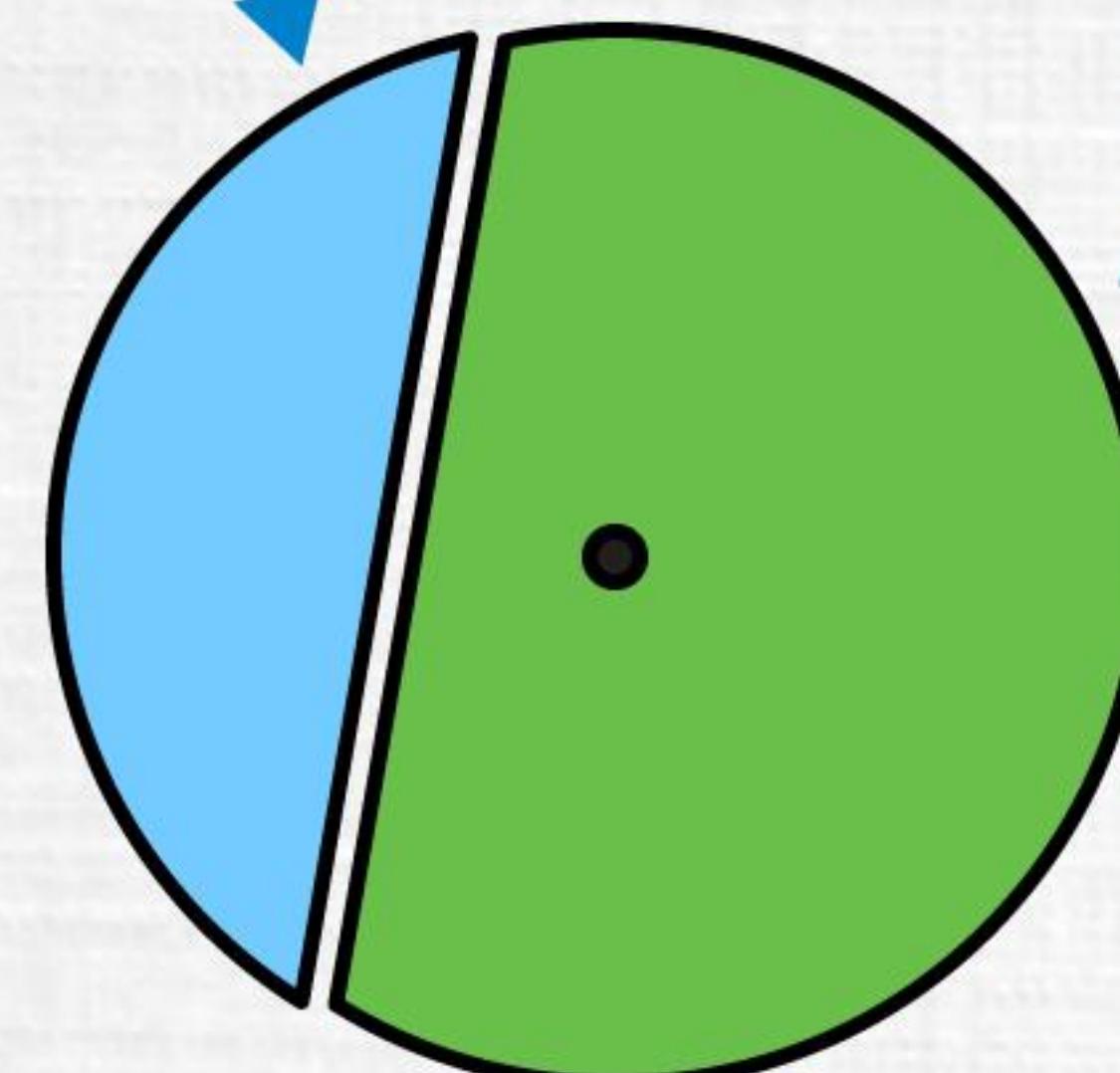
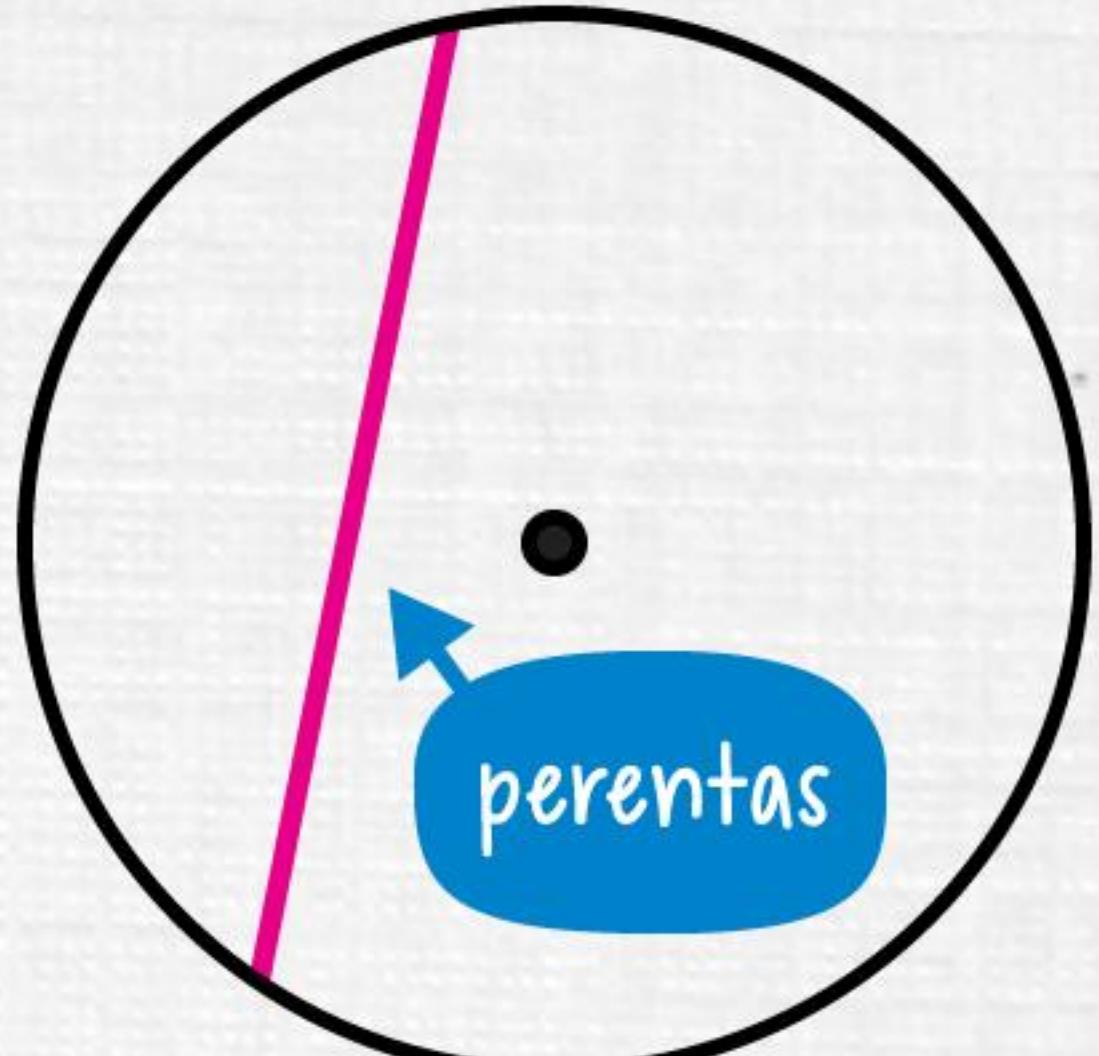


garis lurus dari lilitan ke lilitan

tembereng minor

tembereng major

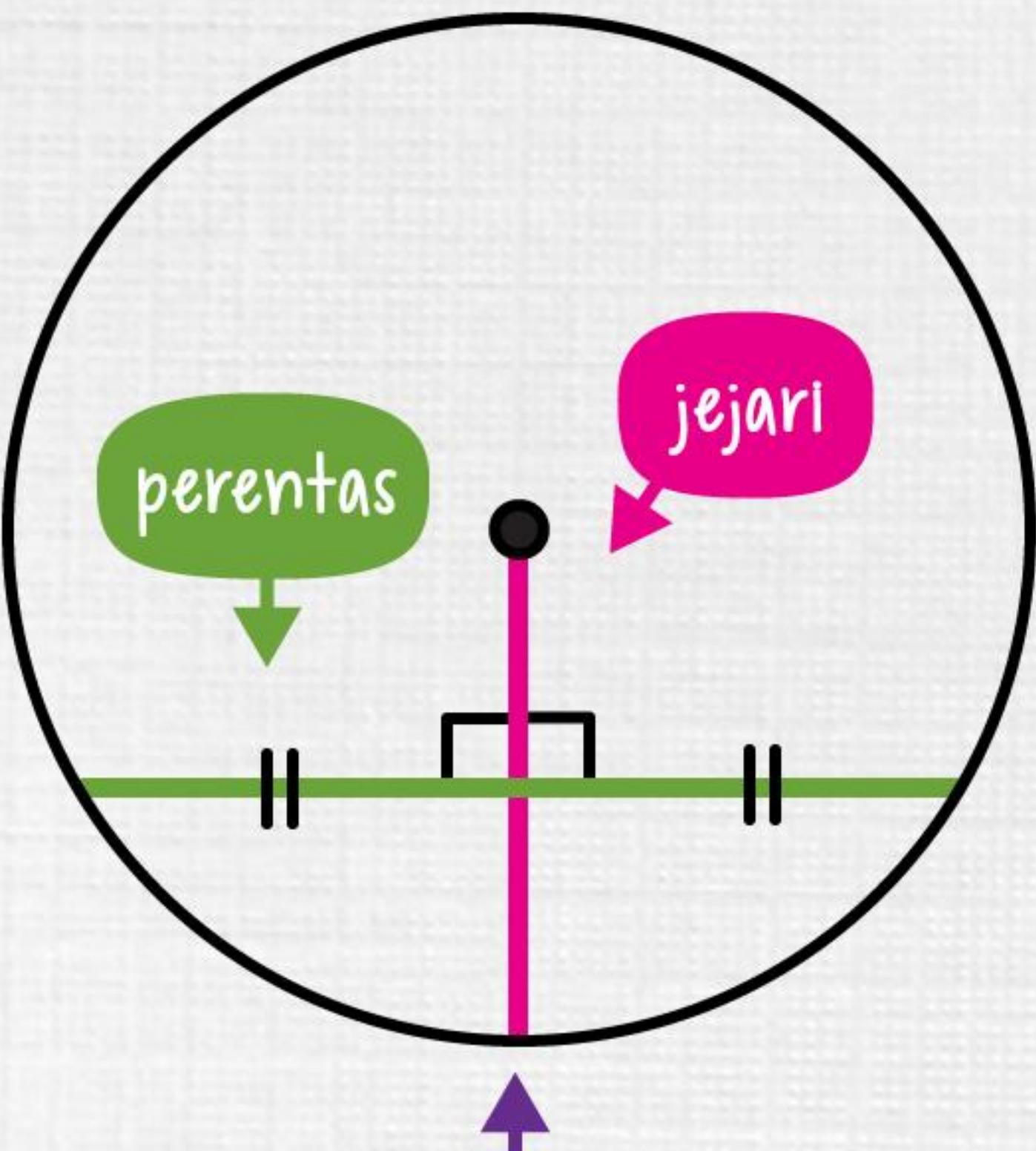
perentas



kabur
puteh

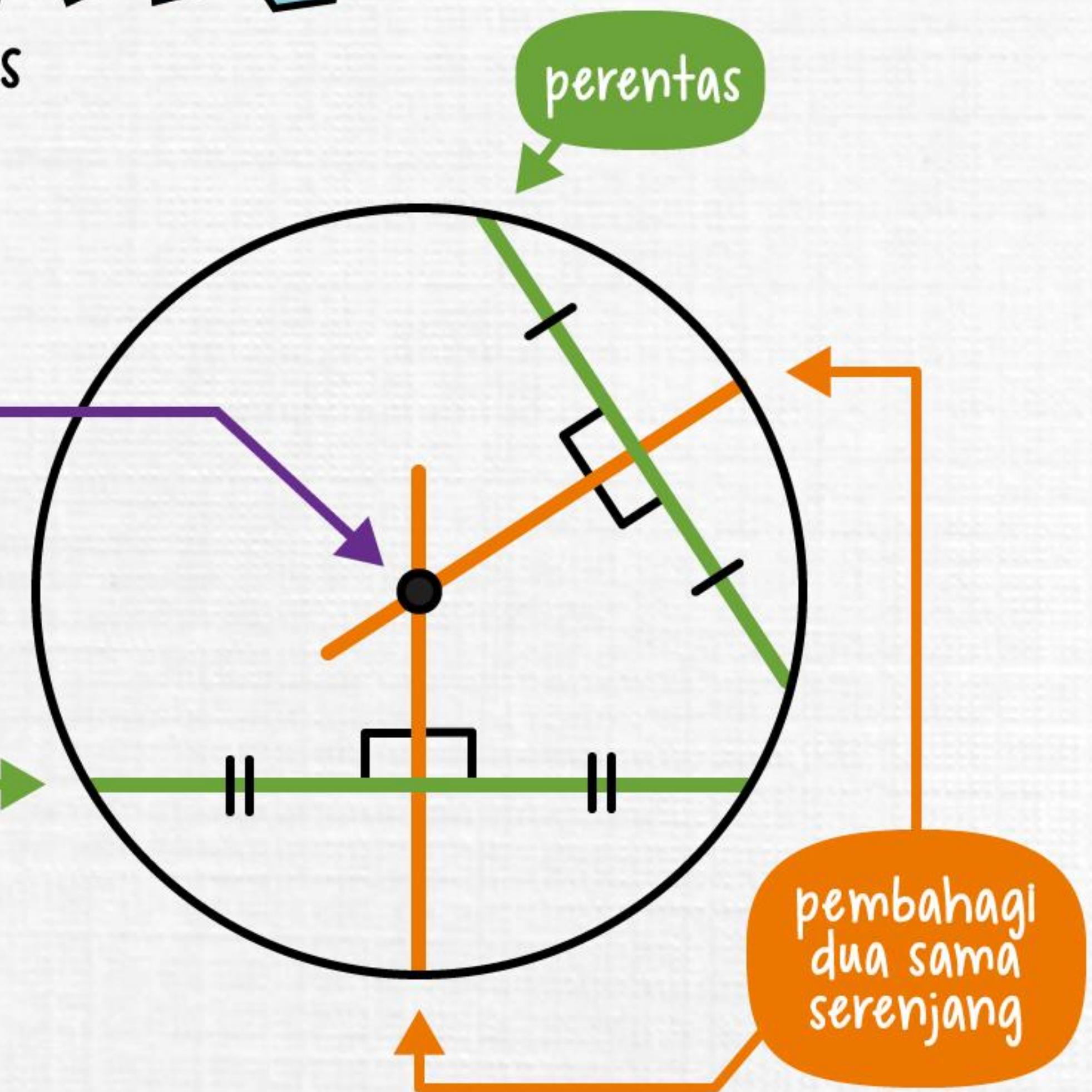
BULATAN

Sifat Simetri Perentas

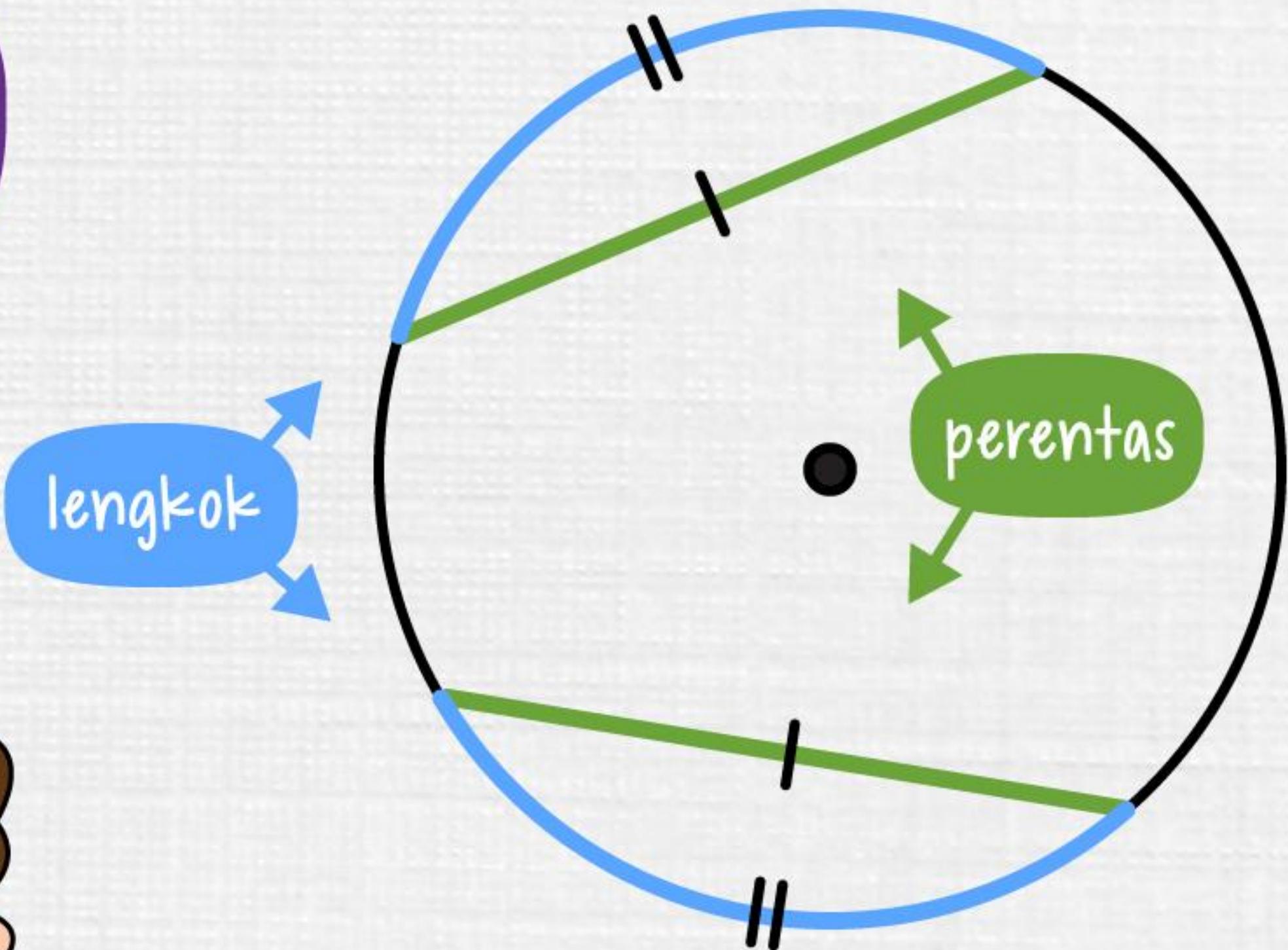


perentas dibahagi dua sama apabila jejari berserengang dengan perentas

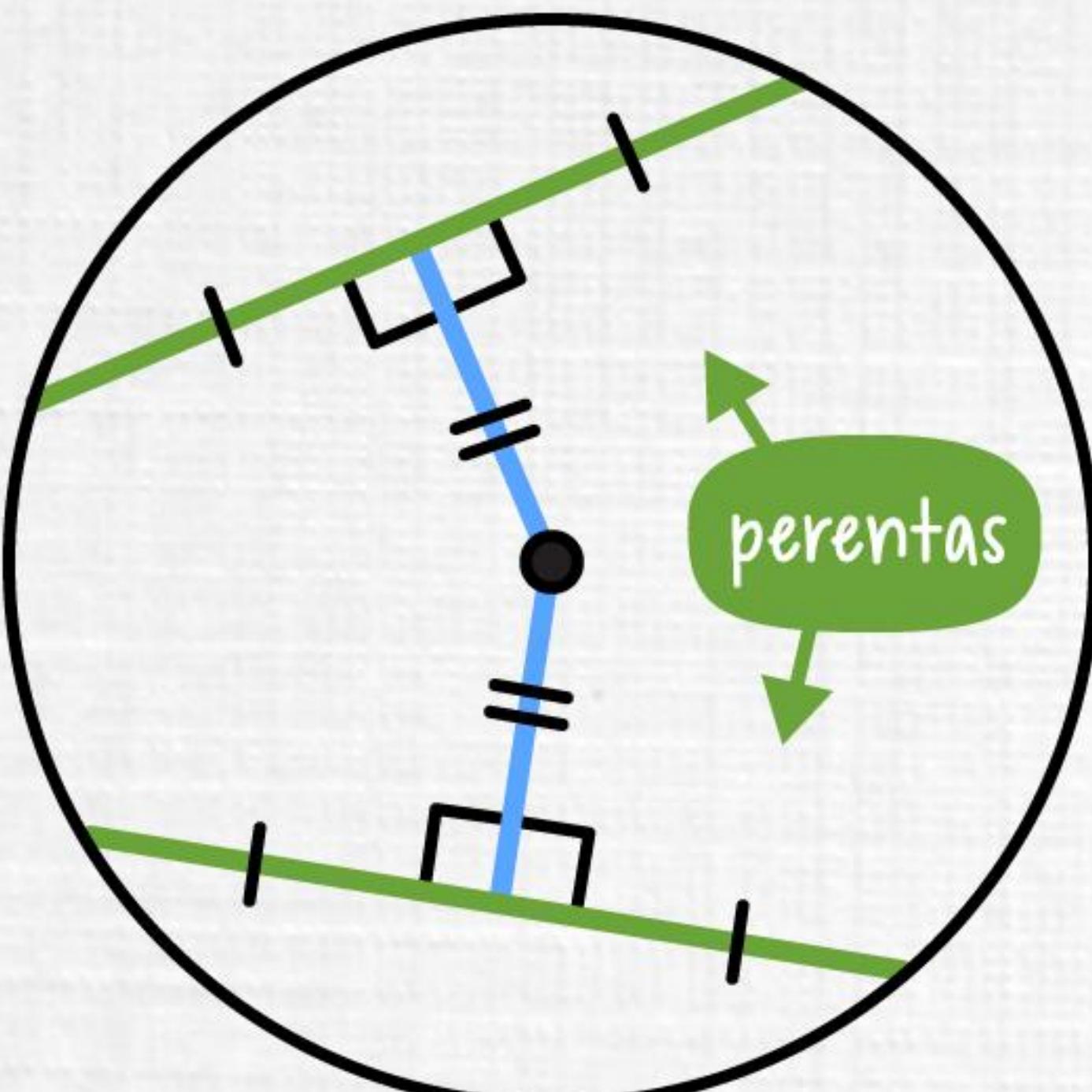
pembahagi dua sama serenjang dua perentas bertemu di pusat bulatan



