

CIRCUNFERÊNCIA / CÍRCULO

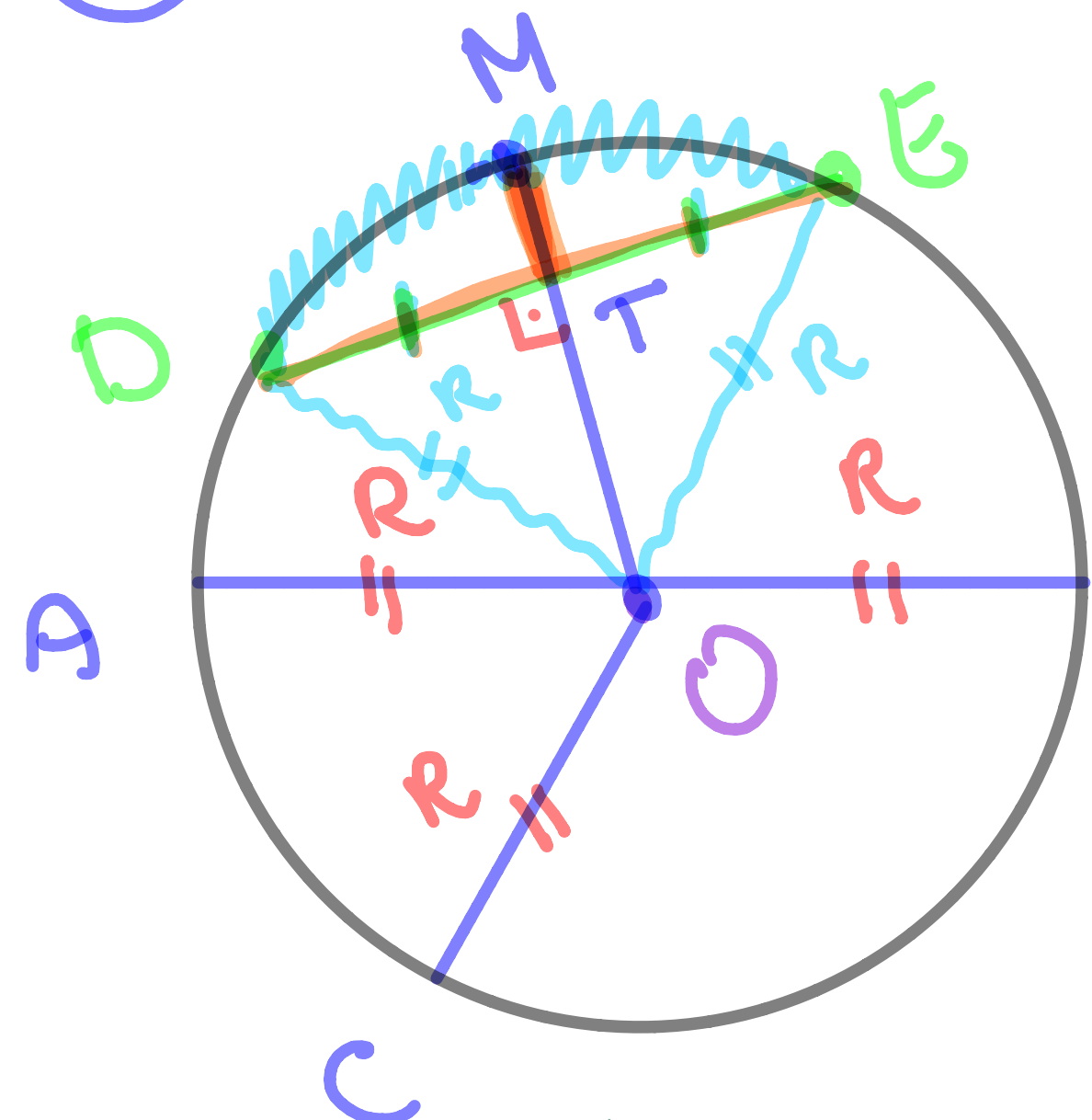
$$C = 2\pi R$$

(comprimento ou
perímetro)

$$A = \pi R^2$$

(área)

1) Elementos



- Centro: O

- Raio: $\overline{OA} = \overline{OB} = \overline{OC} = R$

- Diâmetro: $\overline{AB} = 2R$

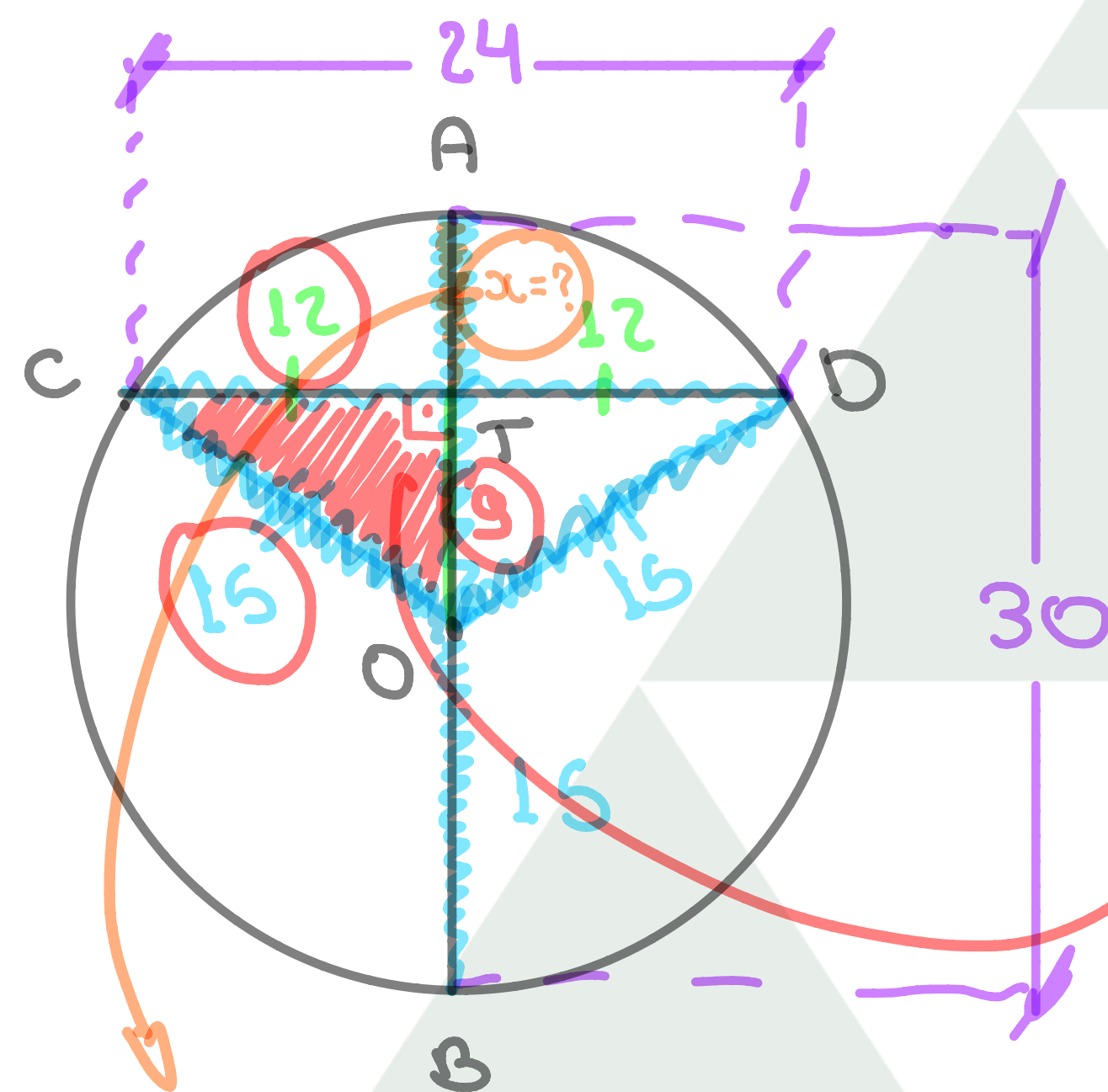
- Corda: \overline{DE} , \overline{AB}
(\rightarrow corda!)