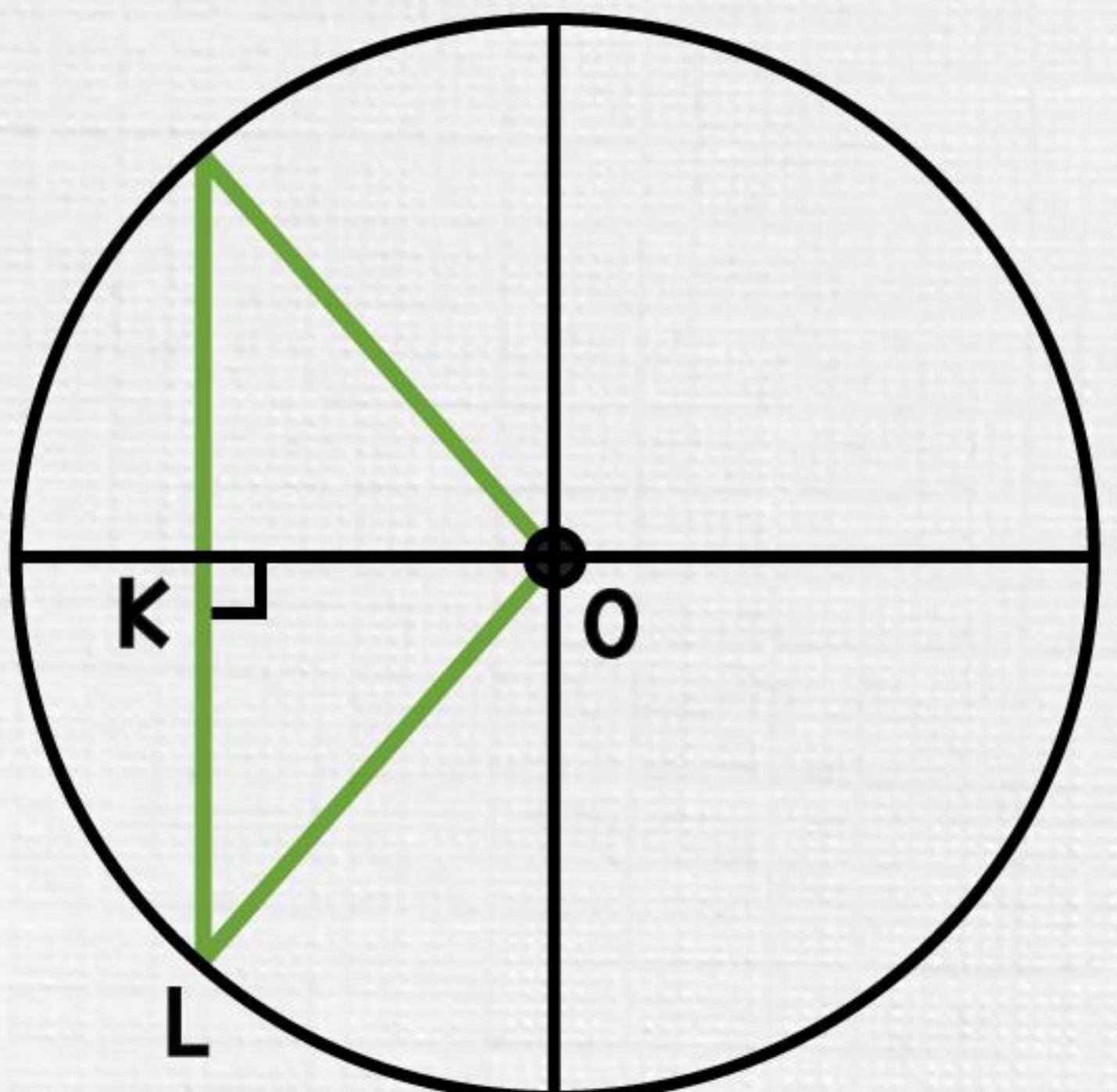
perentas yang sama panjang hasilkan lengkok yang sama panjang



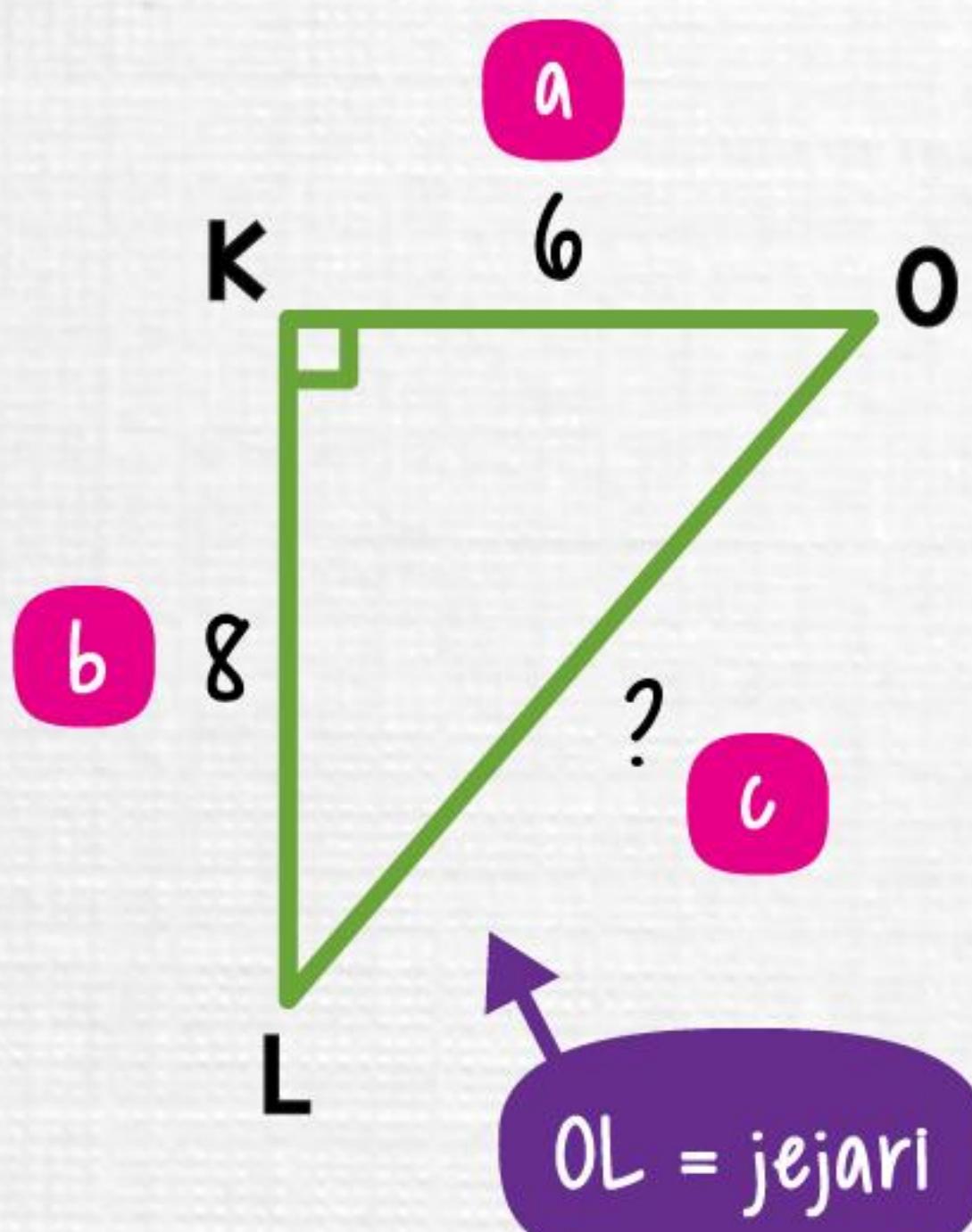
dua perentas yang sama panjang adalah sama jarak dari pusat bulatan



BULATAN



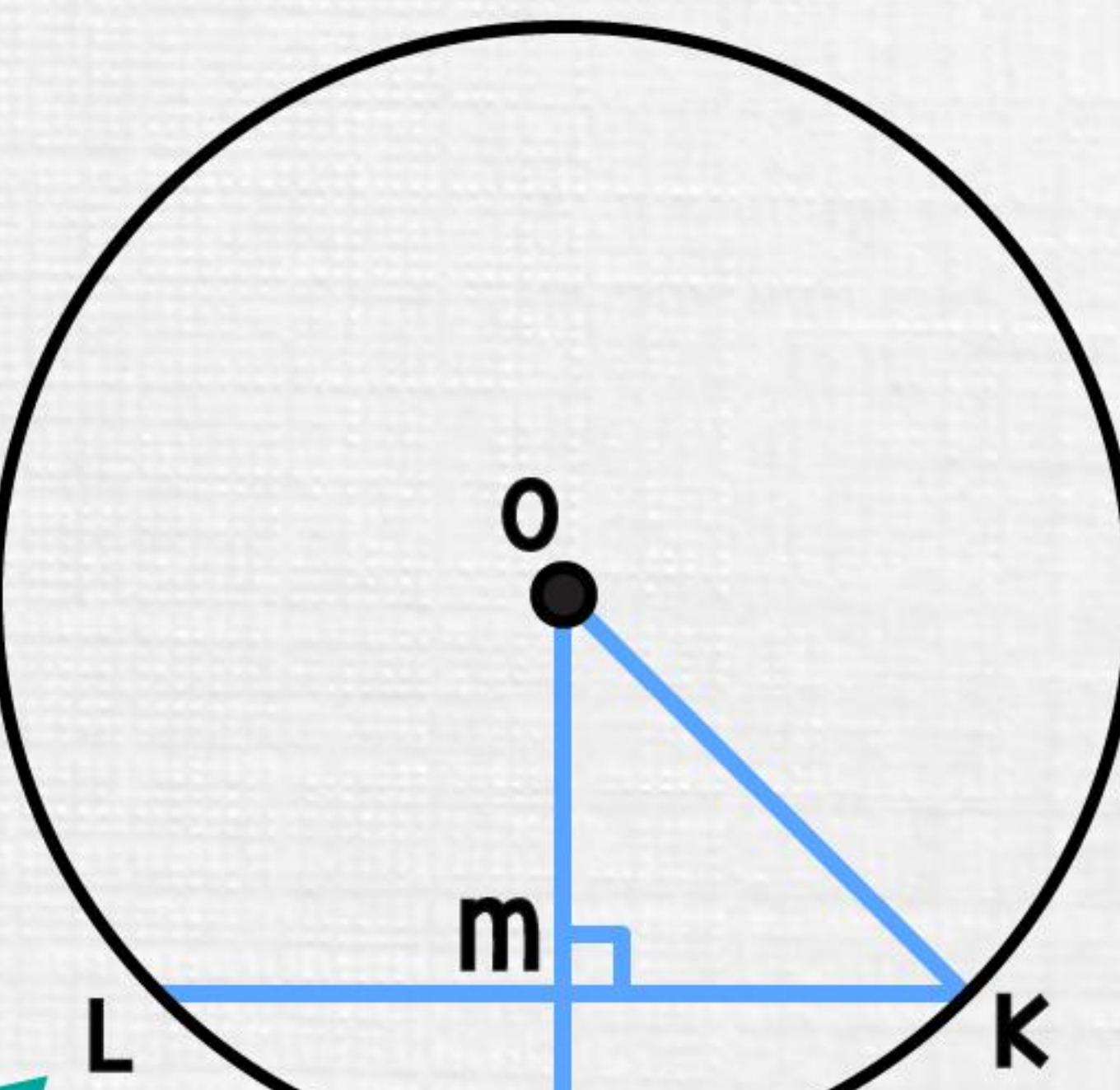
Kira panjang jejari jika $OK = 6$ dan $KL = 8$.



$$\begin{aligned} a^2 + b^2 &= c^2 \\ 6^2 + 8^2 &= c^2 \\ 100 &= c^2 \\ \sqrt{100} &= c \\ 10 &= c \end{aligned}$$

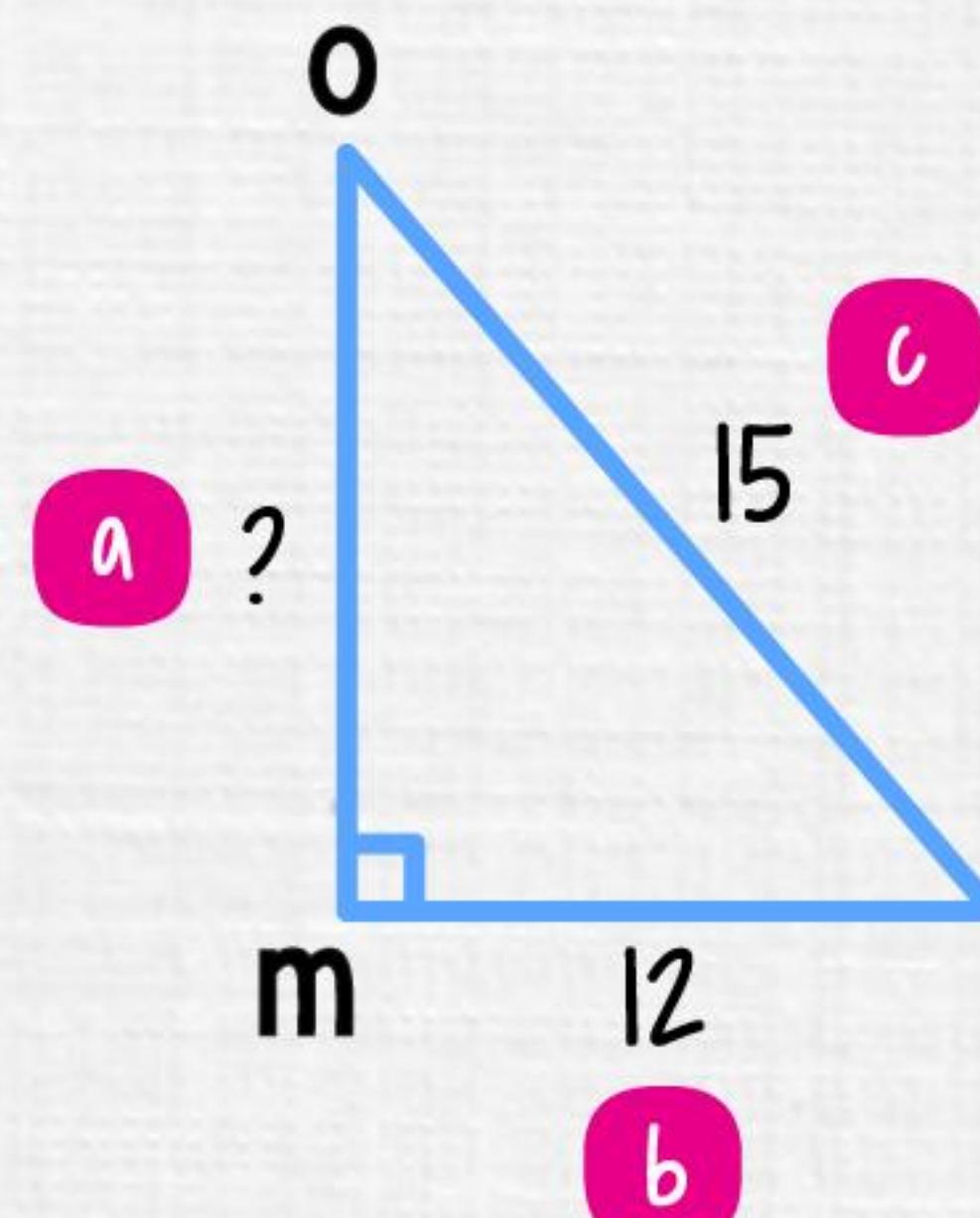
guna Pythagoras Theorem

maka,
jejari = 10



Kira panjang OM jika $OK = 15$ dan $KL = 24$.

perentas KL
dibahagi dua
sama apabila
jejari berserenjang
dengan perentas

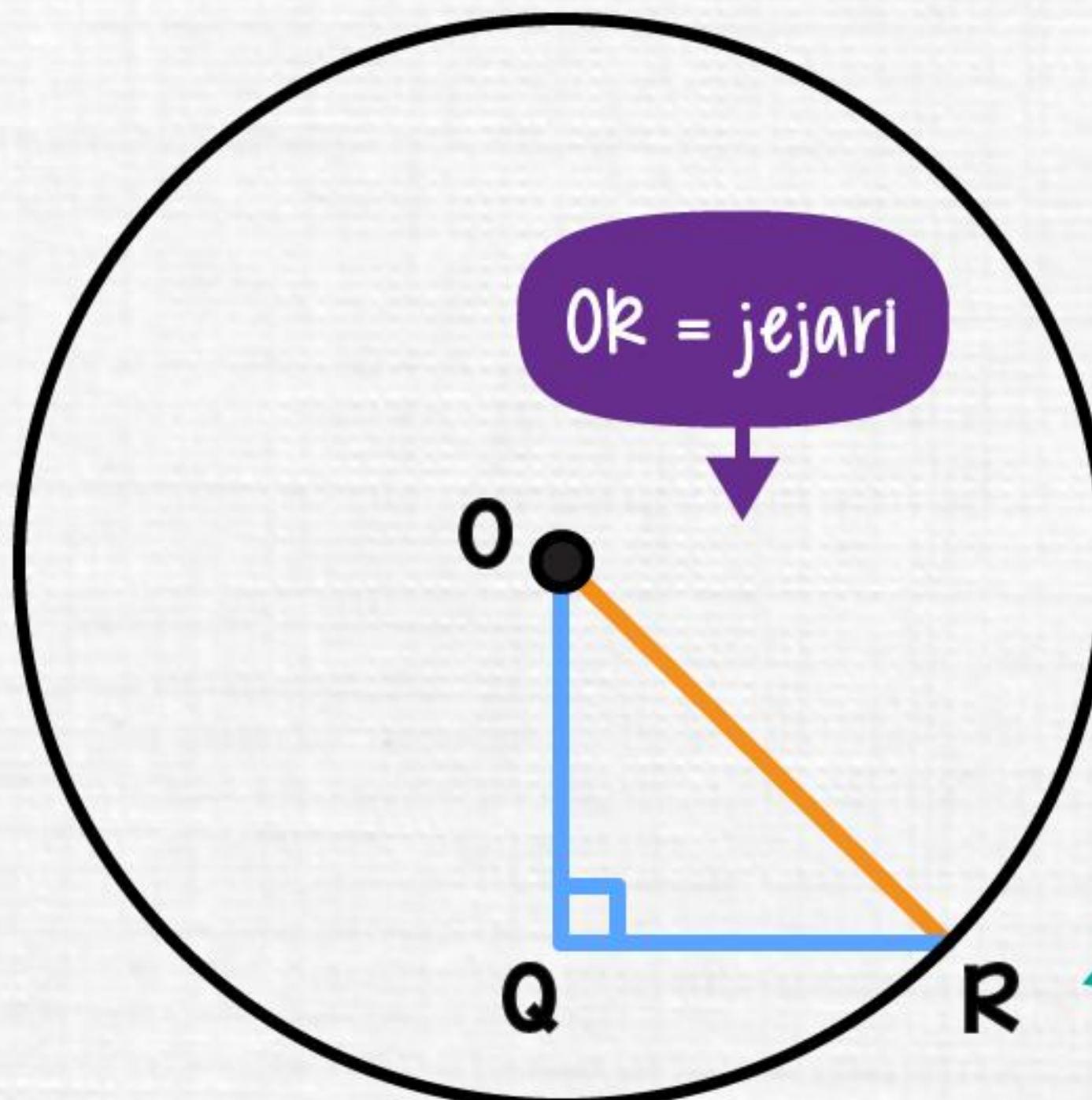
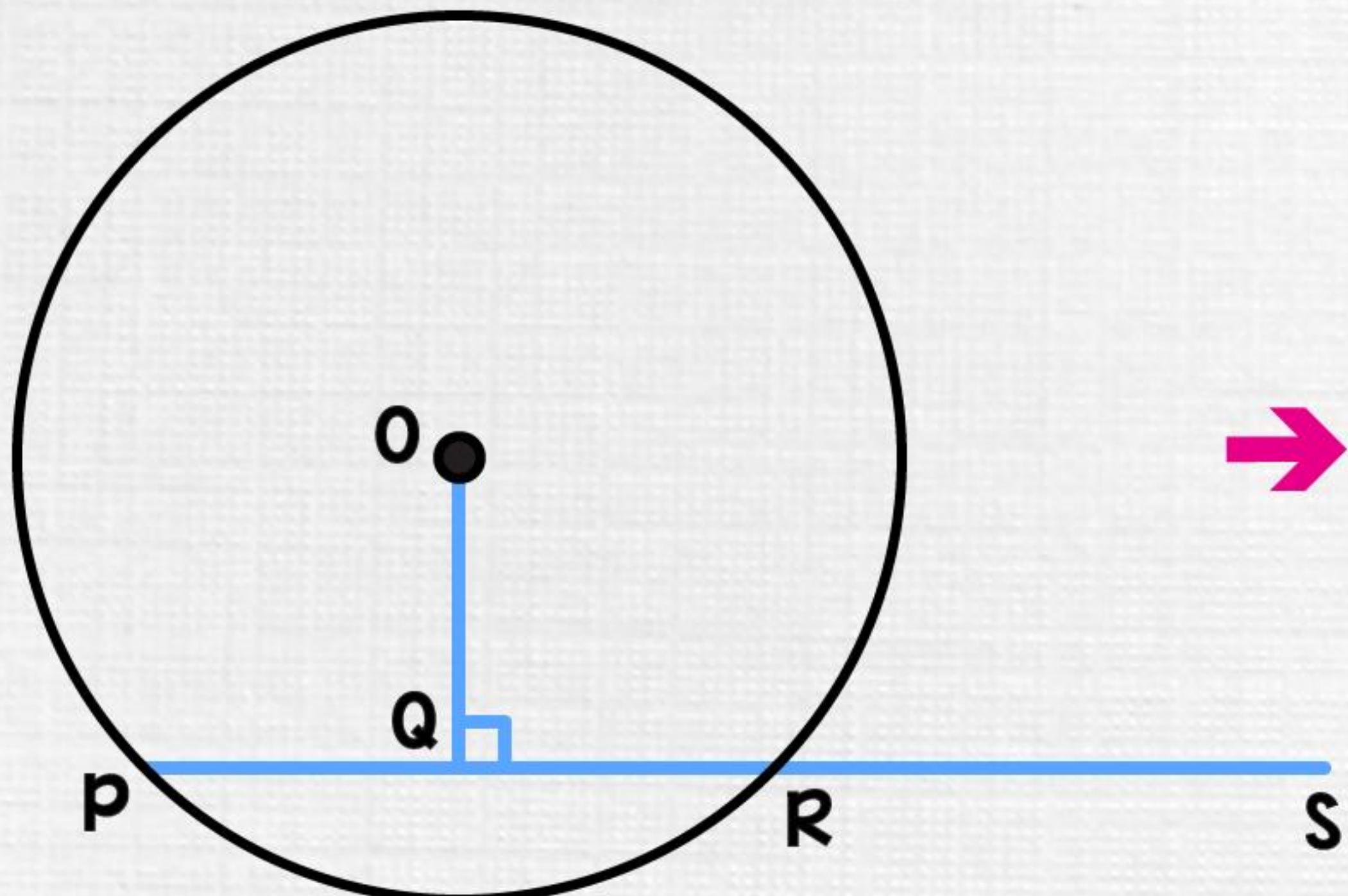


$$\begin{aligned} MK &= 24 \div 2 \\ &= 12 \end{aligned}$$

guna Pythagoras Theorem

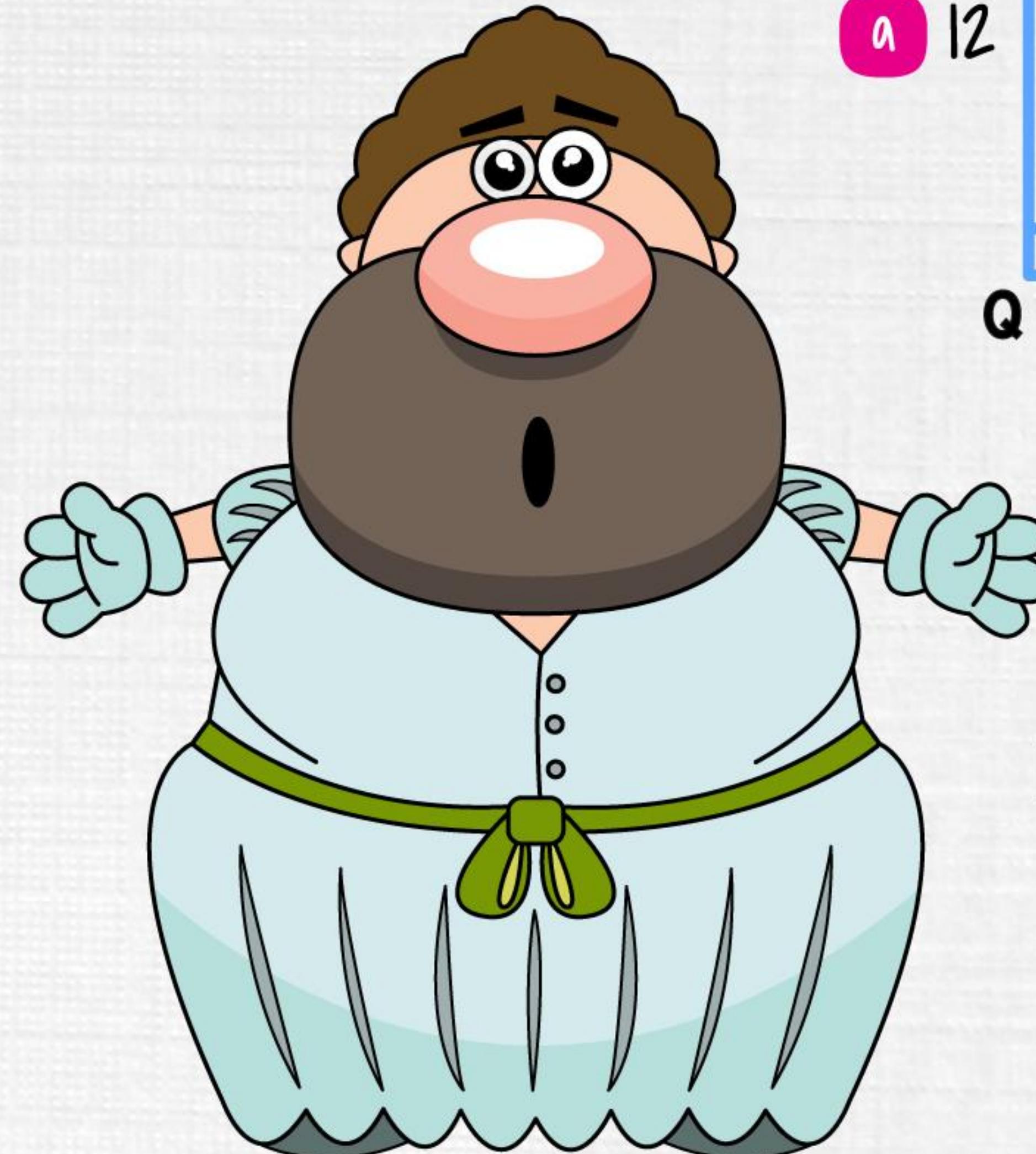
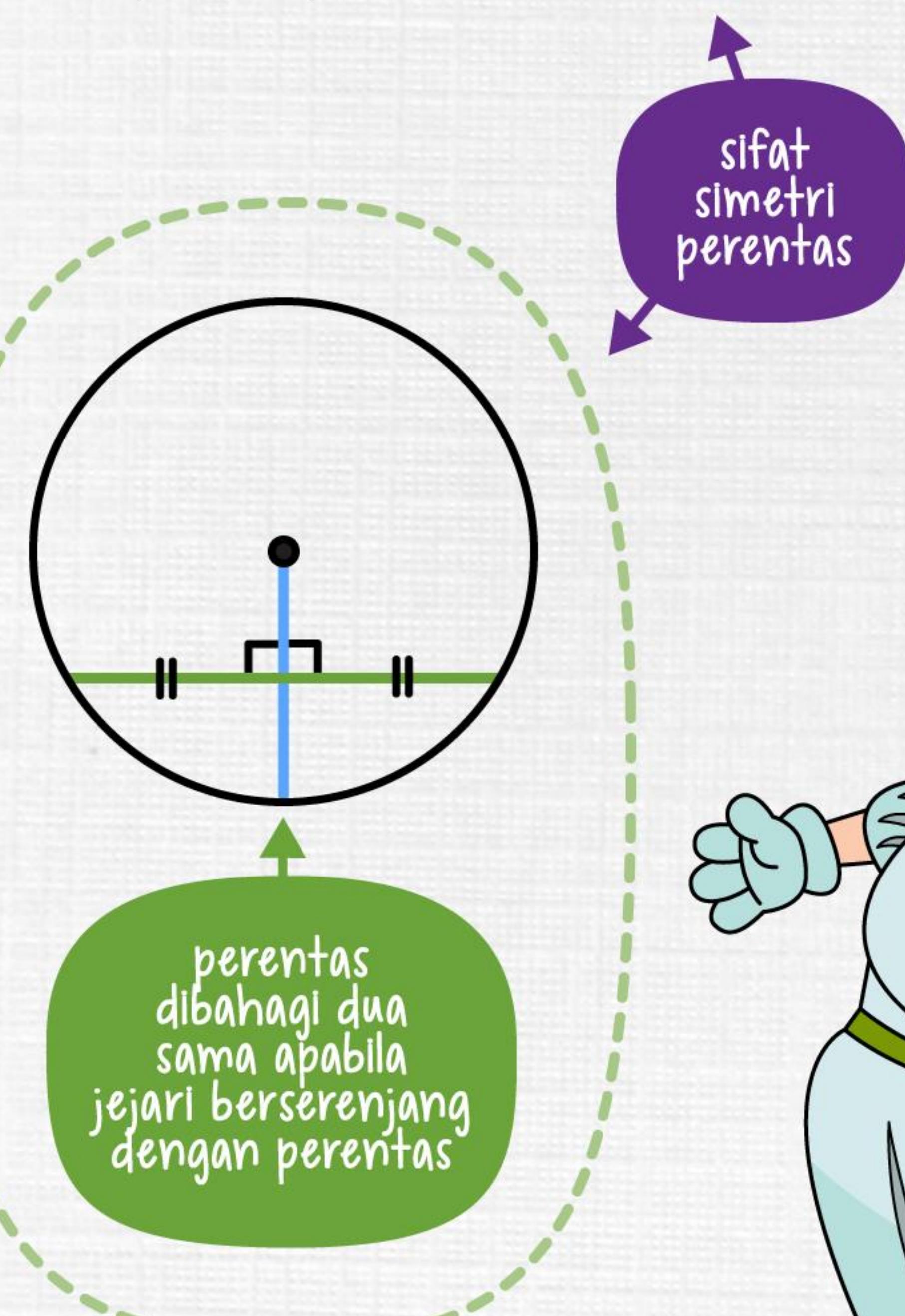
$$\begin{aligned} a^2 + b^2 &= c^2 \\ a^2 + 12^2 &= 15^2 \\ a^2 + 144 &= 225 \\ a^2 &= 225 - 144 \\ a^2 &= 81 \\ a &= \sqrt{81} \\ a &= 9 \end{aligned}$$

BULATAN

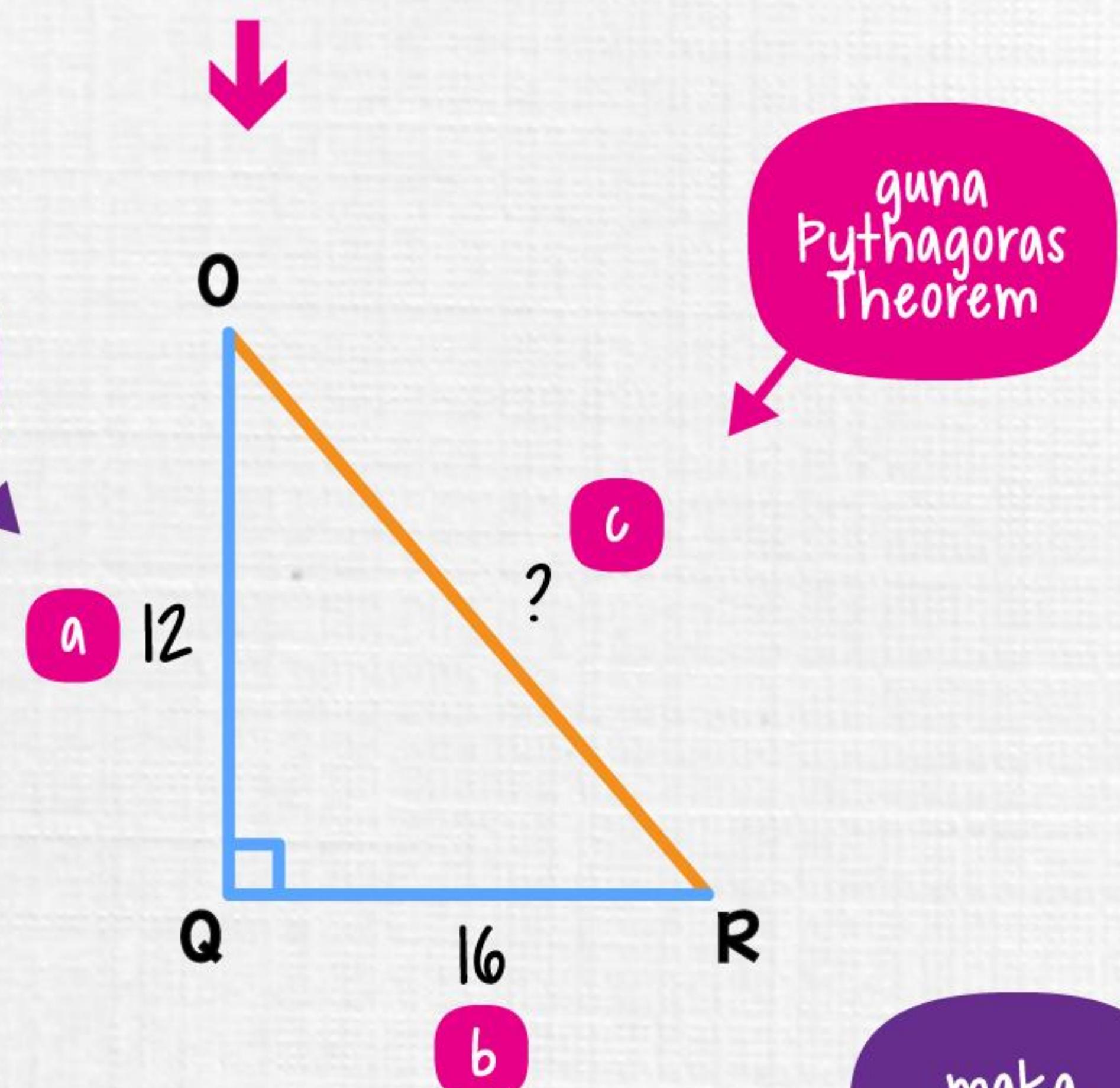


$$\begin{aligned} PR &= 64 \div 2 \\ &= 32 \\ QR &= 32 \div 2 \\ &= 16 \end{aligned}$$

Diberi $OQ = 12$. Jika $PS = 64$ dan R ialah titik tengah PS. Kira panjang jejari.



$OQ = 12$
dapat dari soalan

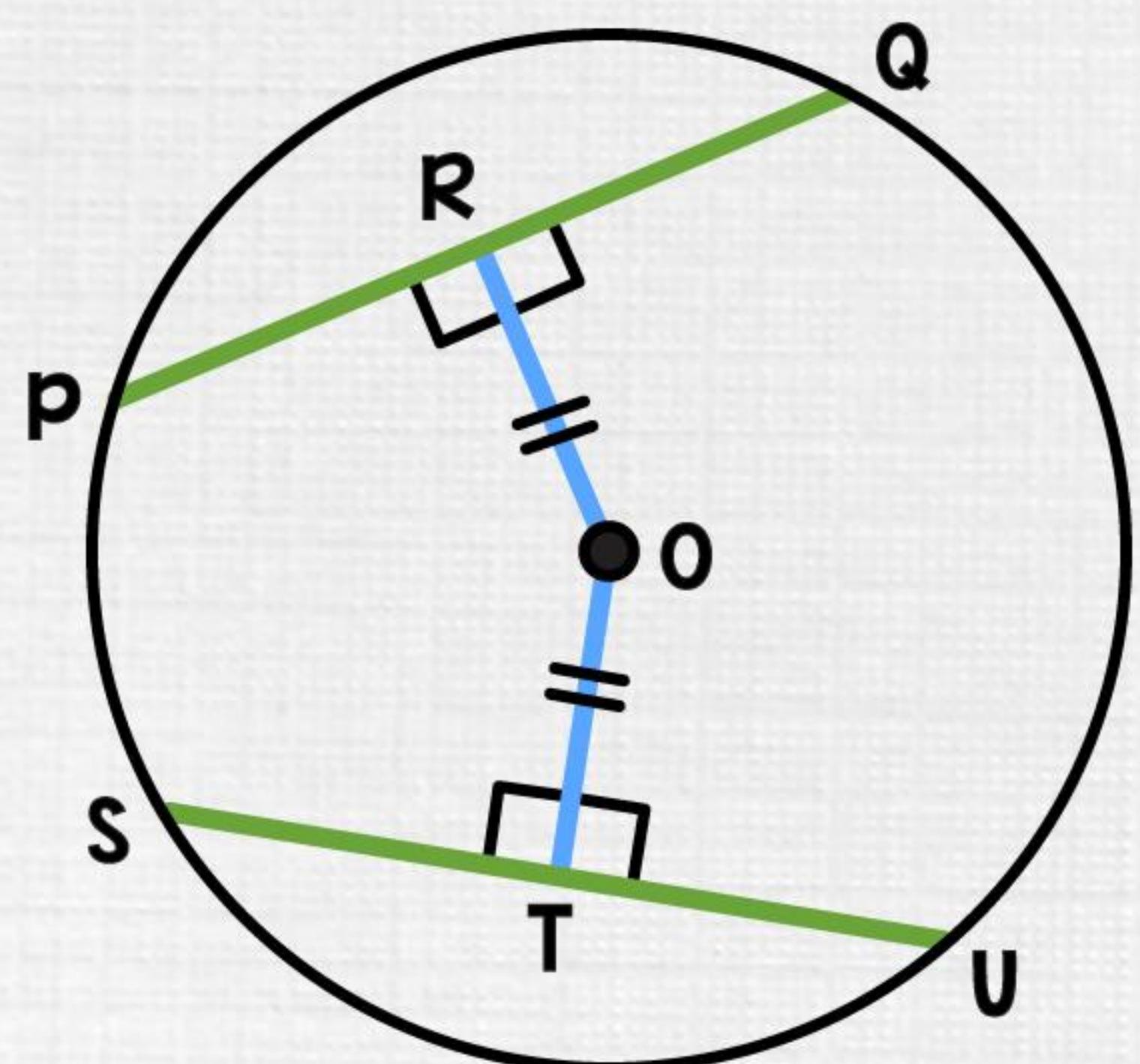


maka,
jejari = 20

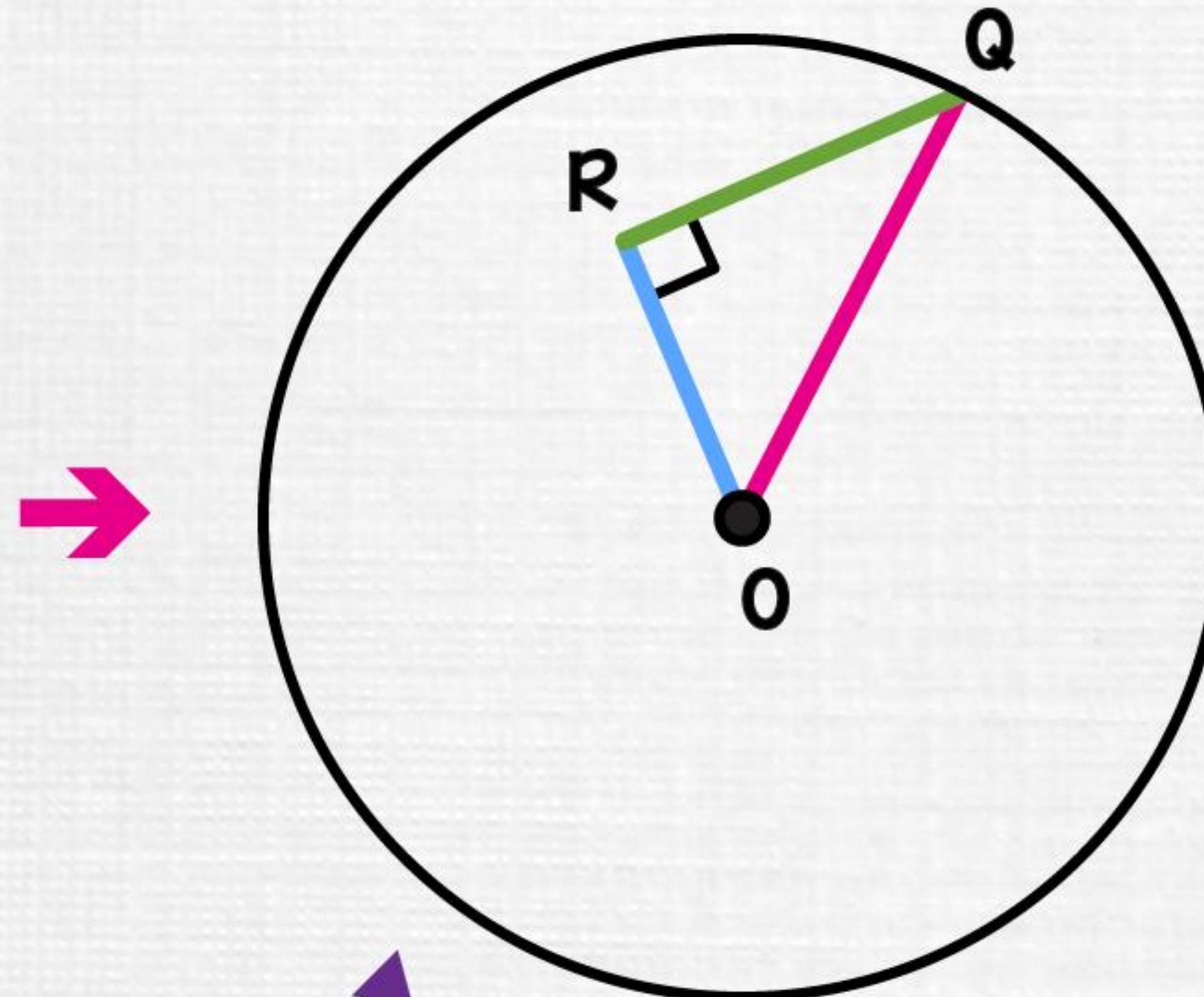
$$\begin{aligned} a^2 + b^2 &= c^2 \\ 12^2 + 16^2 &= c^2 \\ 400 &= c^2 \\ \sqrt{400} &= c \\ 20 &= c \end{aligned}$$