- Arco: \overline{DME}

- Flecha: \overline{MT}

Exemplo 1) Determine

a medida da **FLECHA \overline{AT}** ,
sendo o DIÂMETRO $\overline{AB} = 30\text{cm}$
e a CORDA $\overline{CD} = 24\text{cm}$



(Pit)

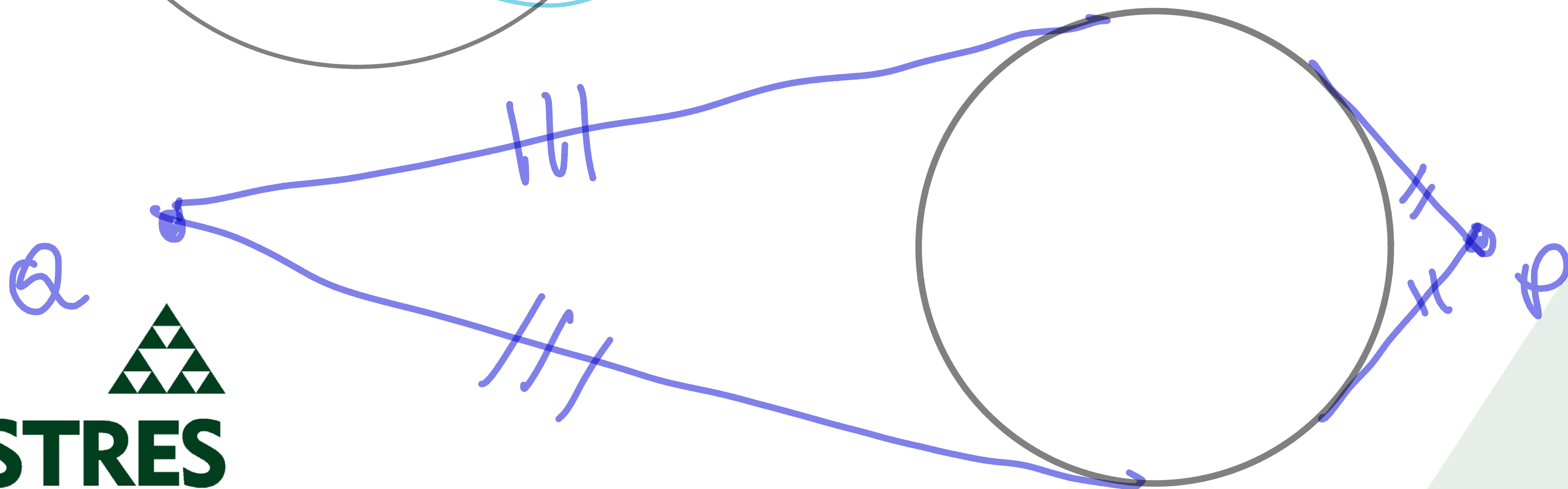
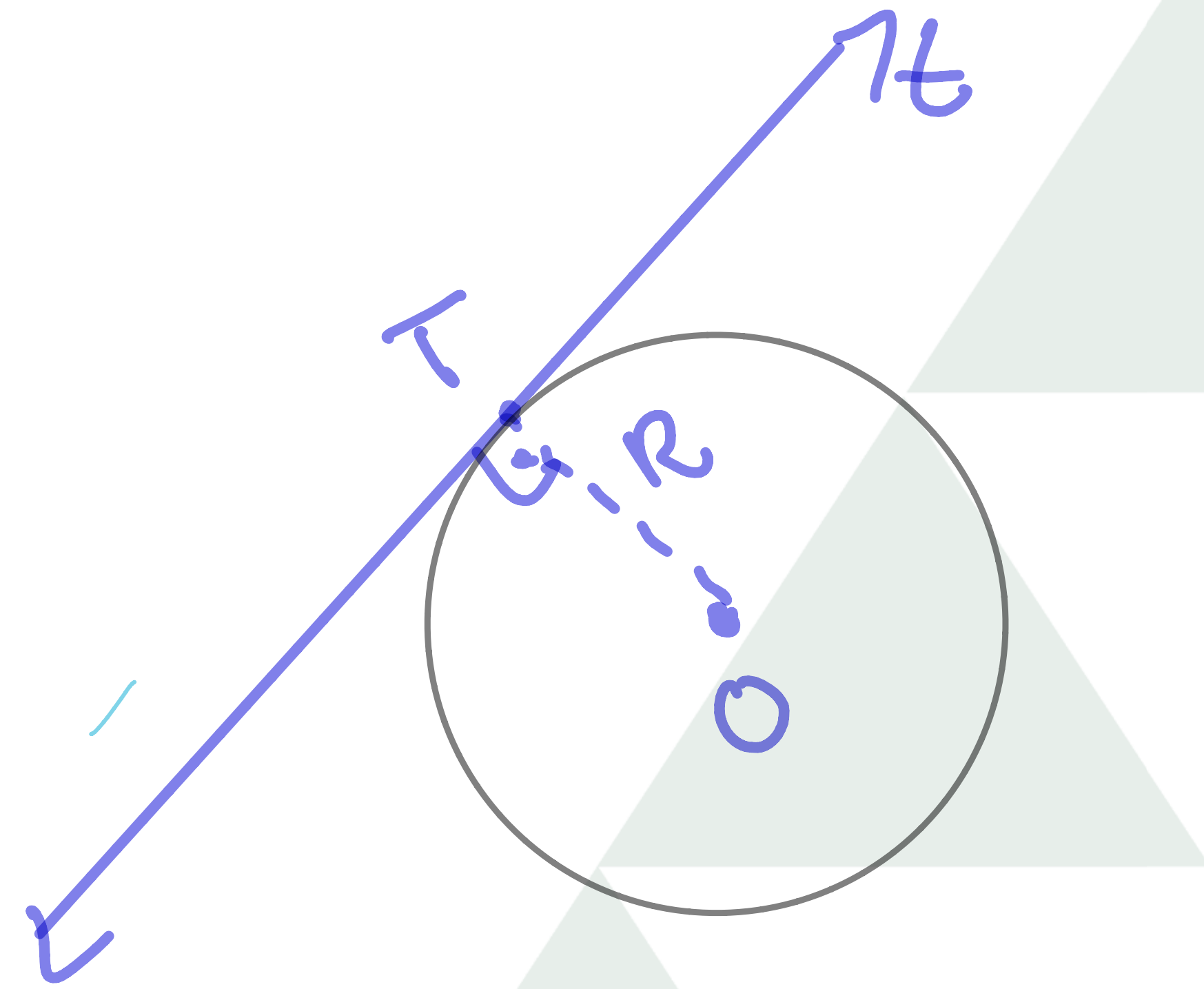
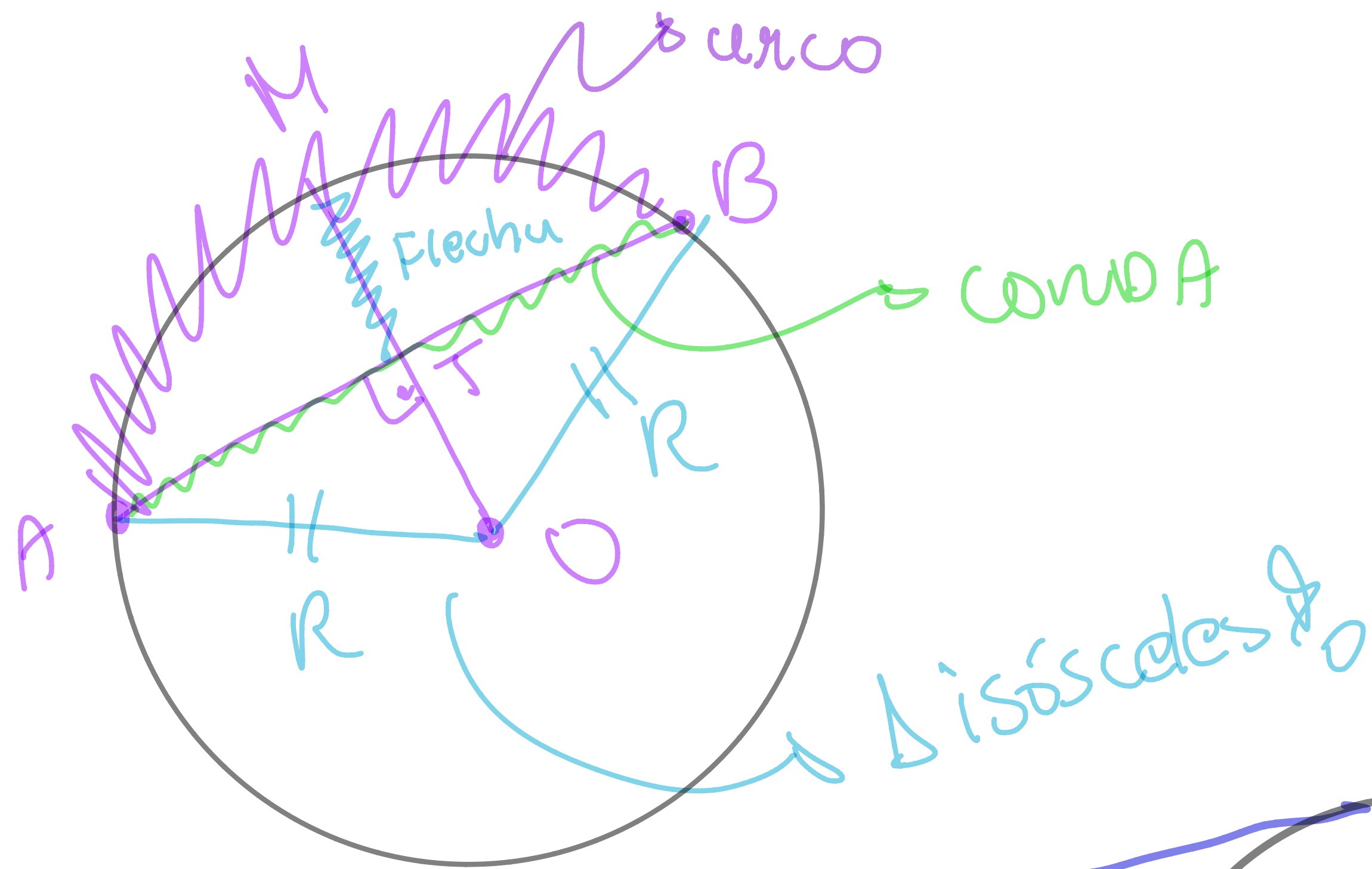
$$15^2 = 12^2 + OT^2$$