kabur
puteh

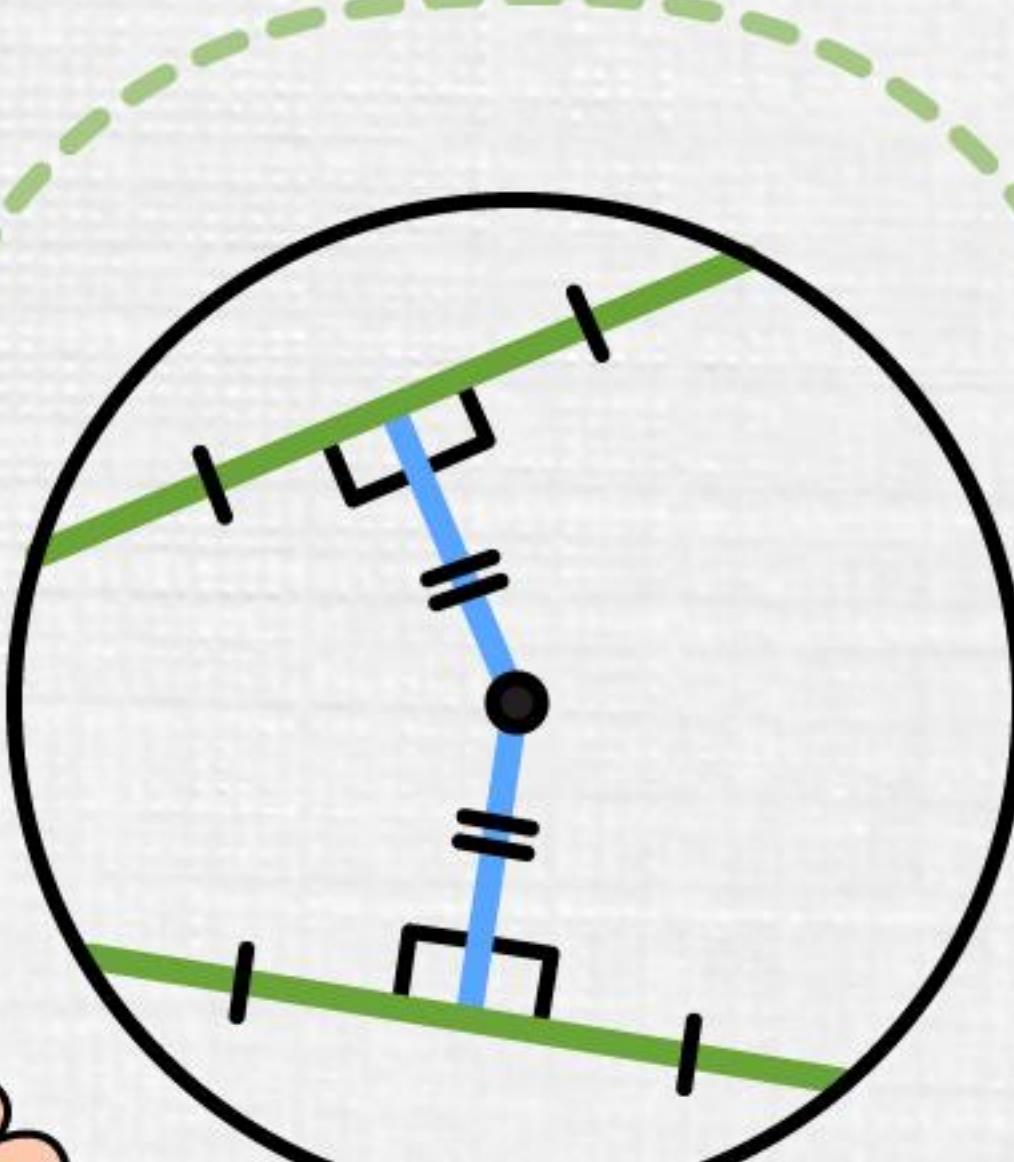
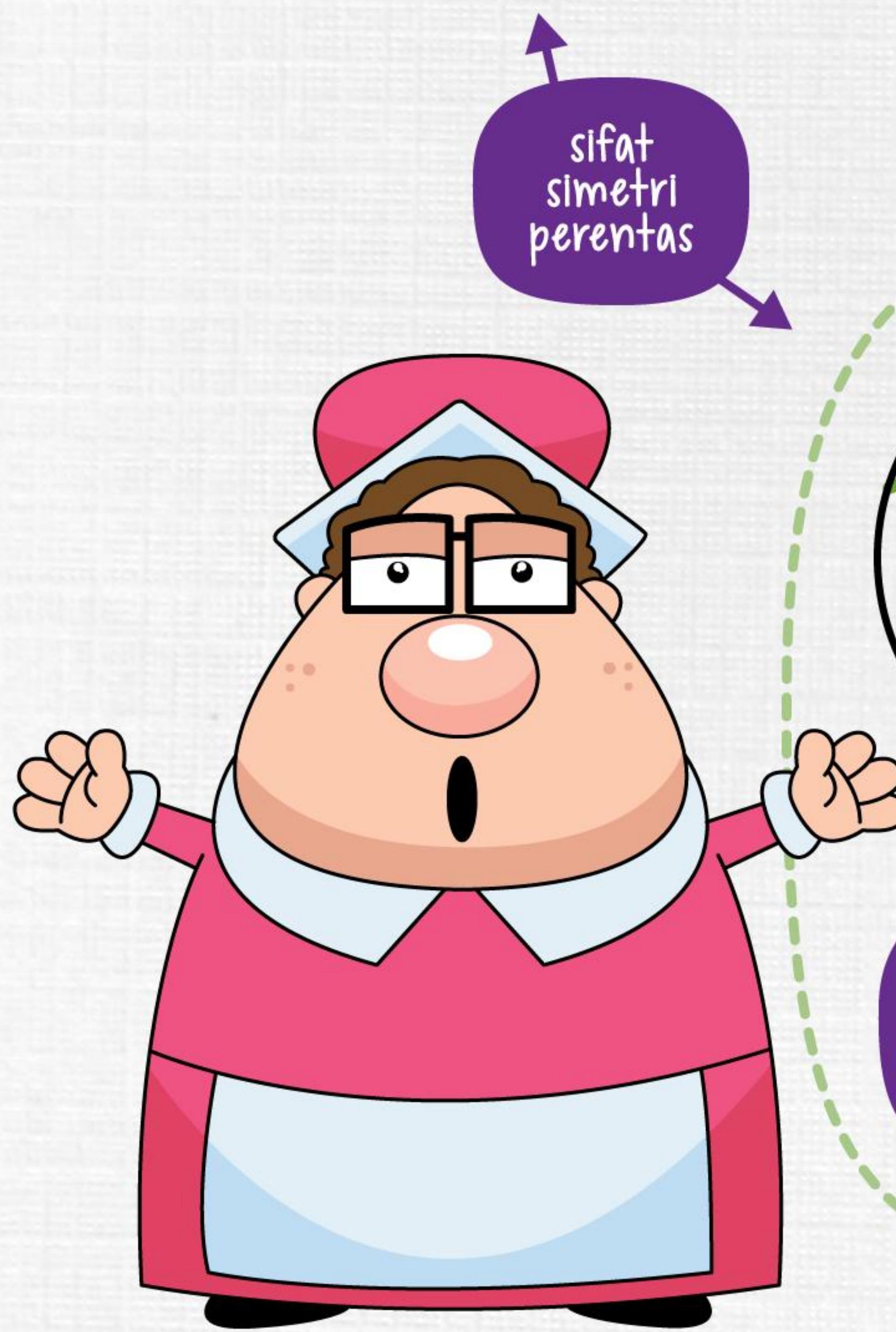
BULATAN



Panjang jejari ialah 25 dan $OR = 15$. Kira SU.



$OQ = \text{jejari}$



dua perentas
yang sama panjang
adalah sama jarak
dari pusat bulatan

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

$$a^2 + 15^2 = 25^2$$

$$a^2 + 225 = 625$$

$$a^2 = 625 - 225$$

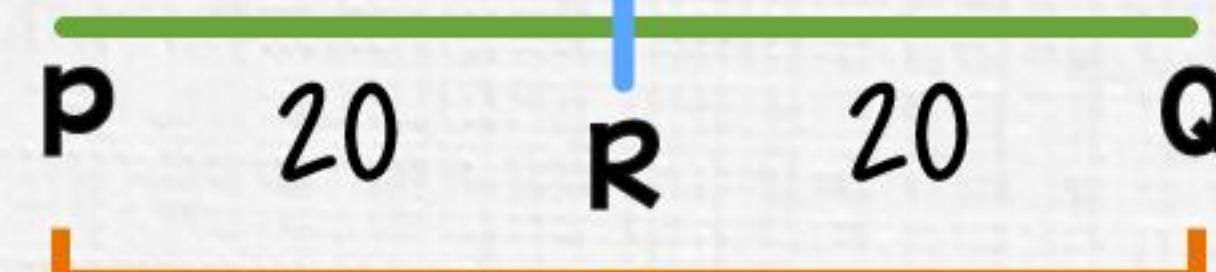
$$a^2 = 400$$

$$a = \sqrt{400}$$

$$a = 20$$

$RQ = 20$

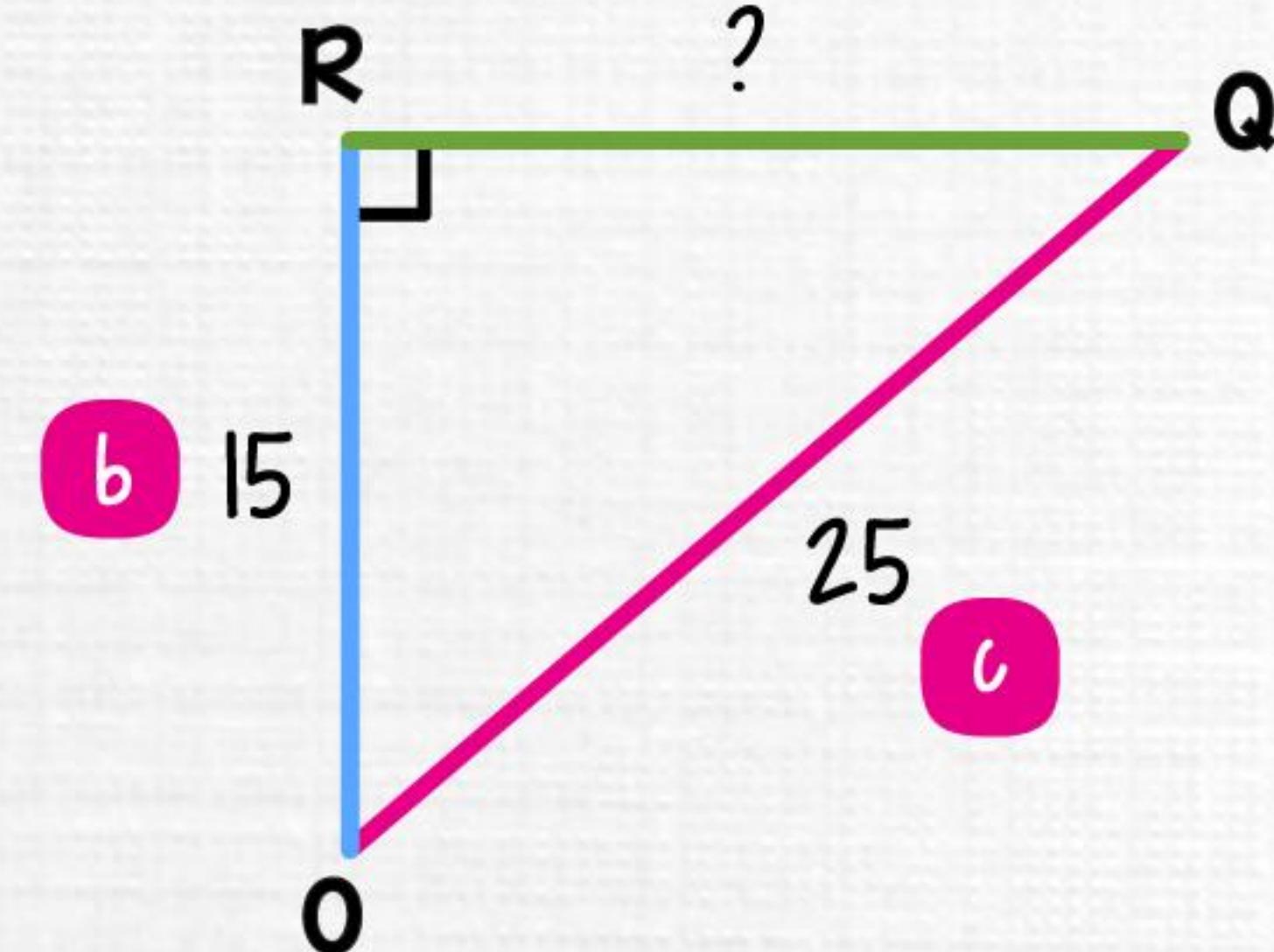
$PR = RQ$



$PQ = 40$

$PQ = SU \rightarrow \text{maka, } SU = 40$

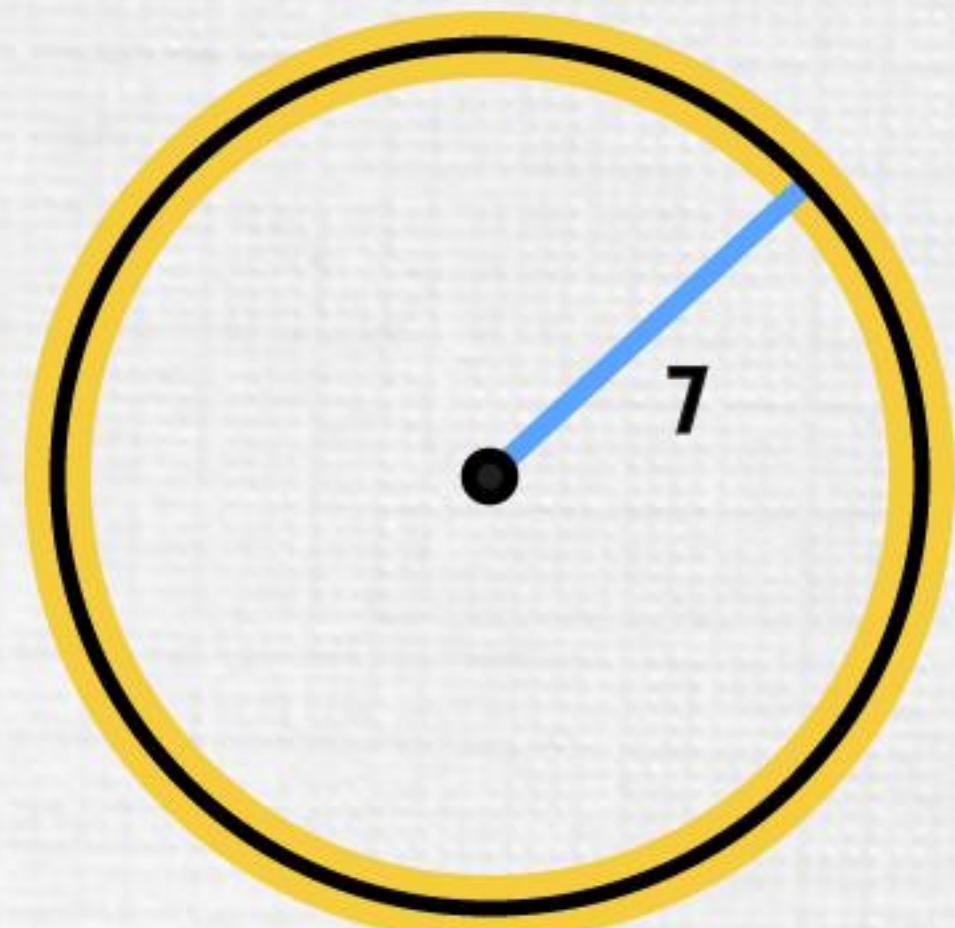
guna
Pythagoras
Theorem



kabur
puteh

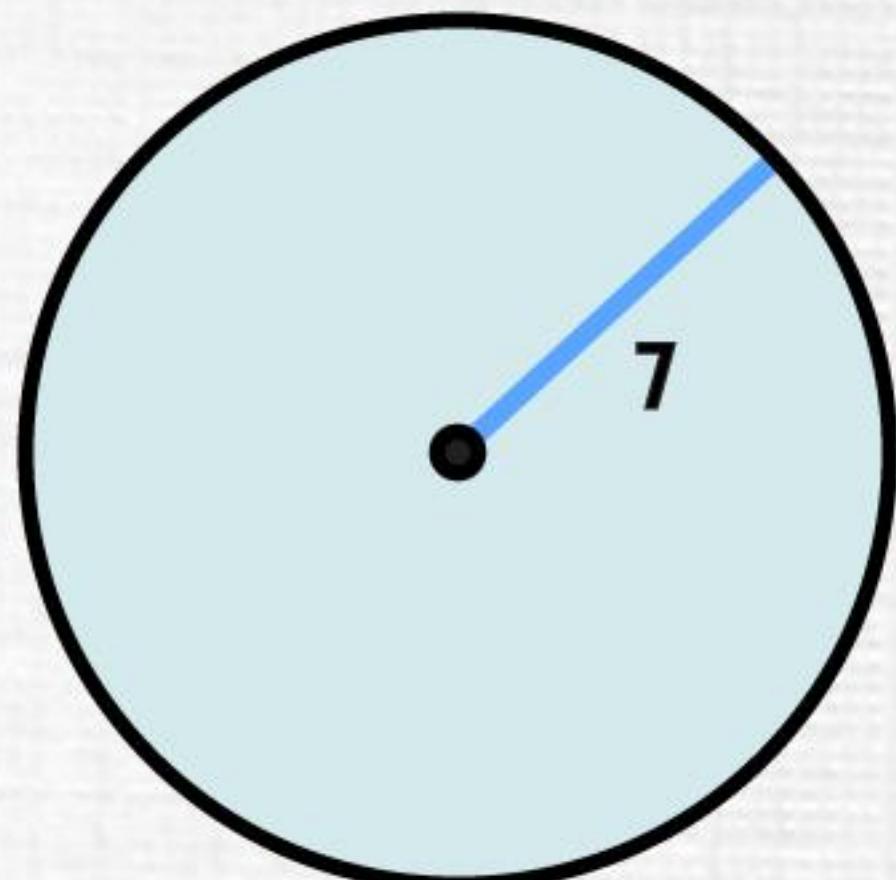
BULATAN

lilitan dan luas

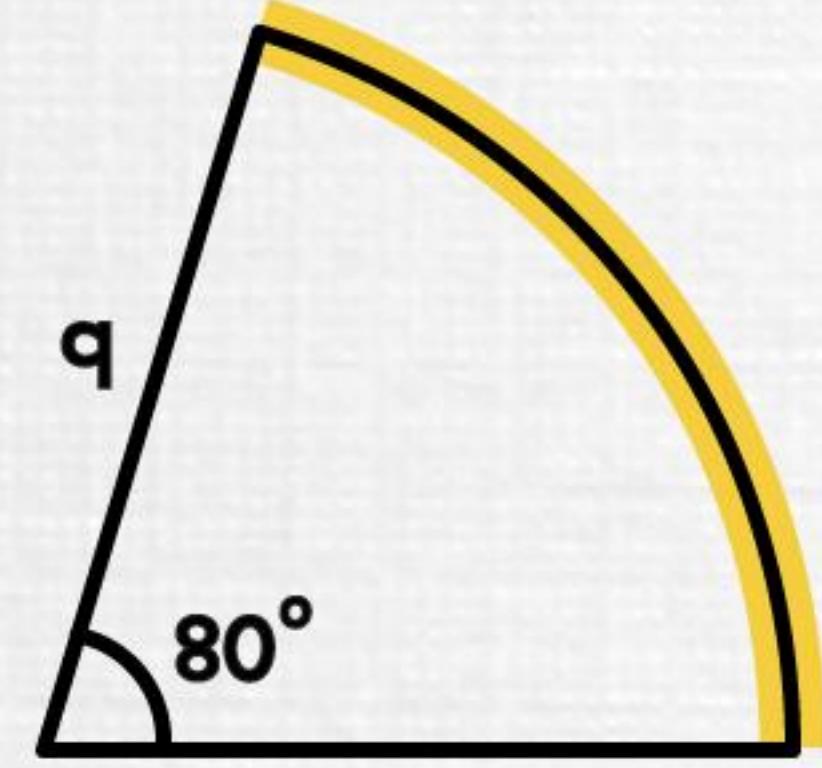


$$\begin{aligned} \text{lilitan} &= 2\pi j \\ &= 2 \times \frac{22}{7} \times 7 \\ &= 44 \end{aligned}$$

lilitan
 $= 2\pi j$

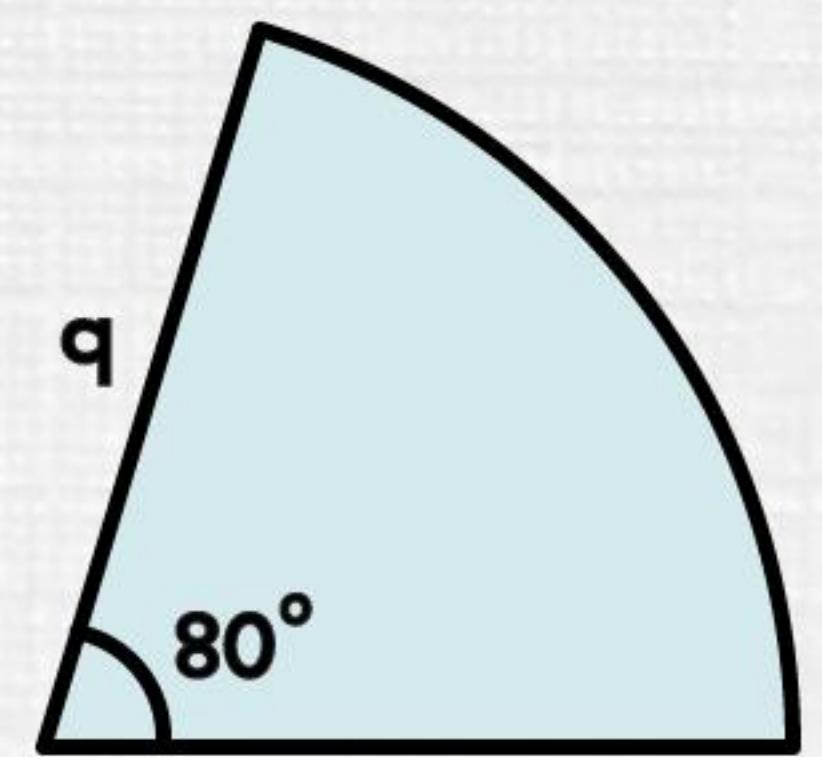


$$\begin{aligned} \text{luas} &= \pi j^2 \\ &= \frac{22}{7} \times 7^2 \\ &= 154 \end{aligned}$$



$$\begin{aligned} \text{panjang lengkok} &= \frac{\theta}{360^\circ} \times 2\pi j \\ &= \frac{80^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times q \\ &= 12.57 \end{aligned}$$

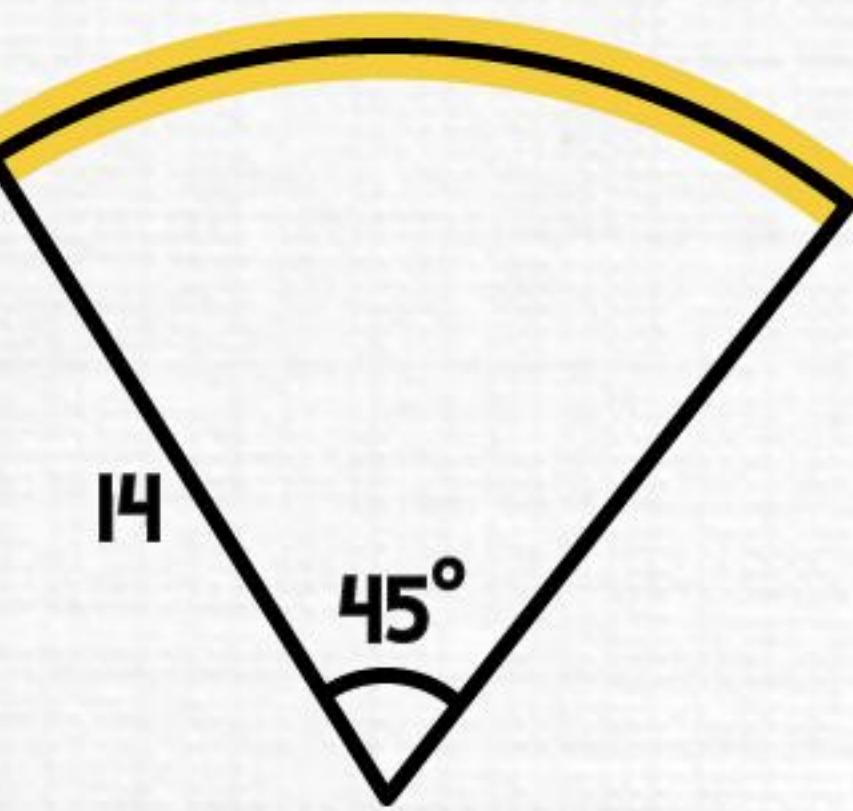
luas
 $= \pi j^2$



$$\begin{aligned} \text{luas sektor} &= \frac{\theta}{360^\circ} \times \pi j^2 \\ &= \frac{80^\circ}{360^\circ} \times \frac{22}{7} \times q^2 \\ &= 56.57 \end{aligned}$$

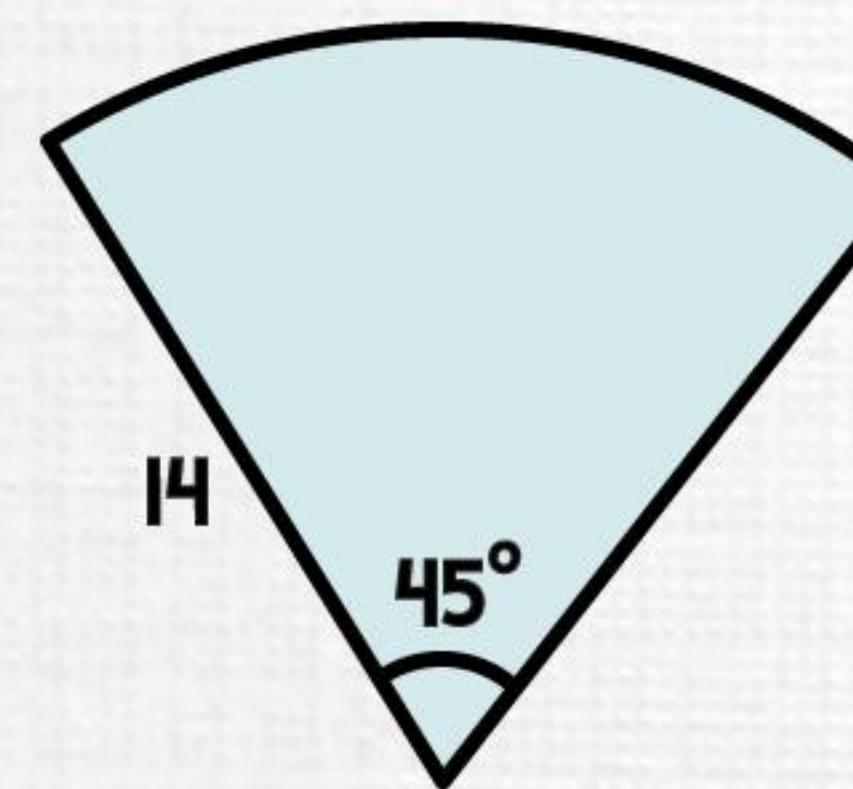
$$\begin{aligned} \text{panjang lengkok} &= \frac{\theta}{360^\circ} \times 2\pi j \\ &= \frac{45^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 14 \end{aligned}$$

= 11



$$\begin{aligned} \text{luas sektor} &= \frac{\theta}{360^\circ} \times \pi j^2 \\ &= \frac{45^\circ}{360^\circ} \times \frac{22}{7} \times 14^2 \end{aligned}$$

= 77

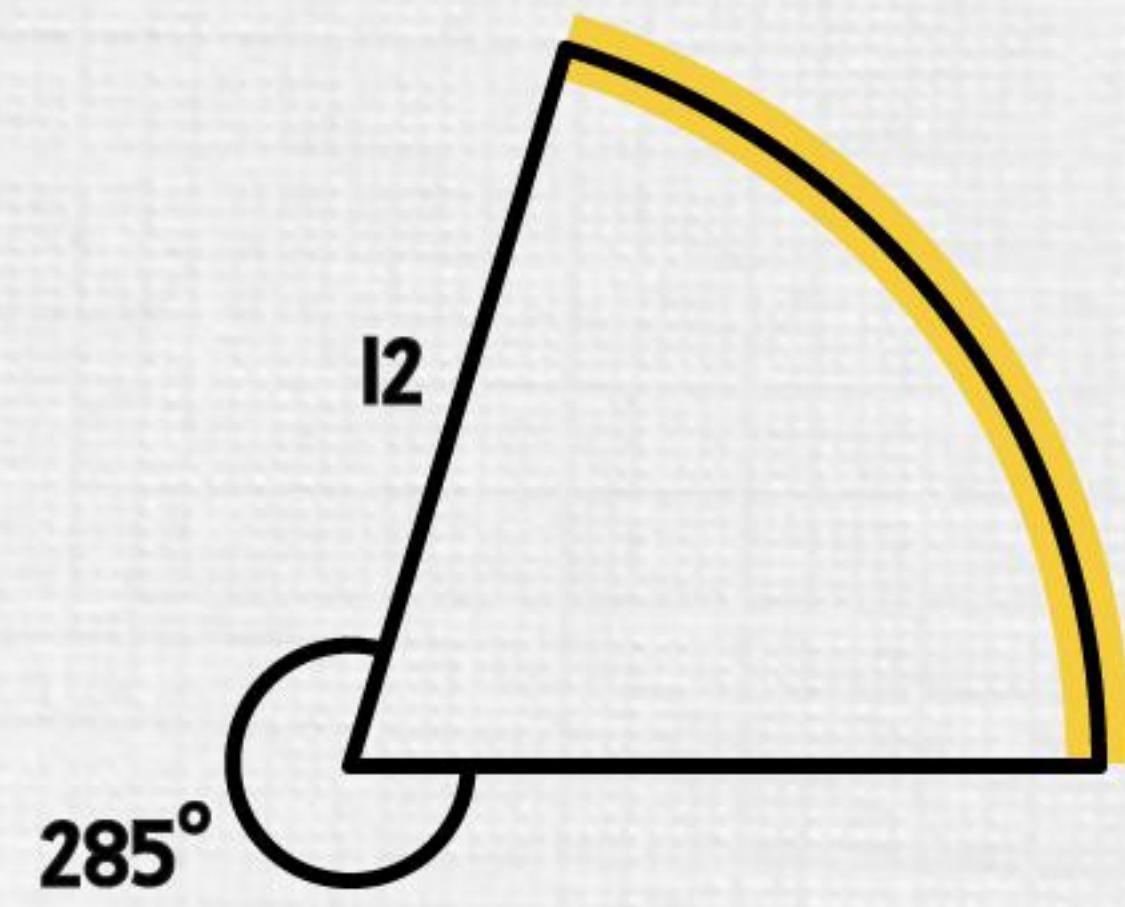


untuk
sektor perlu
letakkan
sudut
di depan



BULATAN

panjang lengkok dan luas sektor

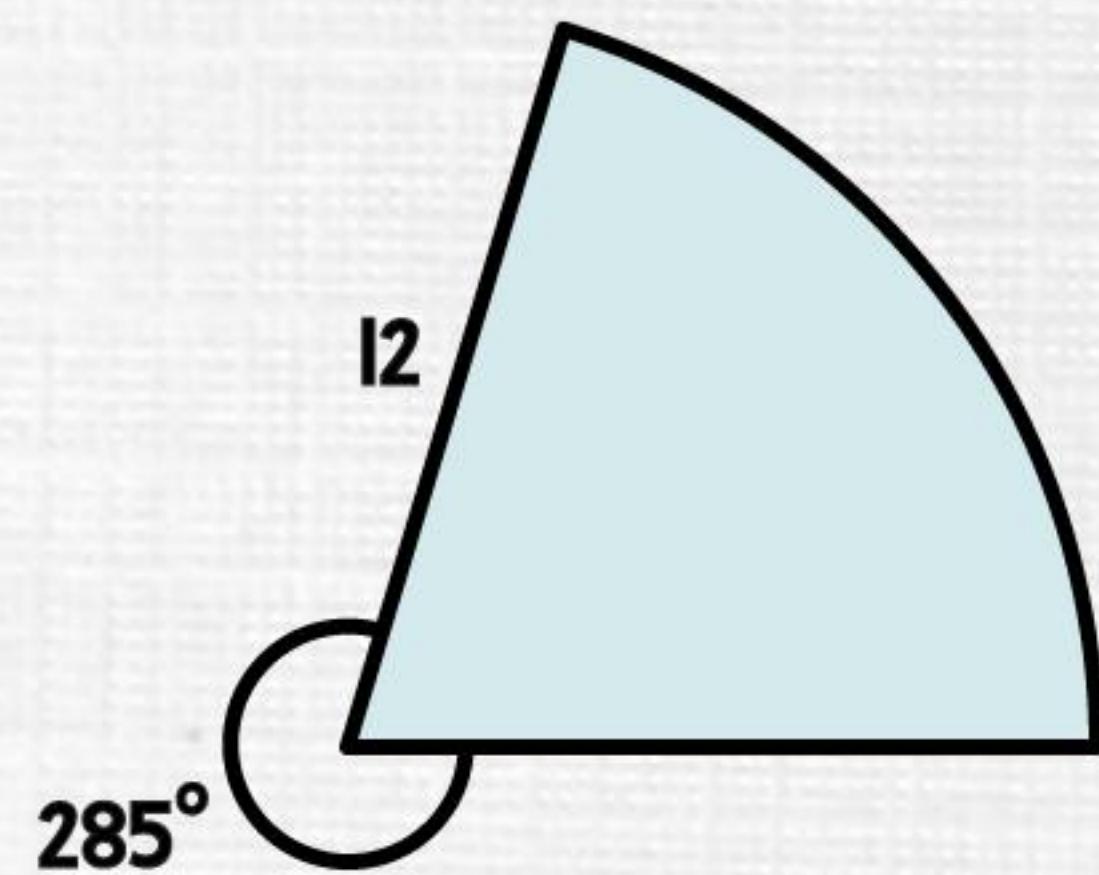


panjang lengkok

$$= \frac{\Theta}{360^\circ} \times 2\pi j$$

$$\begin{aligned} &= \frac{75^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 12 \\ &= 15.71 \end{aligned}$$

$$- \frac{360^\circ - 285^\circ}{75^\circ}$$



luas sektor

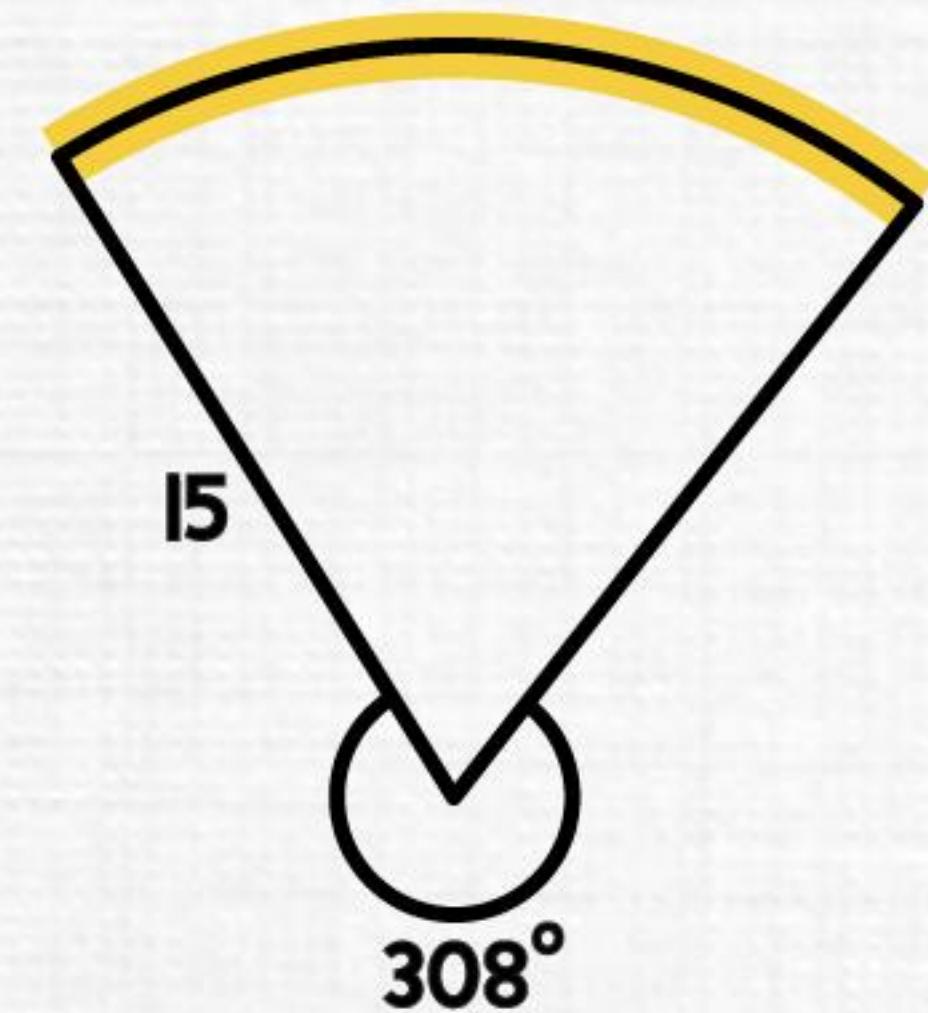
$$= \frac{\Theta}{360^\circ} \times \pi j^2$$

$$\begin{aligned} &= \frac{75^\circ}{360^\circ} \times \frac{22}{7} \times 12^2 \\ &= 94.29 \end{aligned}$$

untuk sektor perlu letakkan sudut di depan

lilitan
 $= 2\pi j$

luas
 $= \pi j^2$

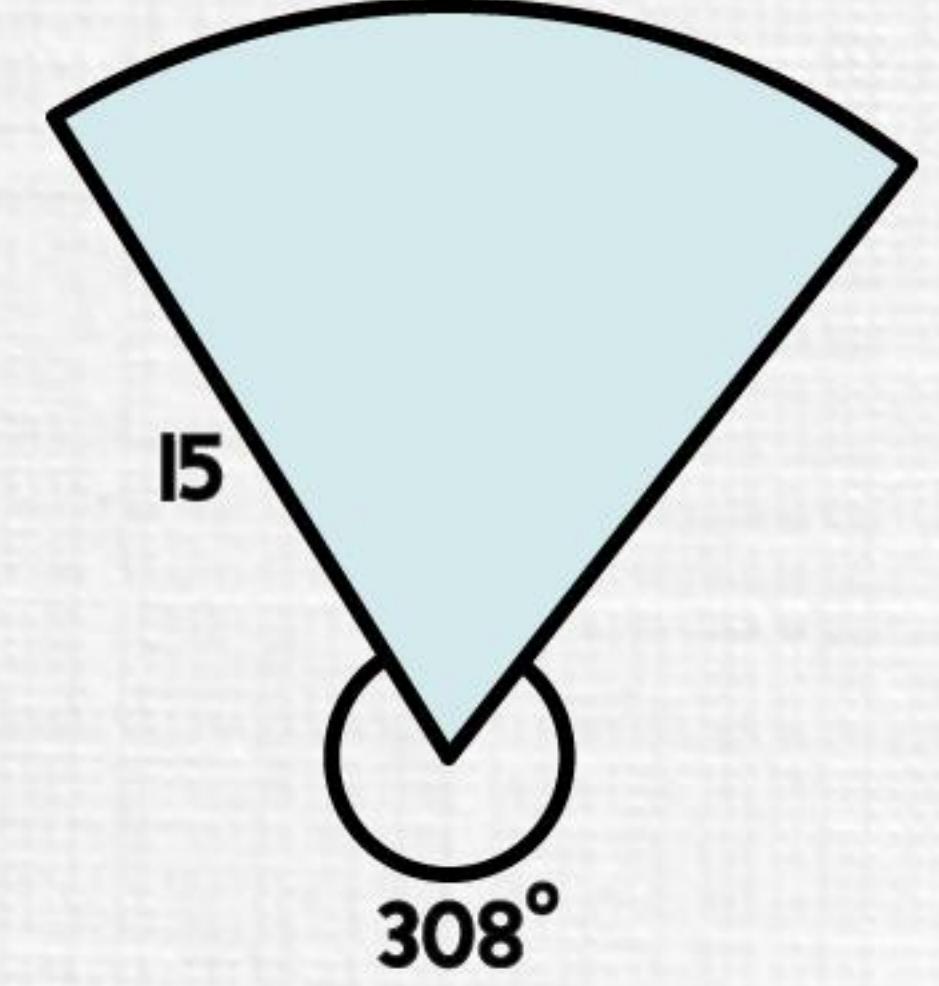


panjang lengkok

$$= \frac{\Theta}{360^\circ} \times 2\pi j$$

$$\begin{aligned} &= \frac{52^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 15 \\ &= 13.62 \end{aligned}$$

$$- \frac{360^\circ - 308^\circ}{52^\circ}$$



luas sektor

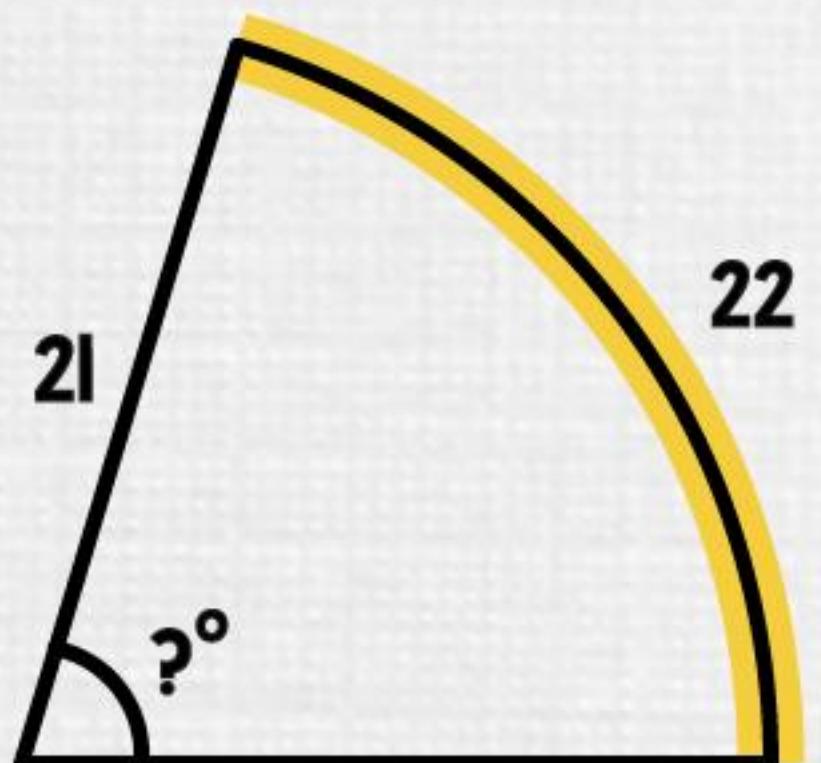
$$= \frac{\Theta}{360^\circ} \times \pi j^2$$

$$\begin{aligned} &= \frac{52^\circ}{360^\circ} \times \frac{22}{7} \times 15^2 \\ &= 102.14 \end{aligned}$$



BULATAN

panjang lengkok dan luas sektor



kira nilai sudut jika diberi panjang lengkok ialah 22.

$$\frac{\theta}{360^\circ} \times 2\pi j = 22$$

$$\frac{\theta}{360^\circ} \times 2 \times \frac{22}{7} \times 21 = 22$$

$$\frac{\theta}{360^\circ} \times 132 = 22$$

~~$$\frac{\theta}{360^\circ} = \frac{22}{132}$$~~

$$\theta \times 132 = 22 \times 360$$

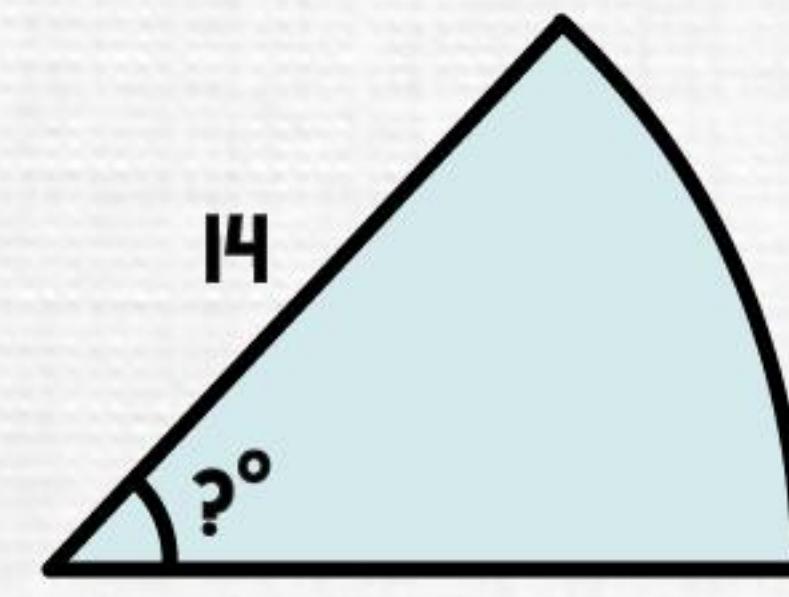
$$132\theta = 7920$$

$$\theta = \frac{7920}{132}$$

$$\theta = 60^\circ$$

lilitan
= $2\pi j$

luas
= πj^2



kira nilai sudut jika diberi luas sektor ialah 77.