$$225 = 144 + OT^2$$

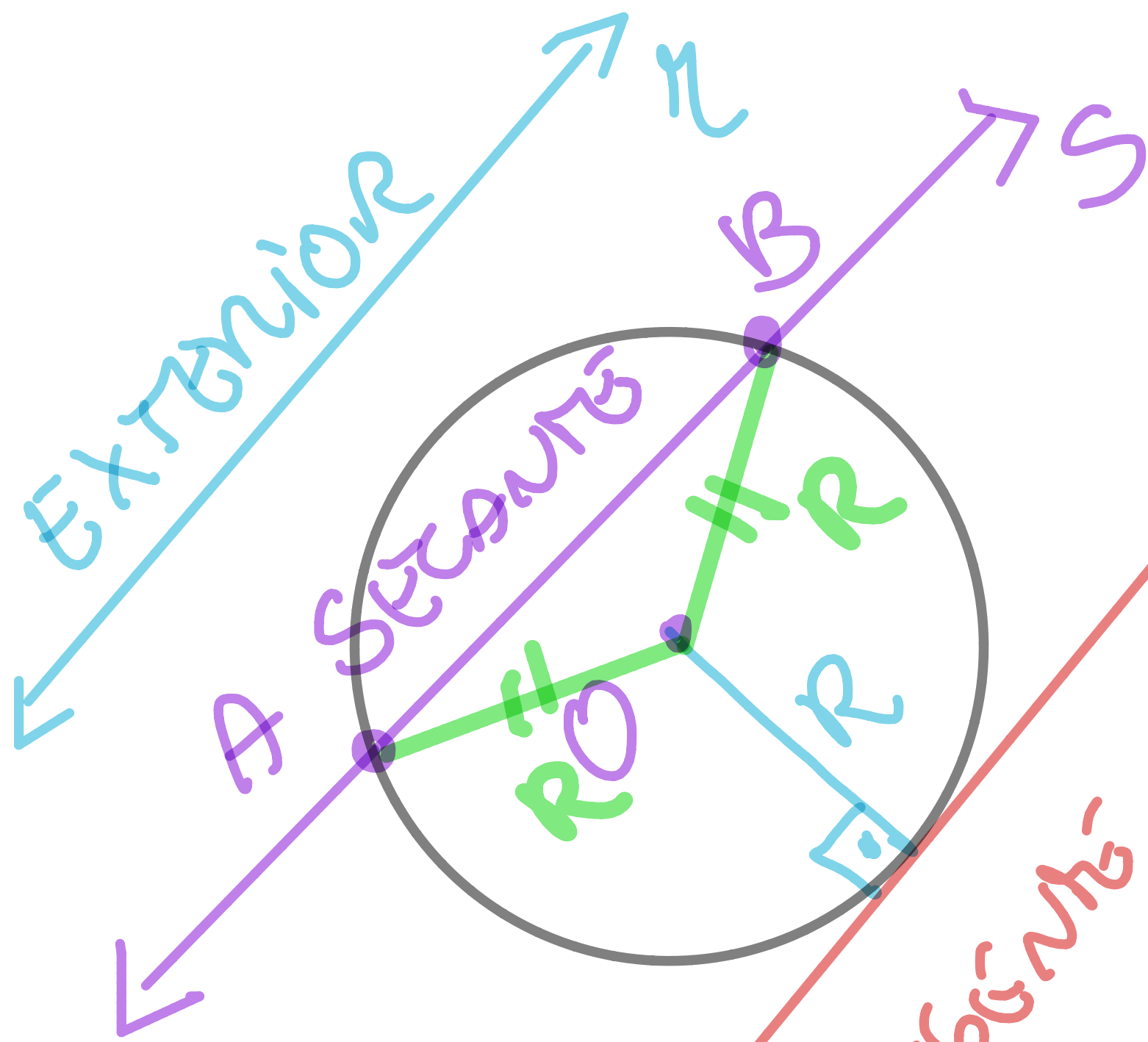
$$81 = OT^2$$

$$OT = 9\text{cm} //$$

R: $AT = x = 15 - 9 = 6\text{cm} //$

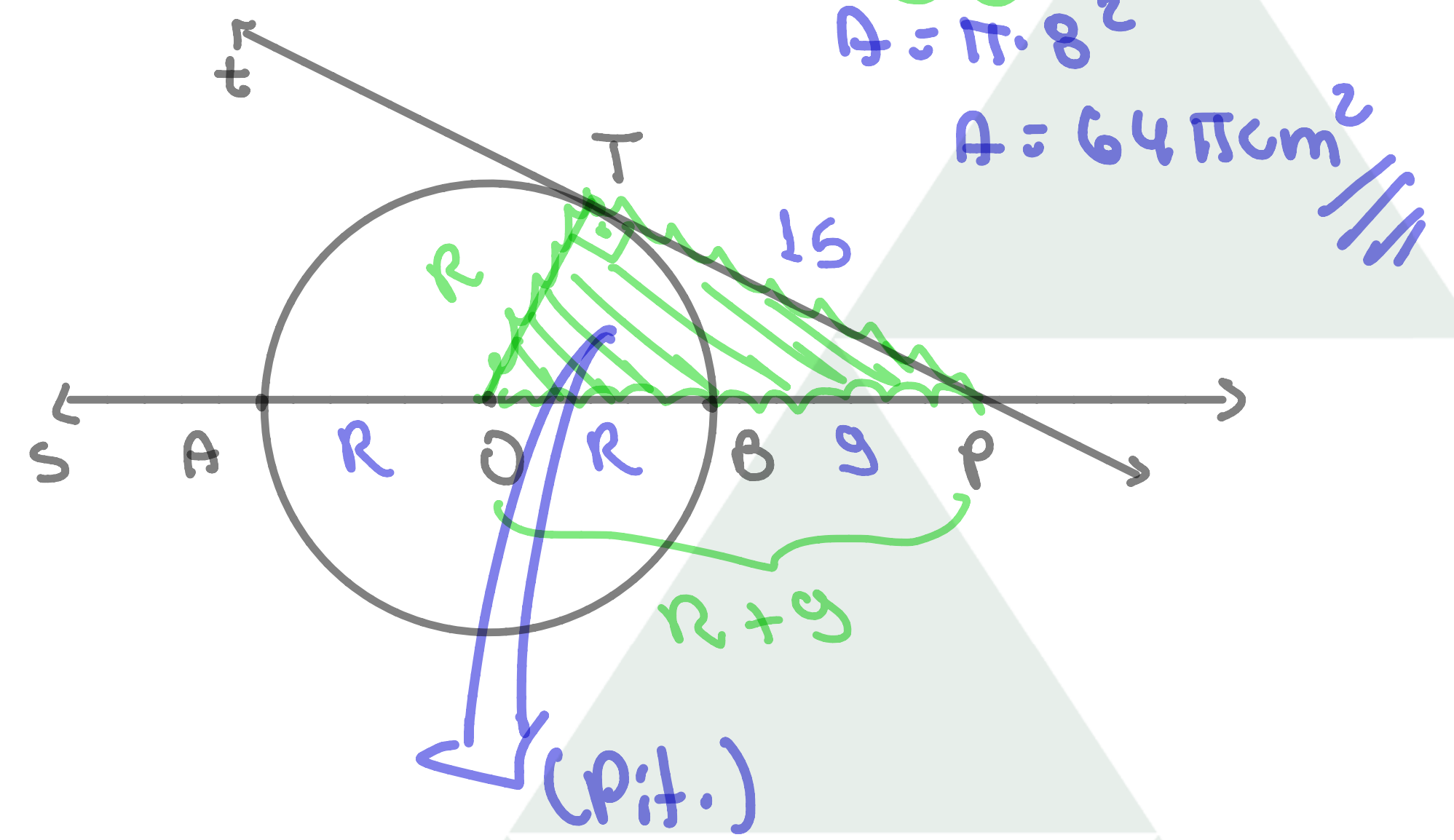


2) Posições relativas entre
reta e circunferência