$$\frac{\theta}{360^\circ} \times \pi j^2 = 77$$

$$\frac{\theta}{360^\circ} \times \frac{22}{7} \times 14^2 = 77$$

$$\frac{\theta}{360^\circ} \times 616 = 77$$

~~$$\frac{\theta}{360^\circ} = \frac{77}{616}$$~~

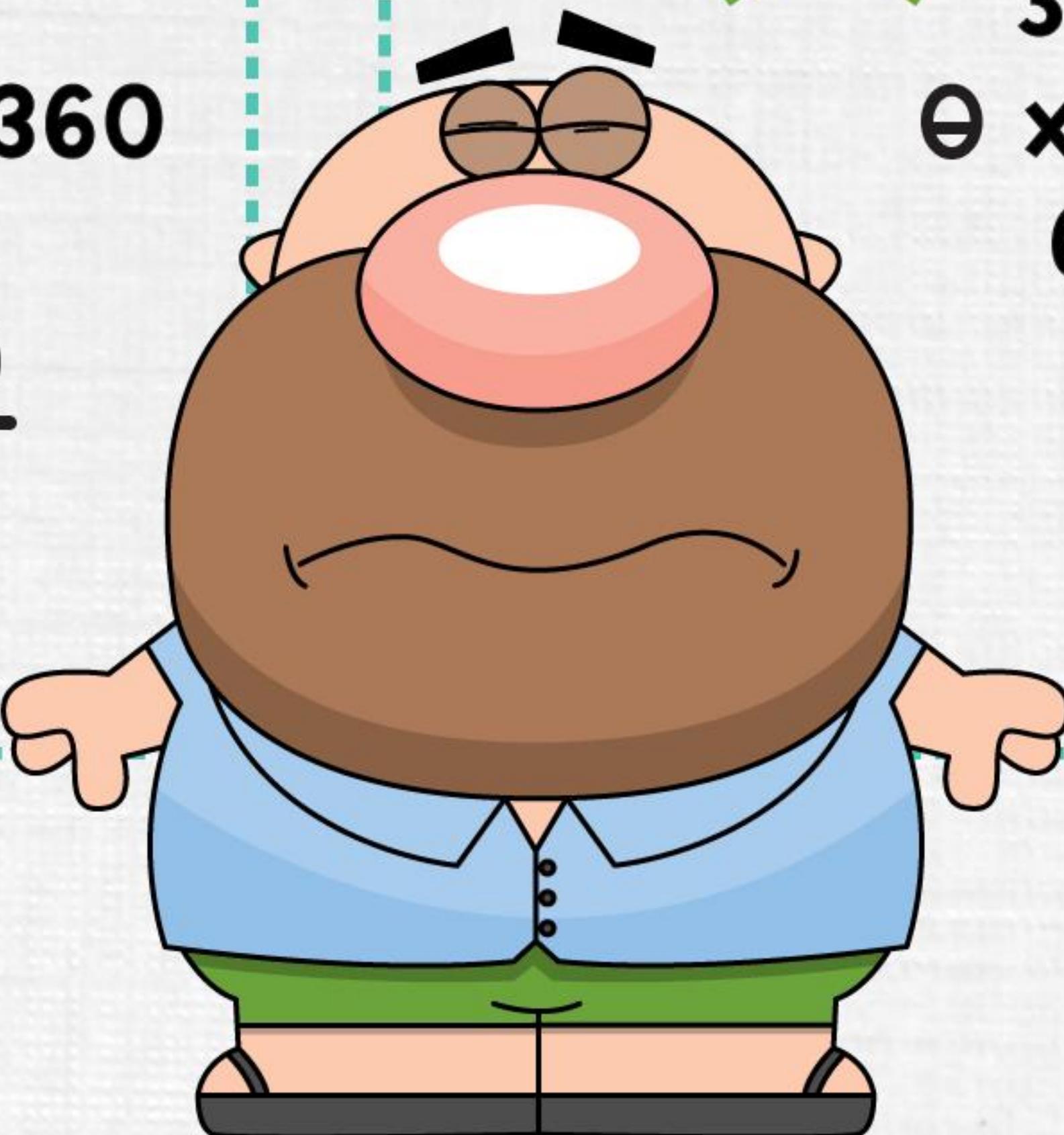
$$\theta \times 616 = 77 \times 360$$

$$616\theta = 27720$$

$$\theta = \frac{27720}{616}$$

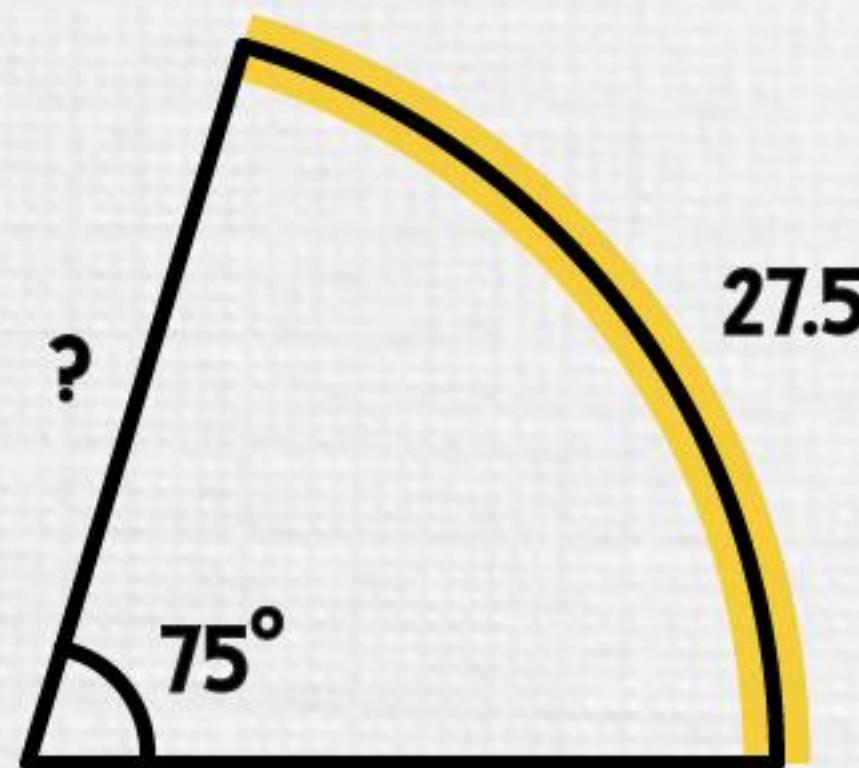
$$\theta = 45^\circ$$

jangan keliru
formula untuk
panjang lengkok
dan luas sektor



BULATAN

panjang lengkok dan luas sektor



kira panjang jejari jika diberi panjang lengkok ialah 27.5.

$$\frac{\theta}{360^\circ} \times 2\pi j = 27.5$$

$$\frac{75^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times j = 27.5$$

$$\cancel{\times} \quad \frac{55}{42} j = 27.5$$

$$55j = 27.5 \times 42$$

$$55j = 1155$$

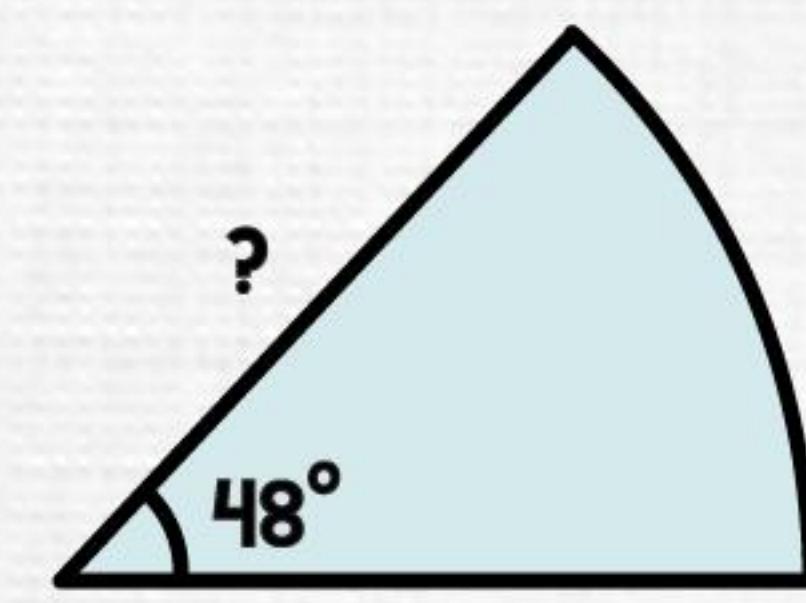
$$j = \frac{1155}{55}$$

$$j = 21$$

lilitan
= $2\pi j$

luas
= πj^2

jangan keliru formula untuk panjang lengkok dan luas sektor



kira panjang jejari jika diberi luas sektor ialah 88.

$$\frac{\theta}{360^\circ} \times \pi j^2 = 88$$

$$\frac{48^\circ}{360^\circ} \times \frac{22}{7} \times j^2 = 88$$

$$\cancel{\times} \quad \frac{44}{105} j^2 = 88$$

$$44j^2 = 88 \times 105$$

$$44j^2 = 9240$$

$$j^2 = \frac{9240}{44}$$

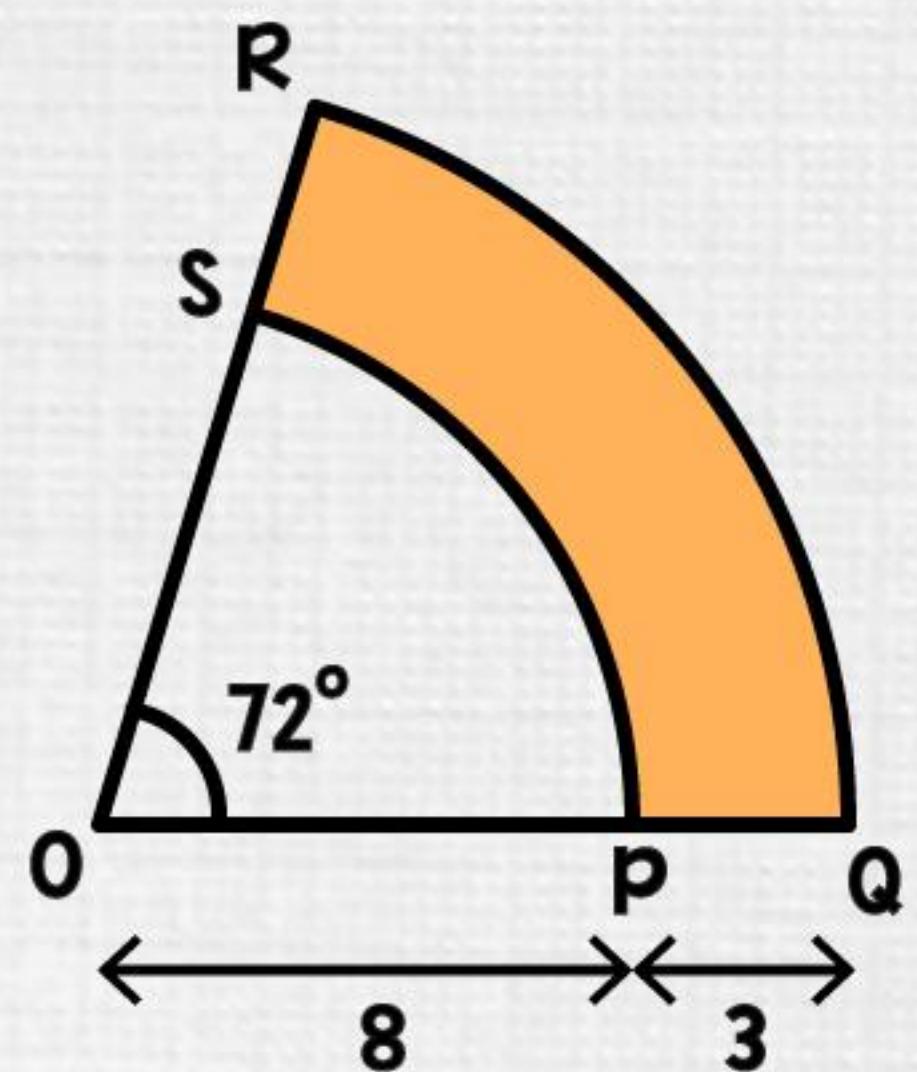
$$j^2 = 210$$

$$j = \sqrt{210}$$

$$j = 14.49$$



BULATAN



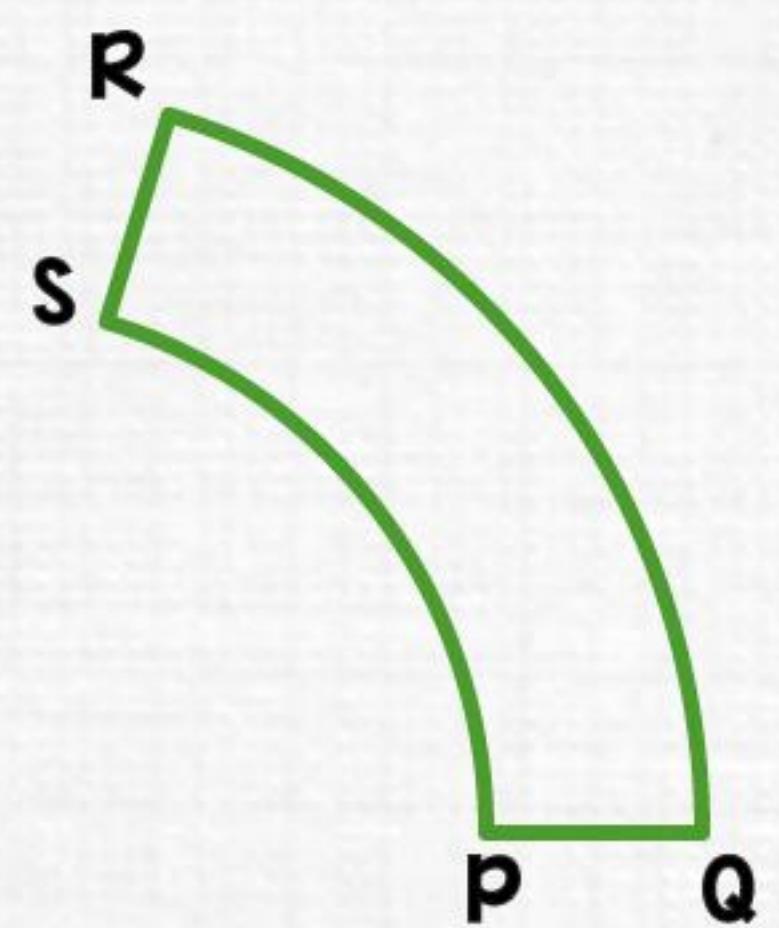
kira luas dan perimeter kawasan berlorek

panjang lengkok PS

$$= \frac{\theta}{360^\circ} \times 2\pi j$$

$$= \frac{72^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 8$$

$$= 10.06$$

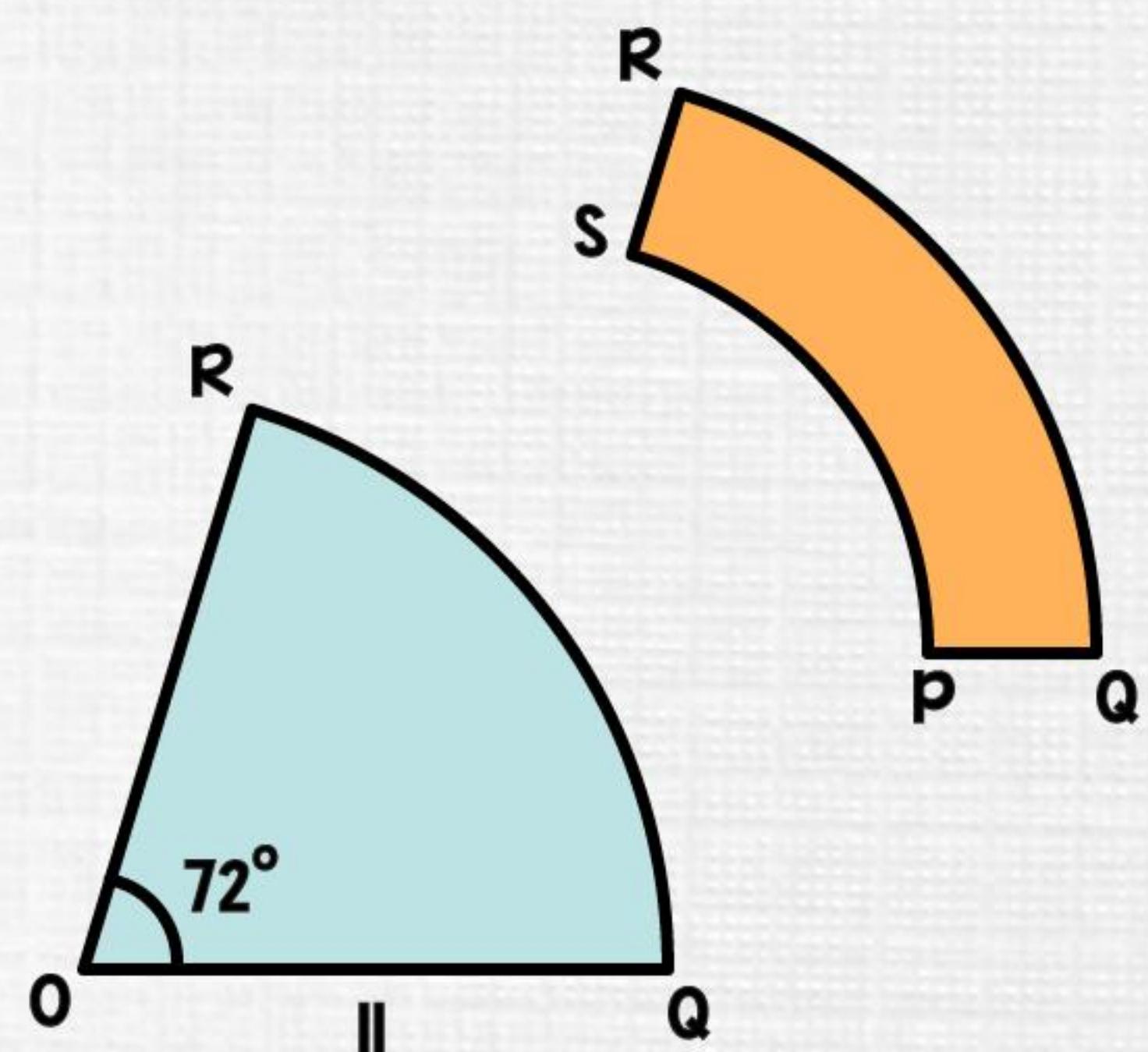


panjang lengkok QR

$$= \frac{\theta}{360^\circ} \times 2\pi j$$

$$= \frac{72^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 11$$

$$= 13.83$$



OQR - OPS

luas sektor OQR

$$= \frac{\theta}{360^\circ} \times \pi j^2$$

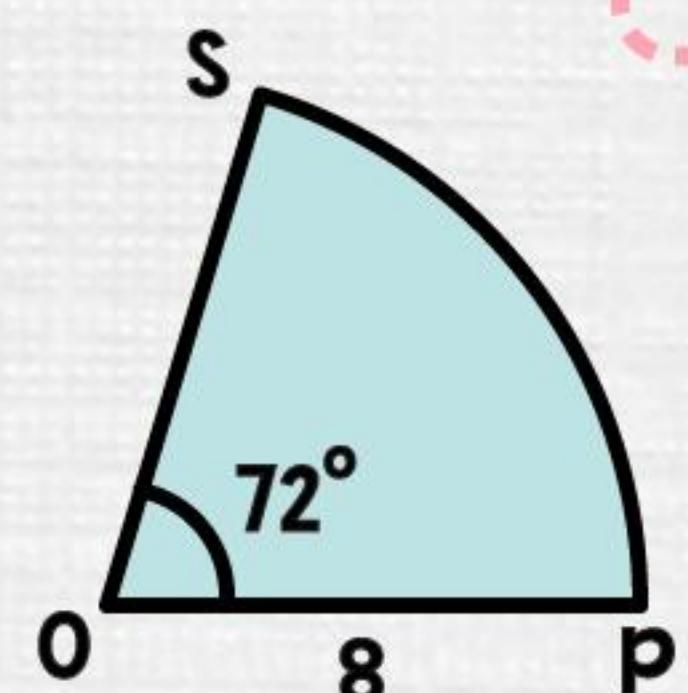
$$= \frac{72^\circ}{360^\circ} \times \frac{22}{7} \times 11^2$$