o raio da circunferência é perpendicular ao segmento de cordão no ponto de tangência

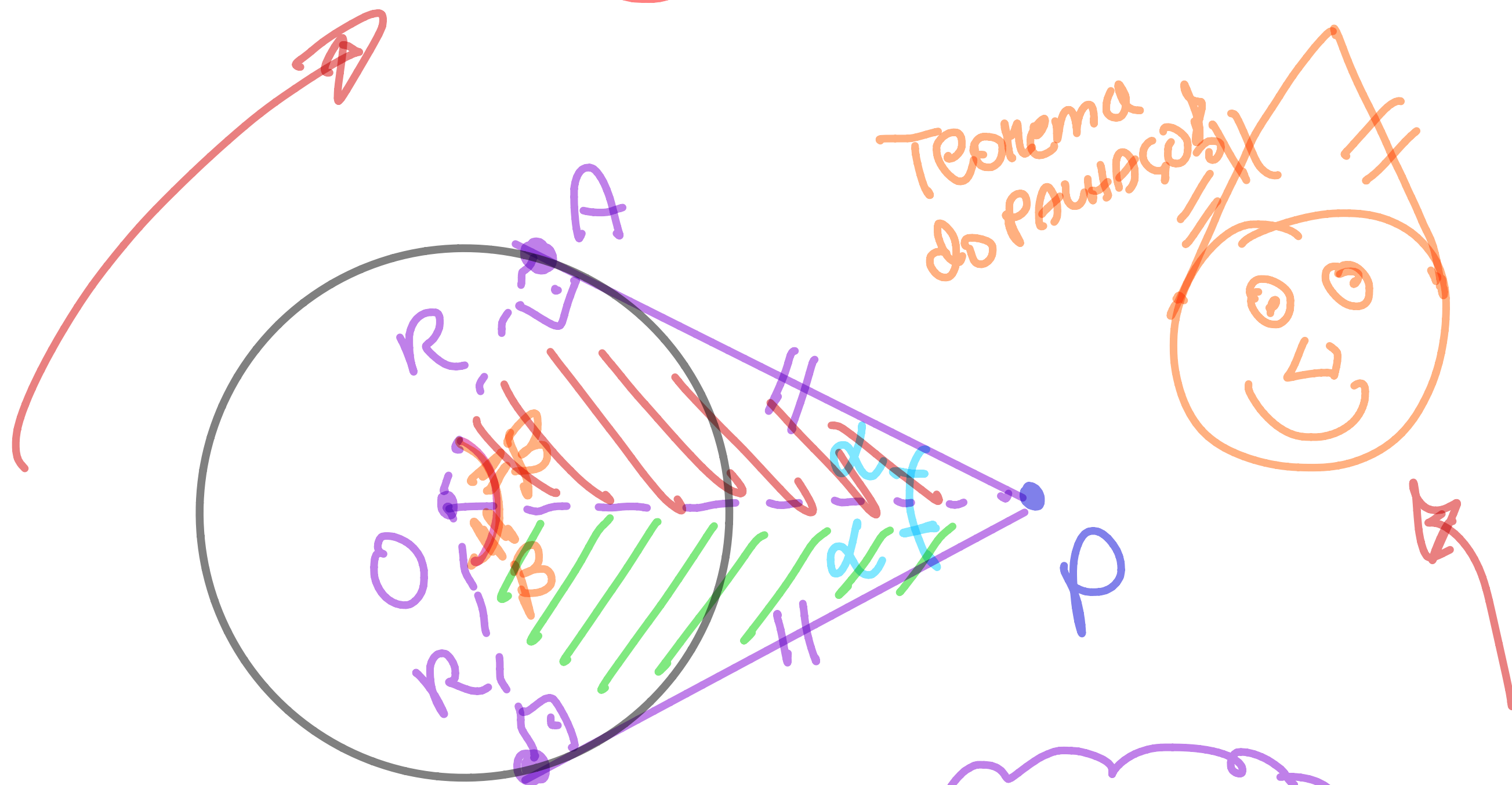
Exemplo 2) Determine
a área do círculo sabendo
sendo $\overline{PT} = 15\text{cm}$
 $\overline{PB} = 9\text{cm}$.



$A = \pi R^2$
 $A = \pi \cdot 8^2$
 $A = 64\pi\text{cm}^2$

$(R+9)^2 = R^2 + 15^2$
 $R^2 + 18R + 81 = R^2 + 225$
 $18R = 144 \Rightarrow R = 8\text{cm}$

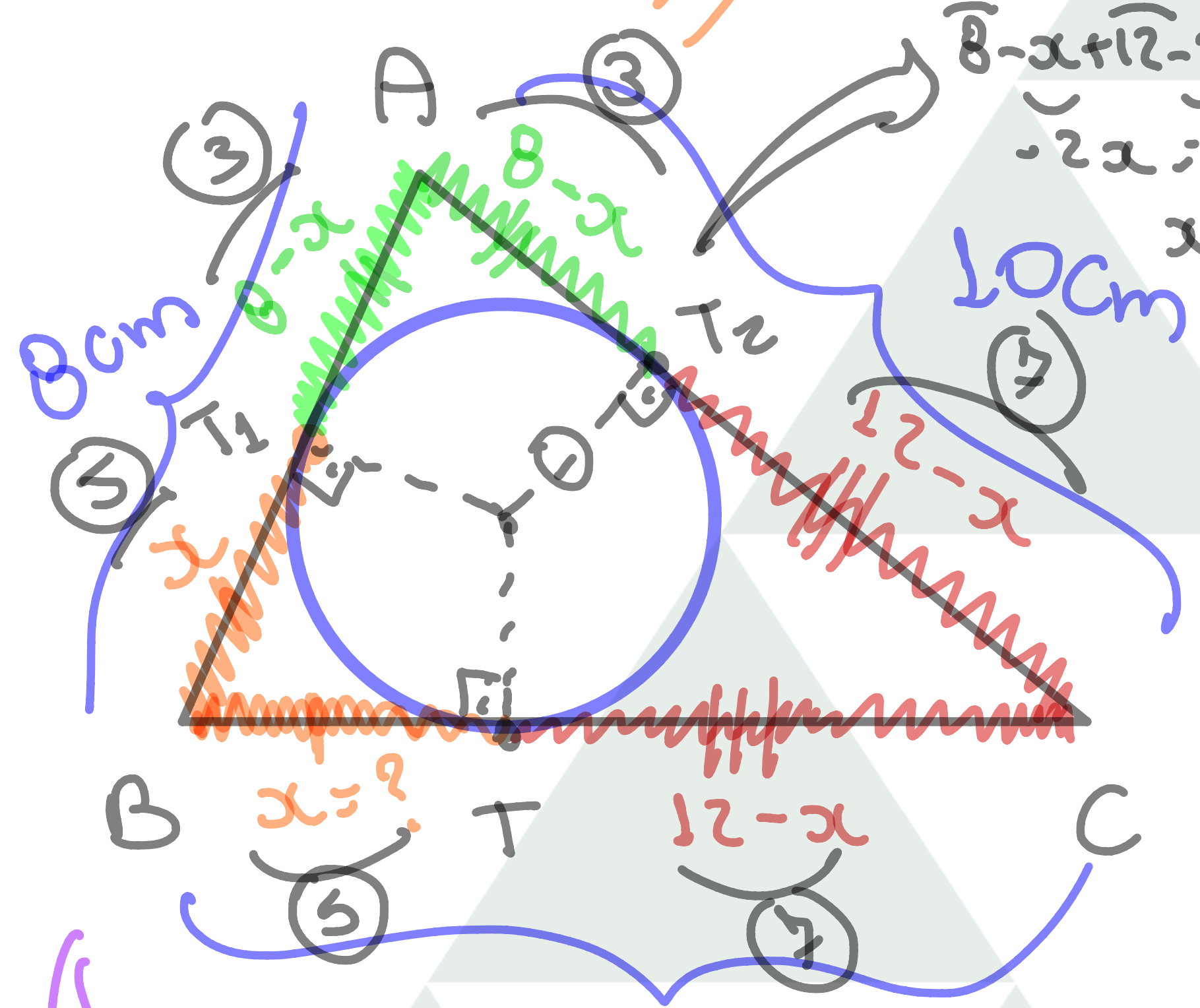
OBS 1º Segmentos Tangentes



$$\overline{PA} = \overline{PB}$$

Exemplo 3 BT = ?

(CLÁSSICA)