$$= 76.06$$

luas kawasan berlorek

$$= 76.06 - 40.23$$

$$= 35.83$$



luas sektor OPS

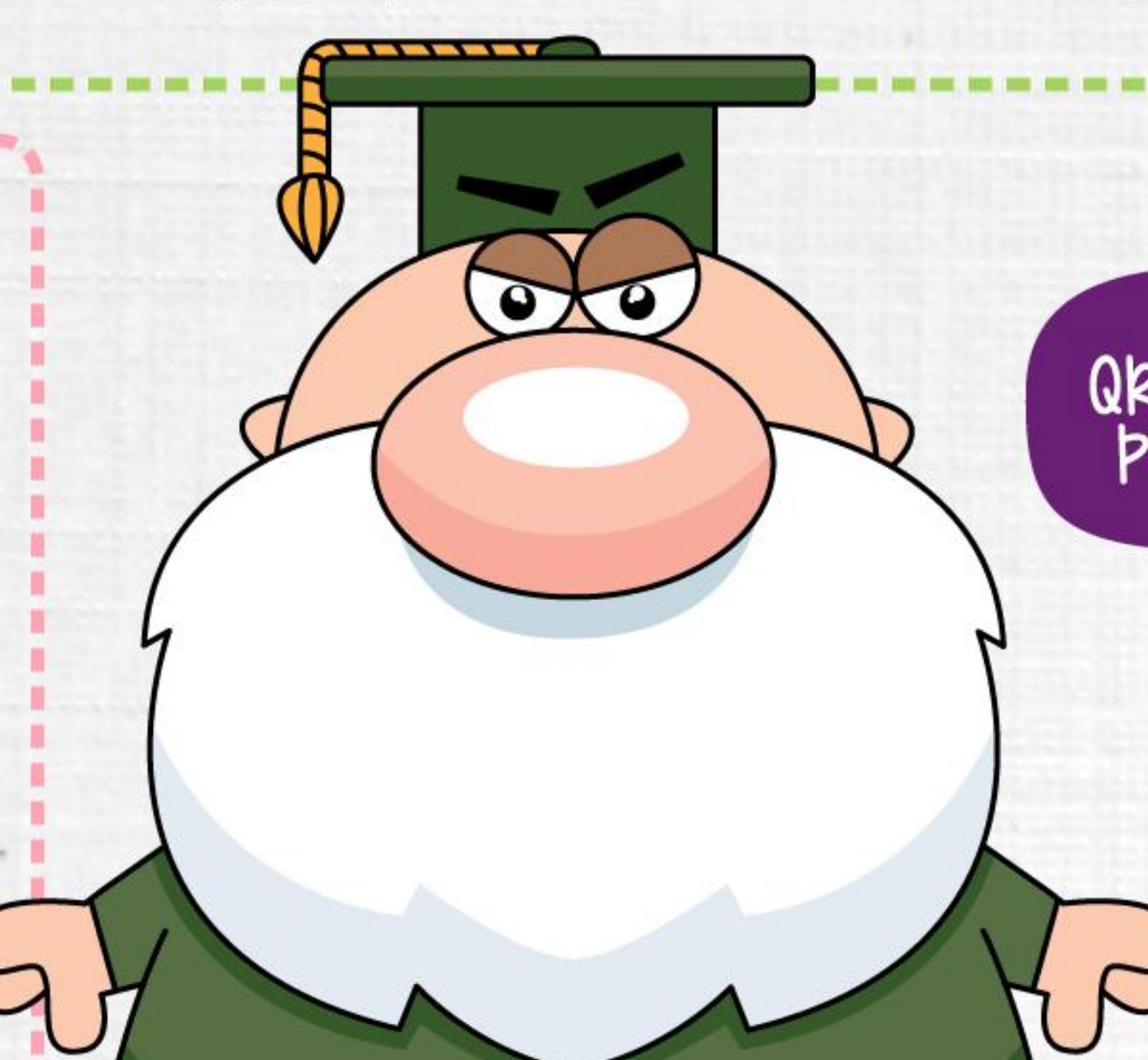
$$= \frac{\theta}{360^\circ} \times \pi j^2$$

$$= \frac{72^\circ}{360^\circ} \times \frac{22}{7} \times 8^2$$

$$= 40.23$$

sektor besar tolak sektor kecil

luas kawasan berlorek



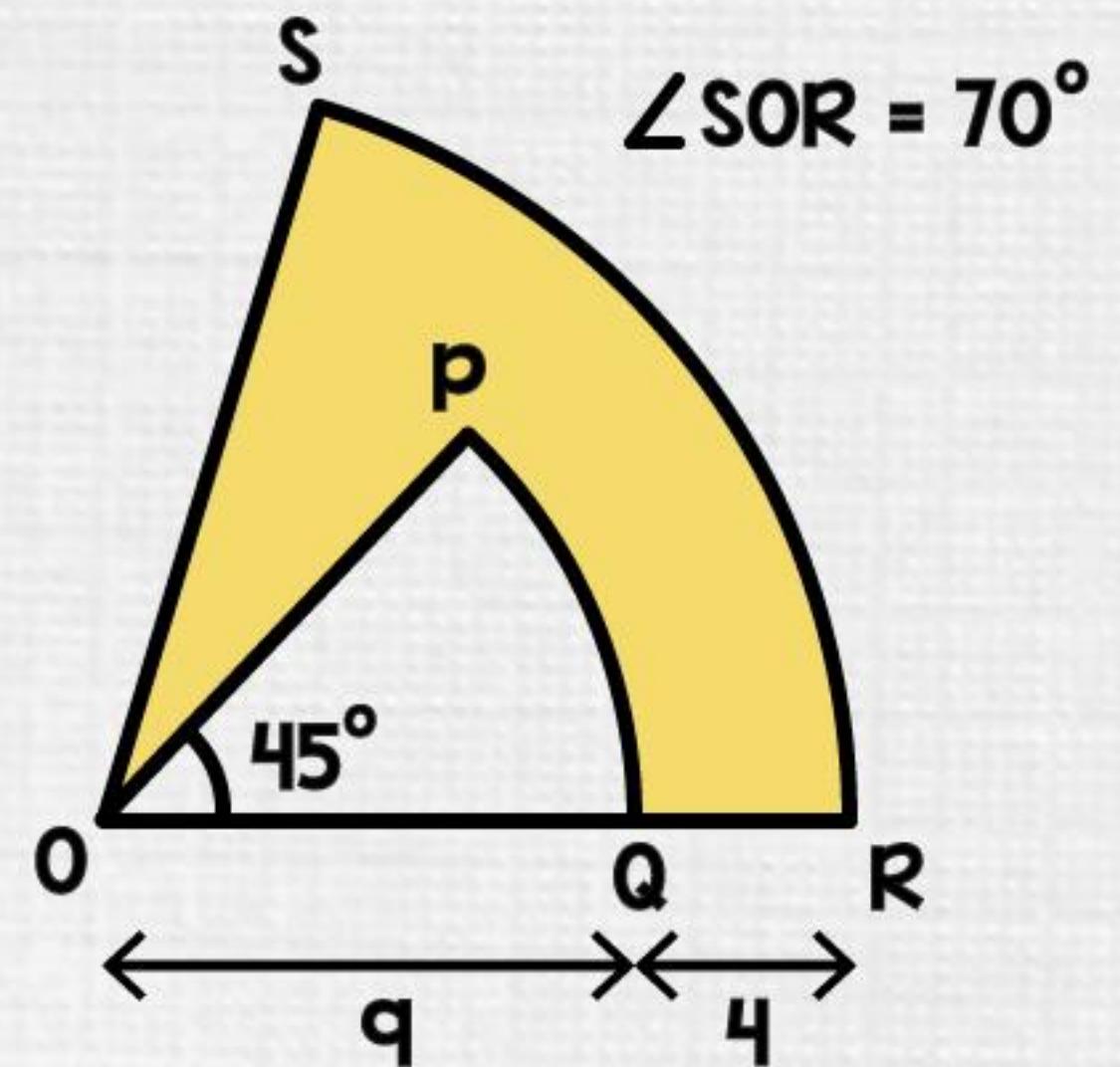
QR + PS +
PQ + RS

perimeter kawasan berlorek

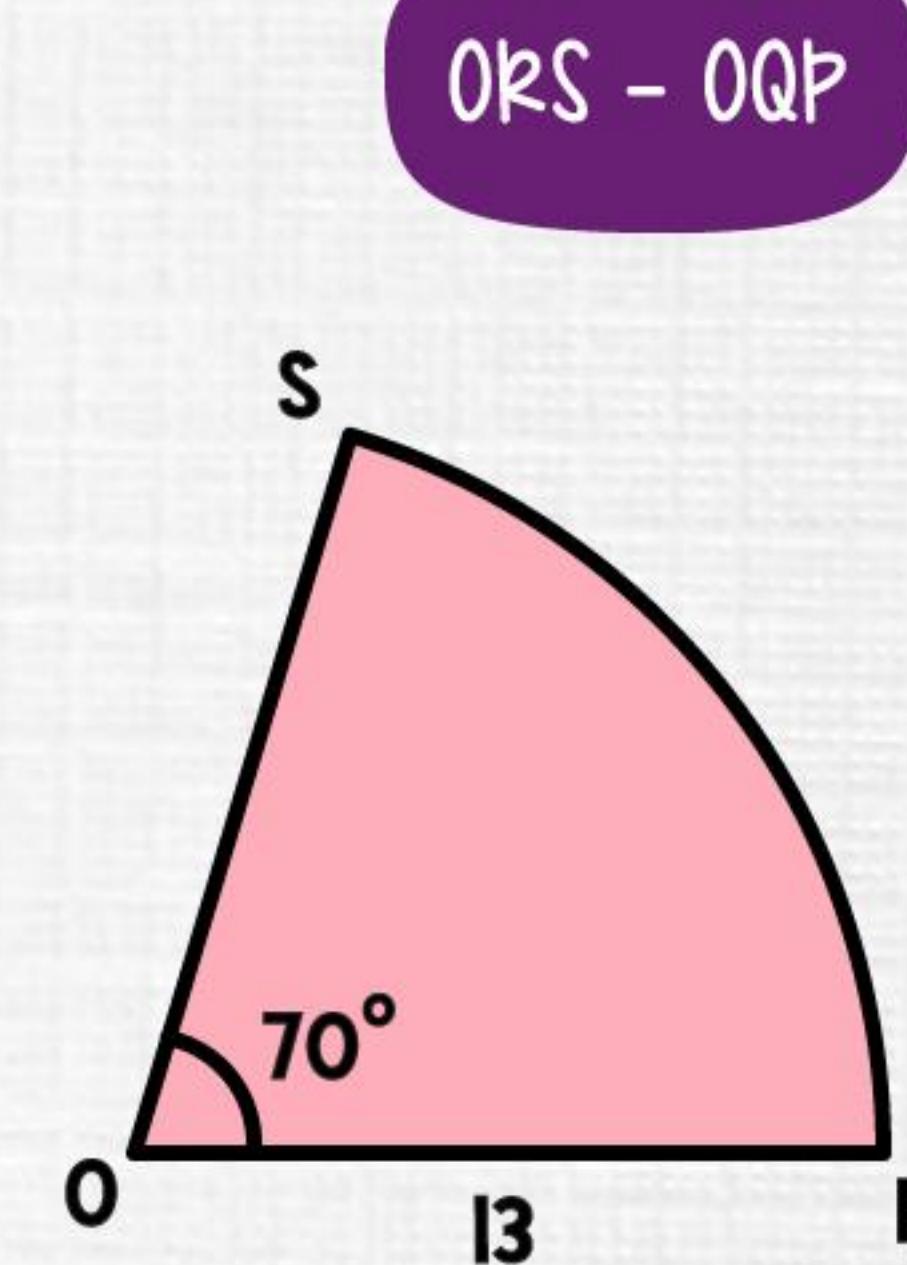
$$= 13.83 + 10.06 + 3 + 3$$

$$= 29.89$$

BULATAN



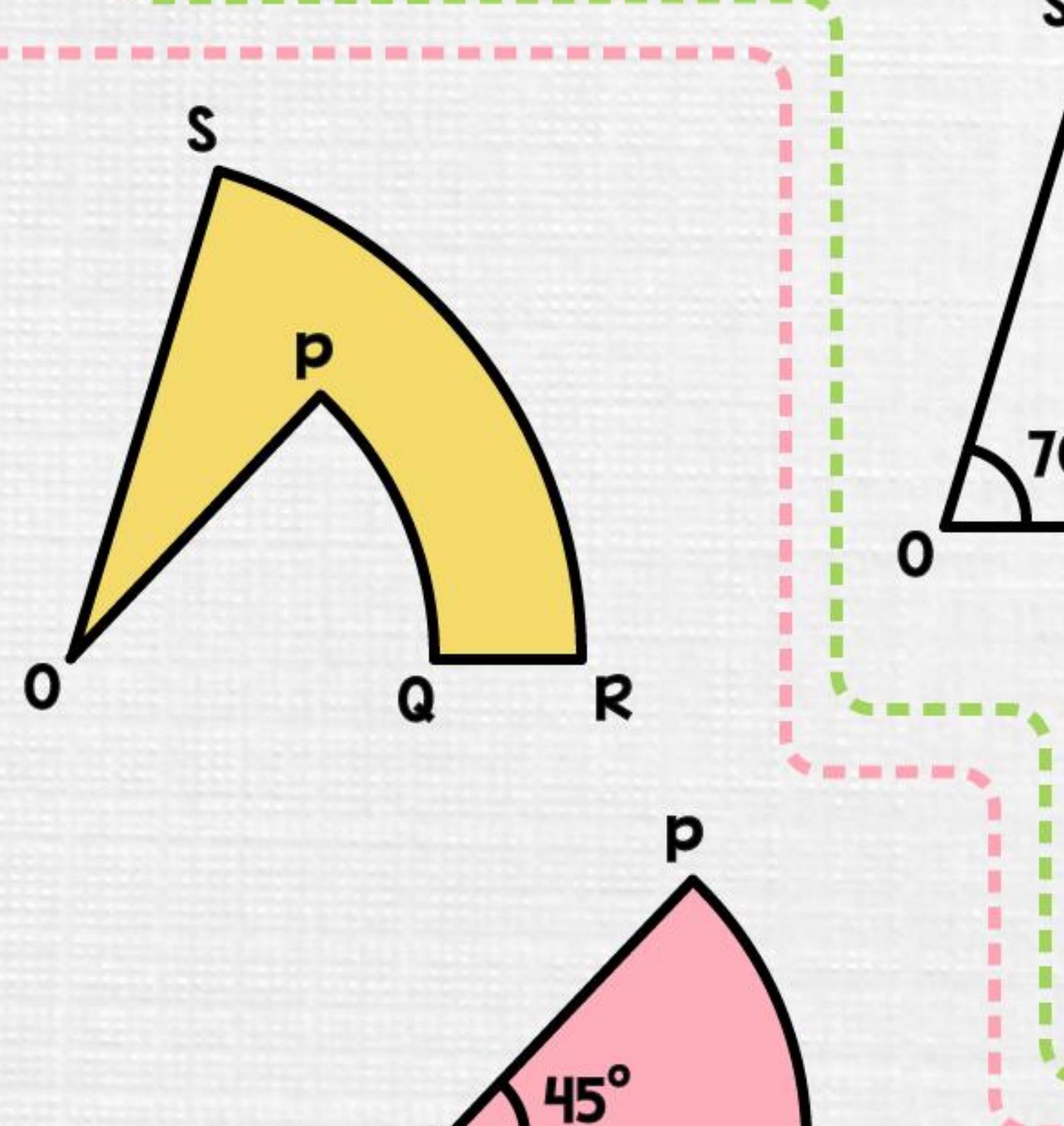
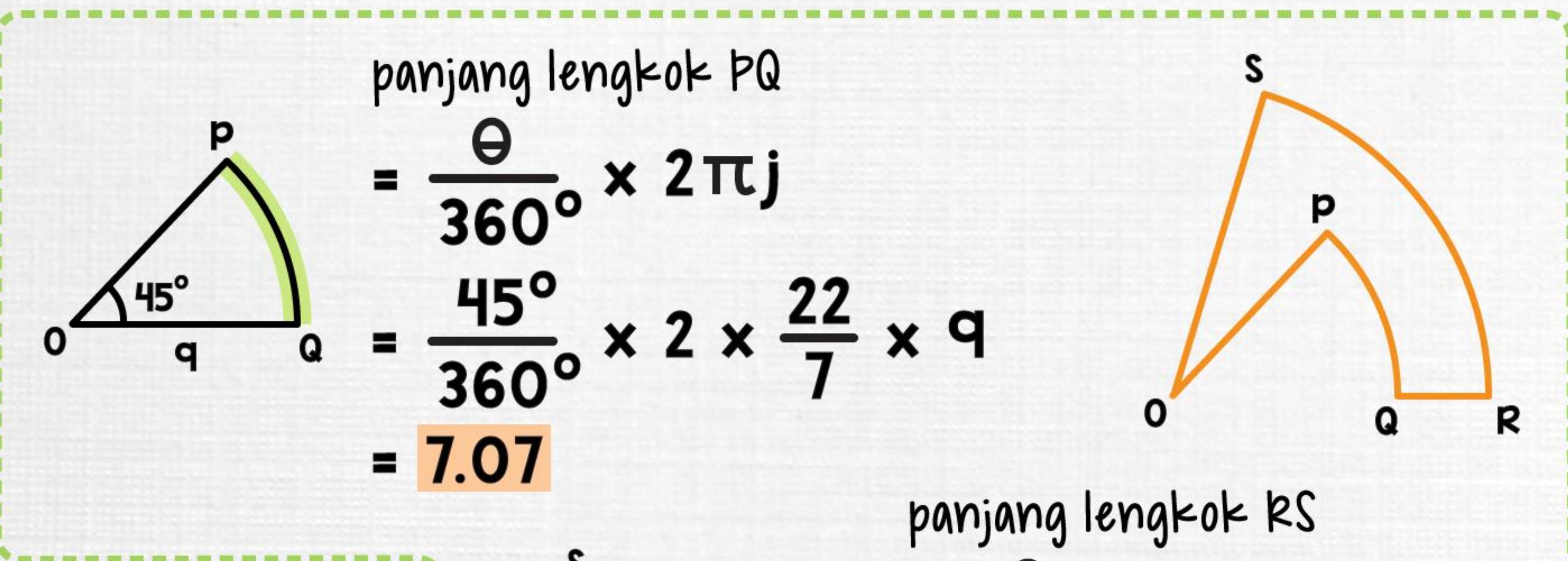
kira luas dan perimeter kawasan berlorek



luas sektor ORS

$$\begin{aligned}
 &= \frac{\theta}{360^\circ} \times \pi j^2 \\
 &= \frac{70^\circ}{360^\circ} \times \frac{22}{7} \times l3^2 \\
 &= 103.28
 \end{aligned}$$

$$\begin{aligned}
 &\text{luas kawasan berlorek} \\
 &= 103.28 - 31.82 \\
 &= 71.46
 \end{aligned}$$



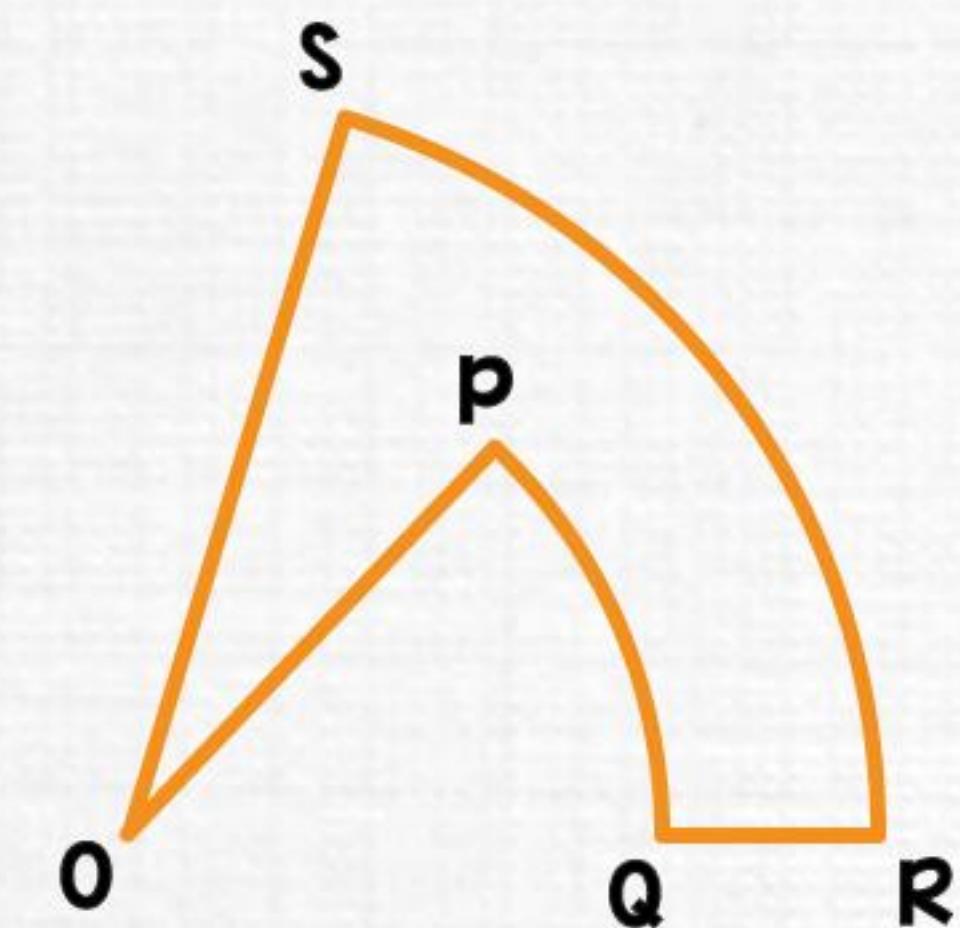
luas sektor OQP

$$\begin{aligned}
 &= \frac{\theta}{360^\circ} \times \pi j^2 \\
 &= \frac{45^\circ}{360^\circ} \times \frac{22}{7} \times q^2 \\
 &= 31.82
 \end{aligned}$$

sektor besar tolak sektor kecil

panjang lengkok RS

$$\begin{aligned}
 &= \frac{\theta}{360^\circ} \times 2\pi j \\
 &= \frac{70^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times l3 \\
 &= 15.8q
 \end{aligned}$$