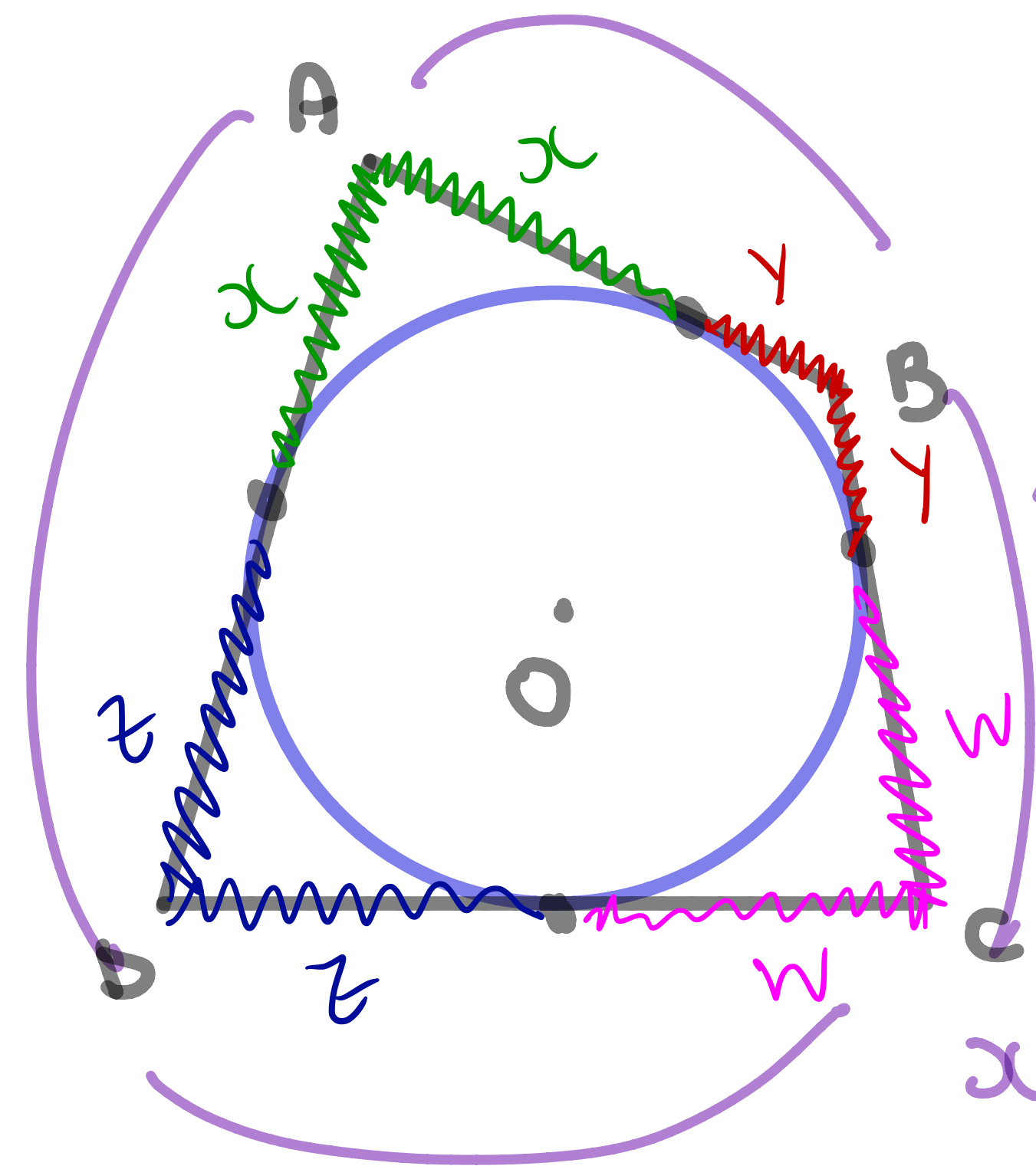


$$\begin{aligned} 8-x + 12-x &= 10 \\ -2x &= -10 \\ x &= 5 \end{aligned}$$

12 cm
círculo inscrito no Δ !
 Δ circunscrito ao círculo!

OBS 2º Teorema de Pitot

(quadrilátero circunscrito)



$$\overline{AB} + \overline{DC} = \overline{AD} + \overline{BC}$$

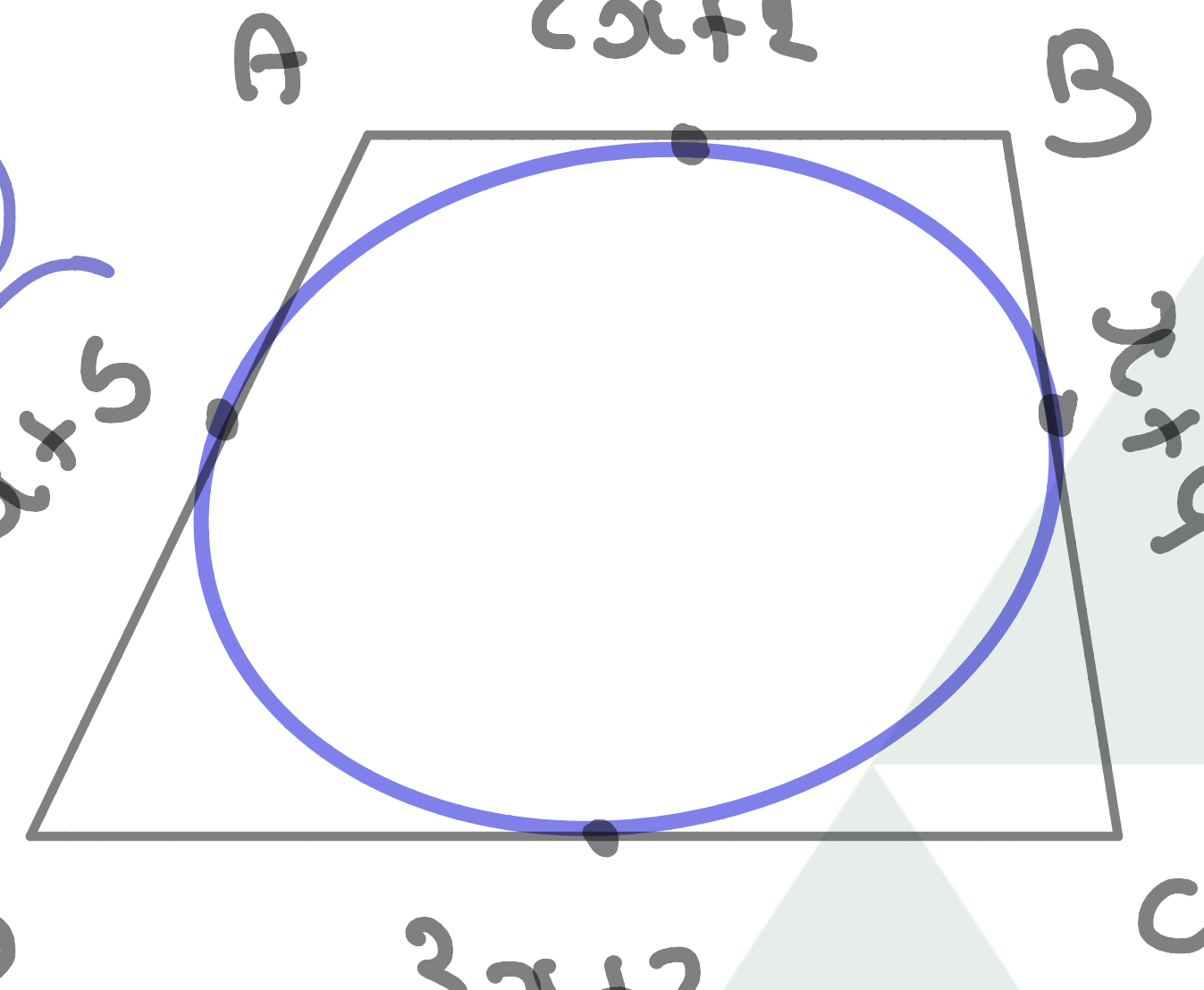
$$x + y + z + w = x + z + y + w$$

Exemplo 4

$$2p_{ABCD} = 5$$

(9)

$$x + 5$$



$$x + 4$$

(6)

$$2p = 11$$

$$\begin{aligned} &+ 5 \\ &+ 0 \\ &+ 7 \\ &+ 6 \\ \hline &26 \end{aligned}$$

(Pitot)