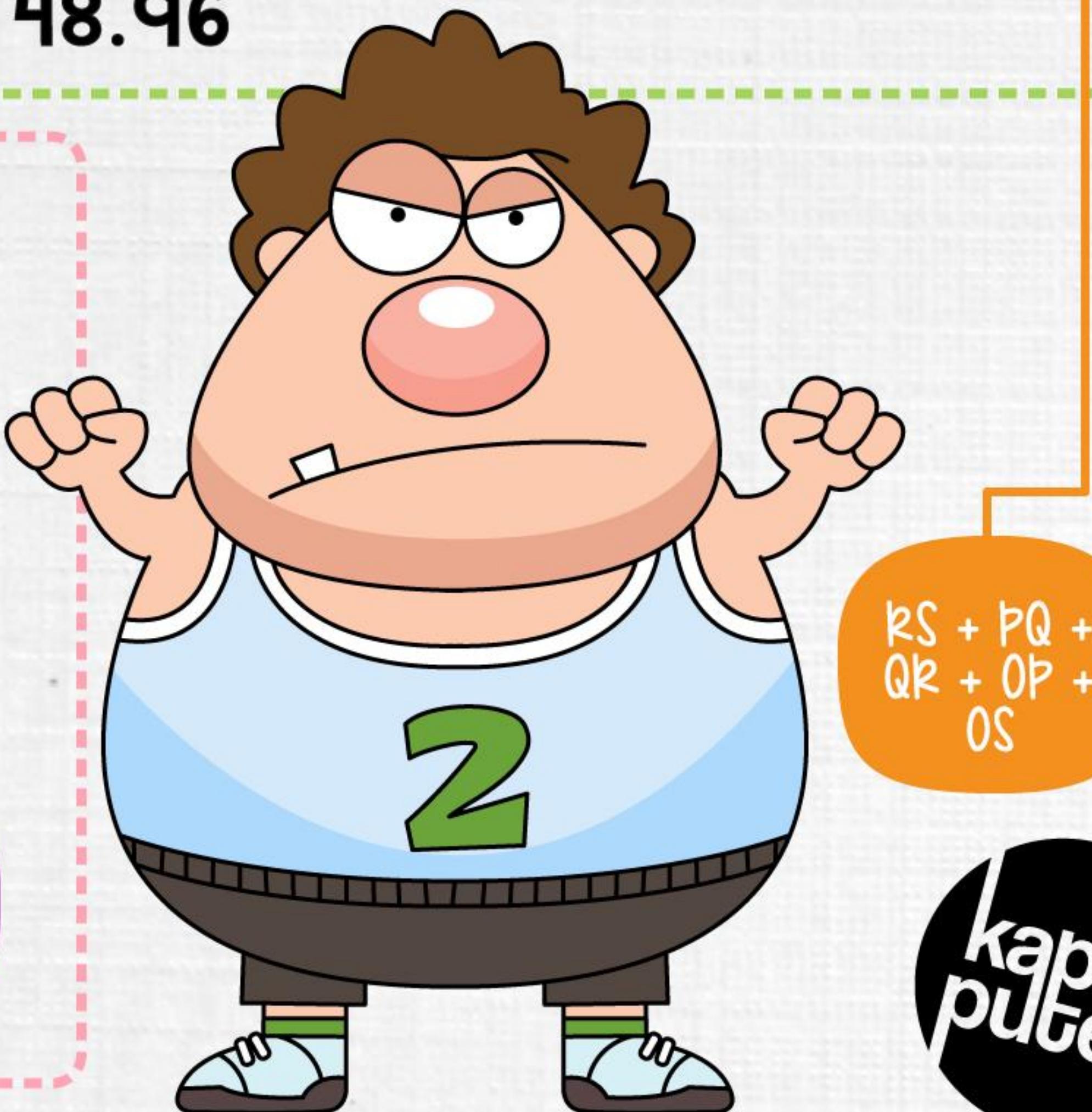


panjang lengkok RS

$$\begin{aligned}
 &= \frac{\theta}{360^\circ} \times 2\pi j \\
 &= \frac{70^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times l3 \\
 &= 15.8q
 \end{aligned}$$

perimeter kawasan berlorek

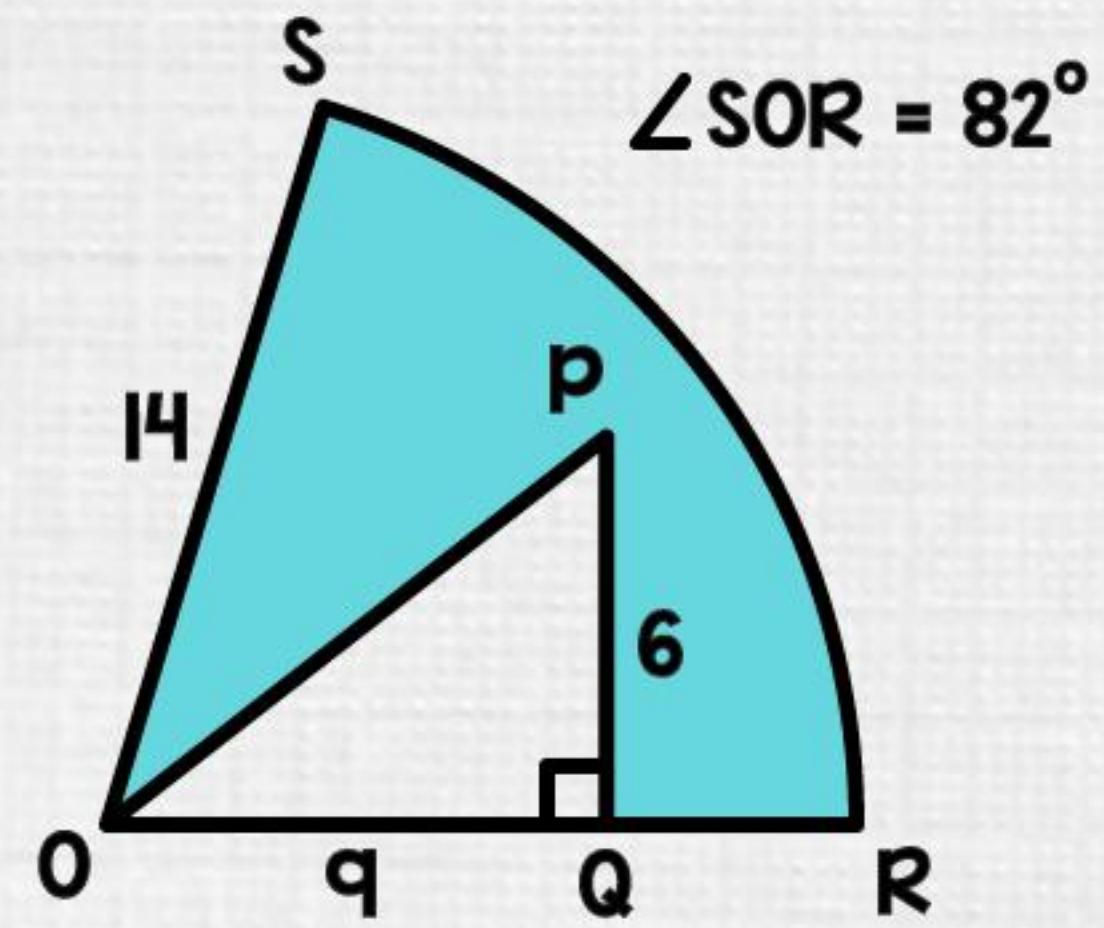
$$\begin{aligned}
 &= 15.8q + 7.07 + 4 + q + l3 \\
 &= 48.96
 \end{aligned}$$



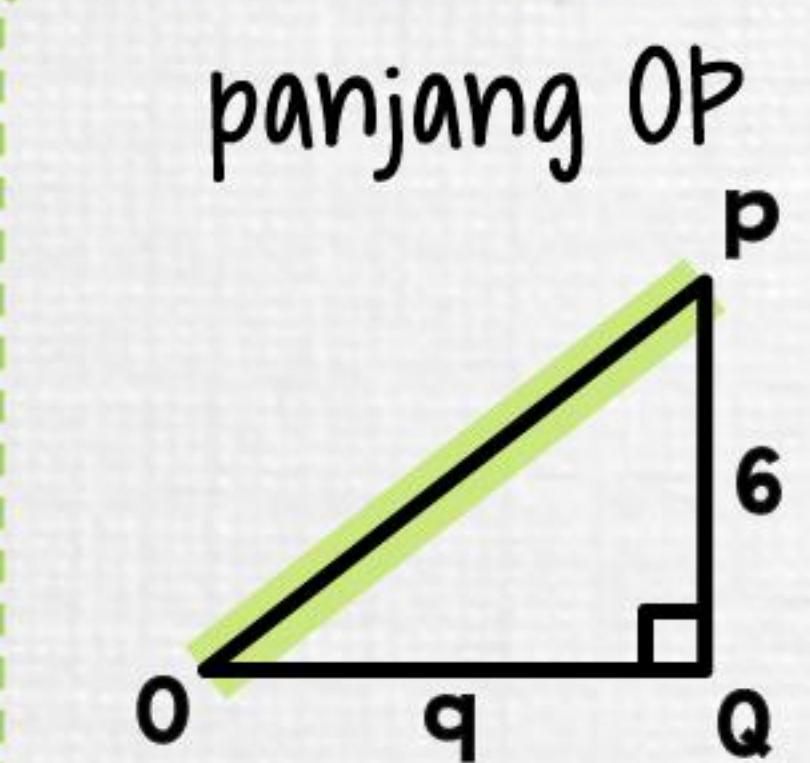
RS + PQ +
QR + OP +
OS

kapur
puteh

BULATAN



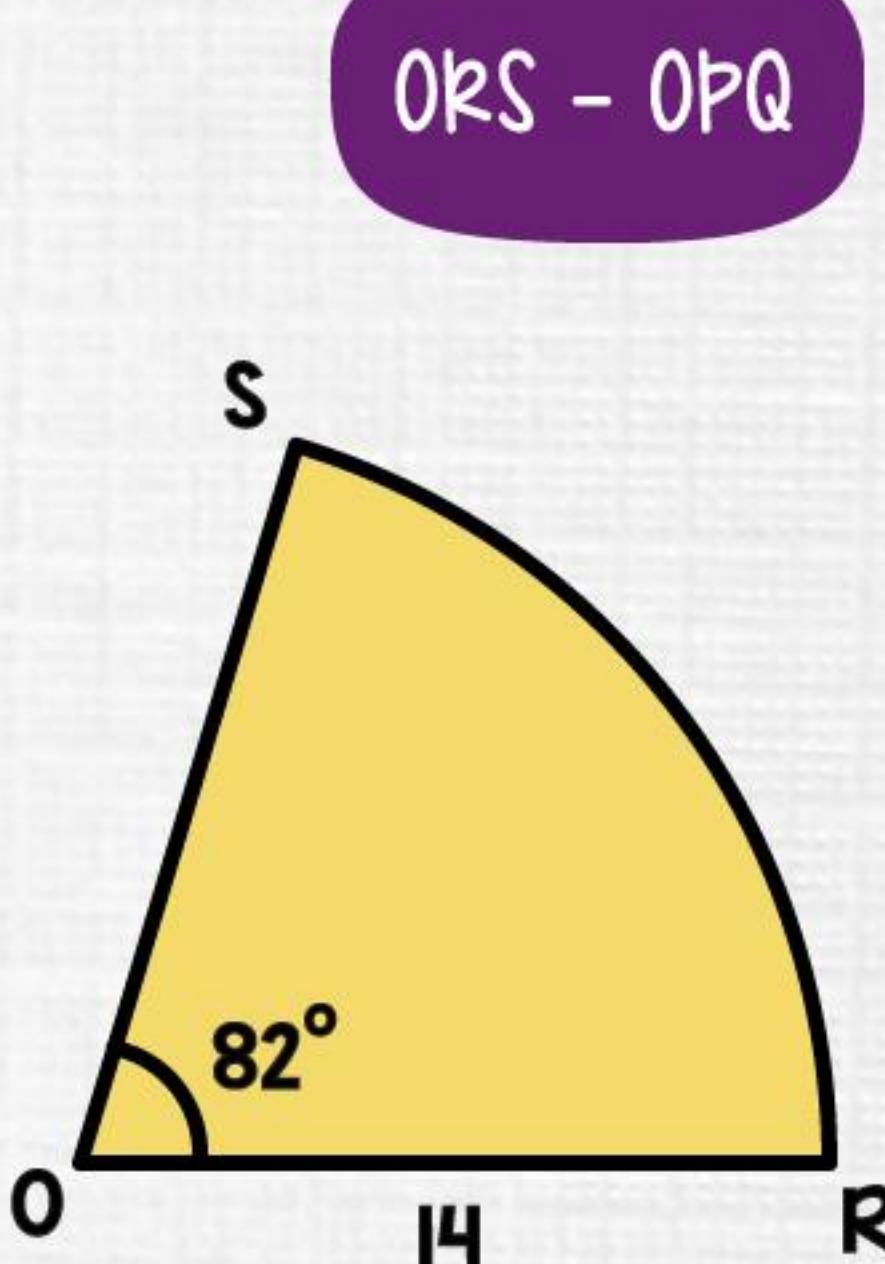
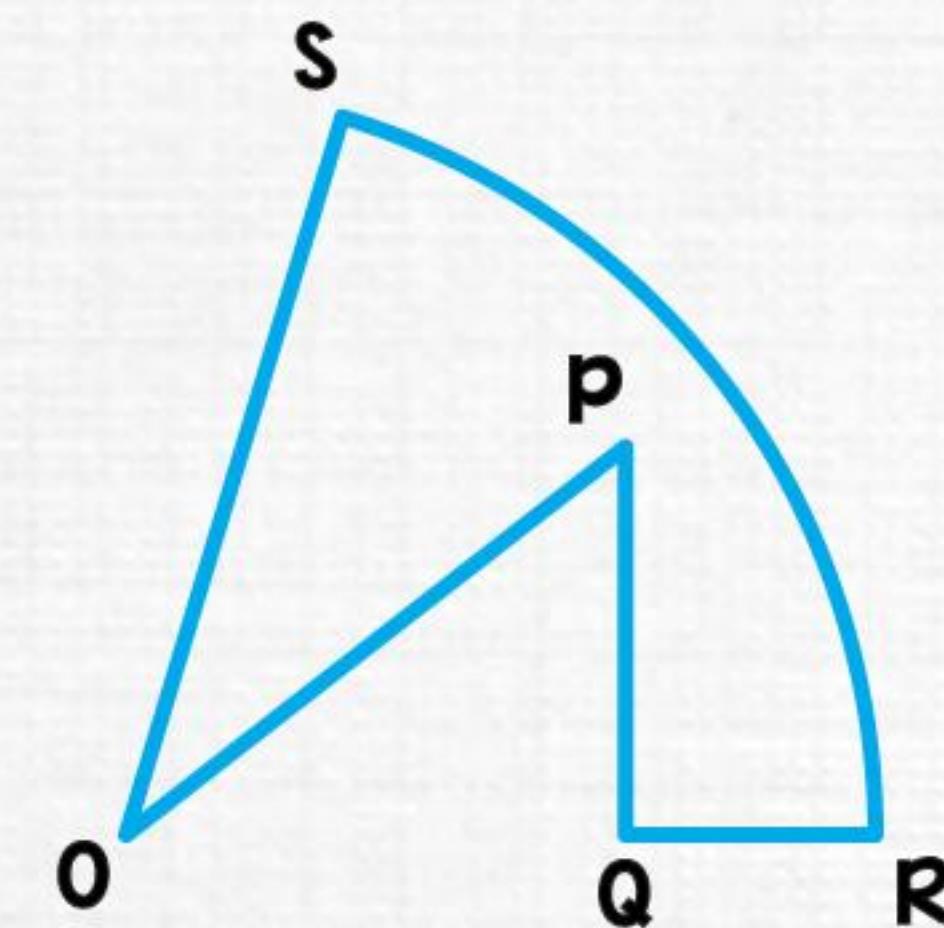
kira luas dan perimeter kawasan berlorek



guna Pythagoras Theorem

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 6^2 + q^2 &= c^2 \\ 36 + q^2 &= c^2 \\ \sqrt{36 + q^2} &= c \\ 10.82 &= c \end{aligned}$$

OPQ ialah segitiga bersudut tegak



luas sektor ORS

$$= \frac{\theta}{360^\circ} \times \pi j^2$$

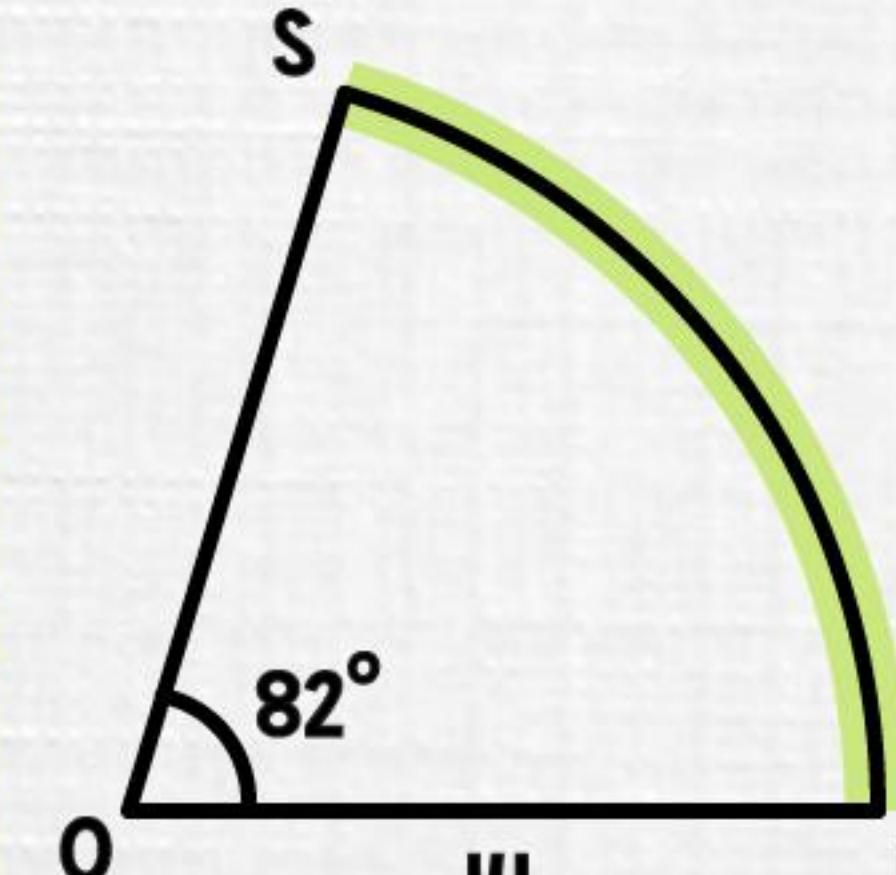
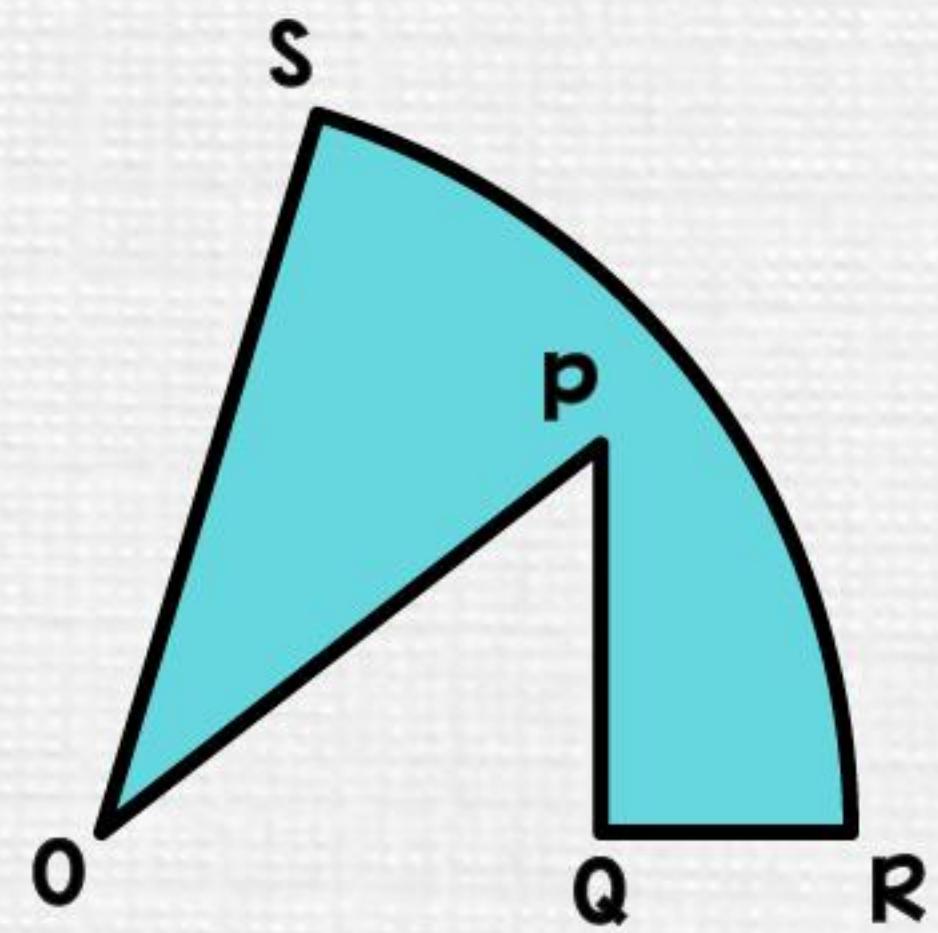
$$= \frac{82^\circ}{360^\circ} \times \frac{22}{7} \times 14^2$$

$$= 140.31$$

luas kawasan berlorek

$$= 140.31 - 27$$

$$= 113.31$$



panjang lengkok RS

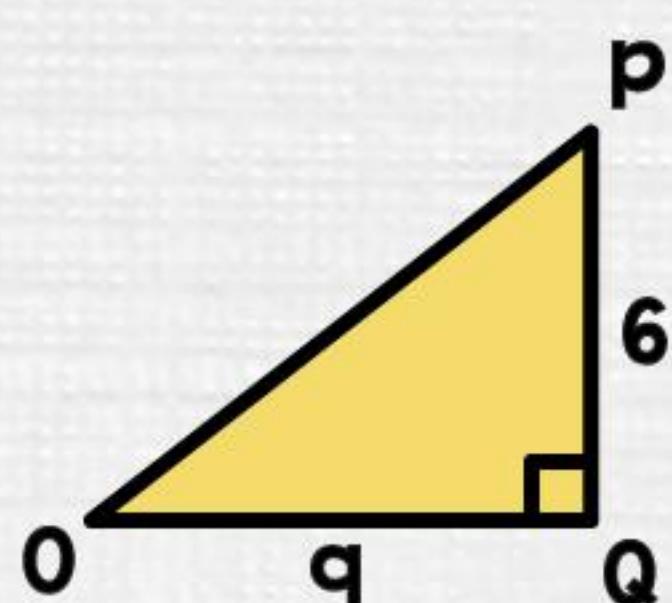
$$= \frac{\theta}{360^\circ} \times 2\pi j$$

$$= \frac{82^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 14$$

$$= 20.04$$

perimeter kawasan berlorek

$$\begin{aligned} &= 20.04 + 10.82 + 5 + 6 + 14 \\ &= 55.86 \end{aligned}$$



luas segitiga OPQ

$$\begin{aligned} &\frac{1}{2} \times q \times 6 \\ &= 27 \end{aligned}$$

OPQ bukan sektor

luas dikira dengan guna formula luas segitiga



RS + OP +
QR + PQ +
OS

*kapur
puteh*

K A P U R P U T E H

"success is the sum of small efforts
repeated day in and day out"