$$2x + 1 + 3x + 2 = x + 5 + x + 4$$

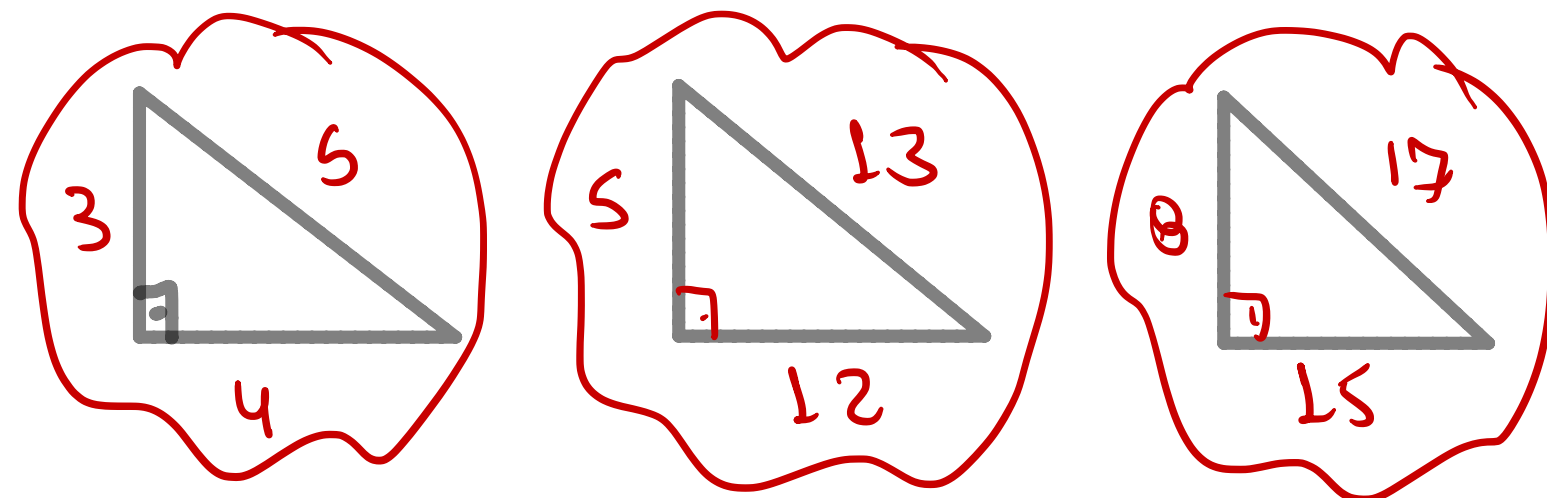
$$5x + 3 = 2x + 9$$

$$3x = 6 \Rightarrow \boxed{x = 2}$$

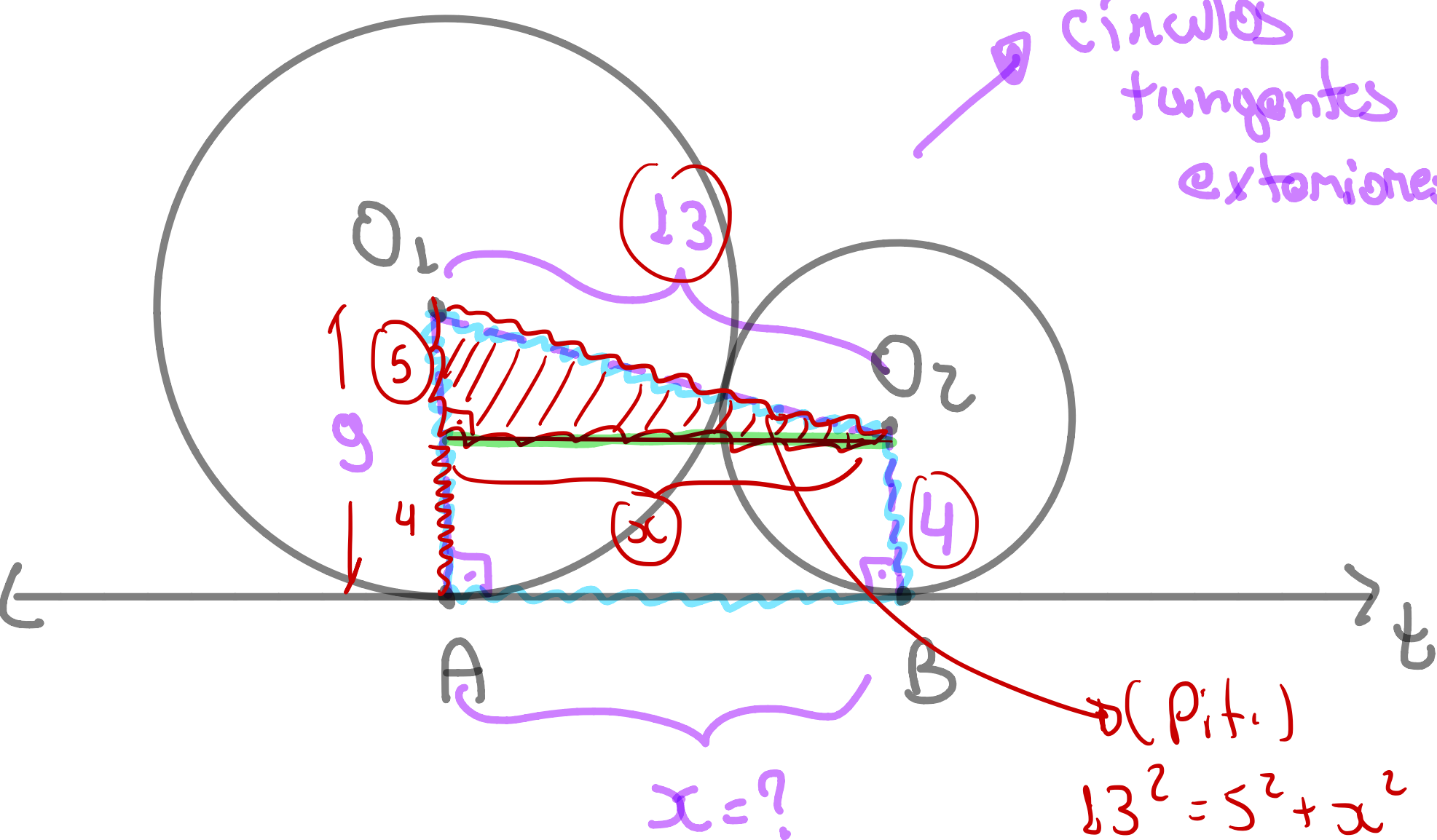
Exemplo 5
(1ª clássica!)

- $R = 9\text{cm}$
- $r = 4\text{cm}$
- $\overline{AB} = ?$

OBS: Δ s pitagóricas!



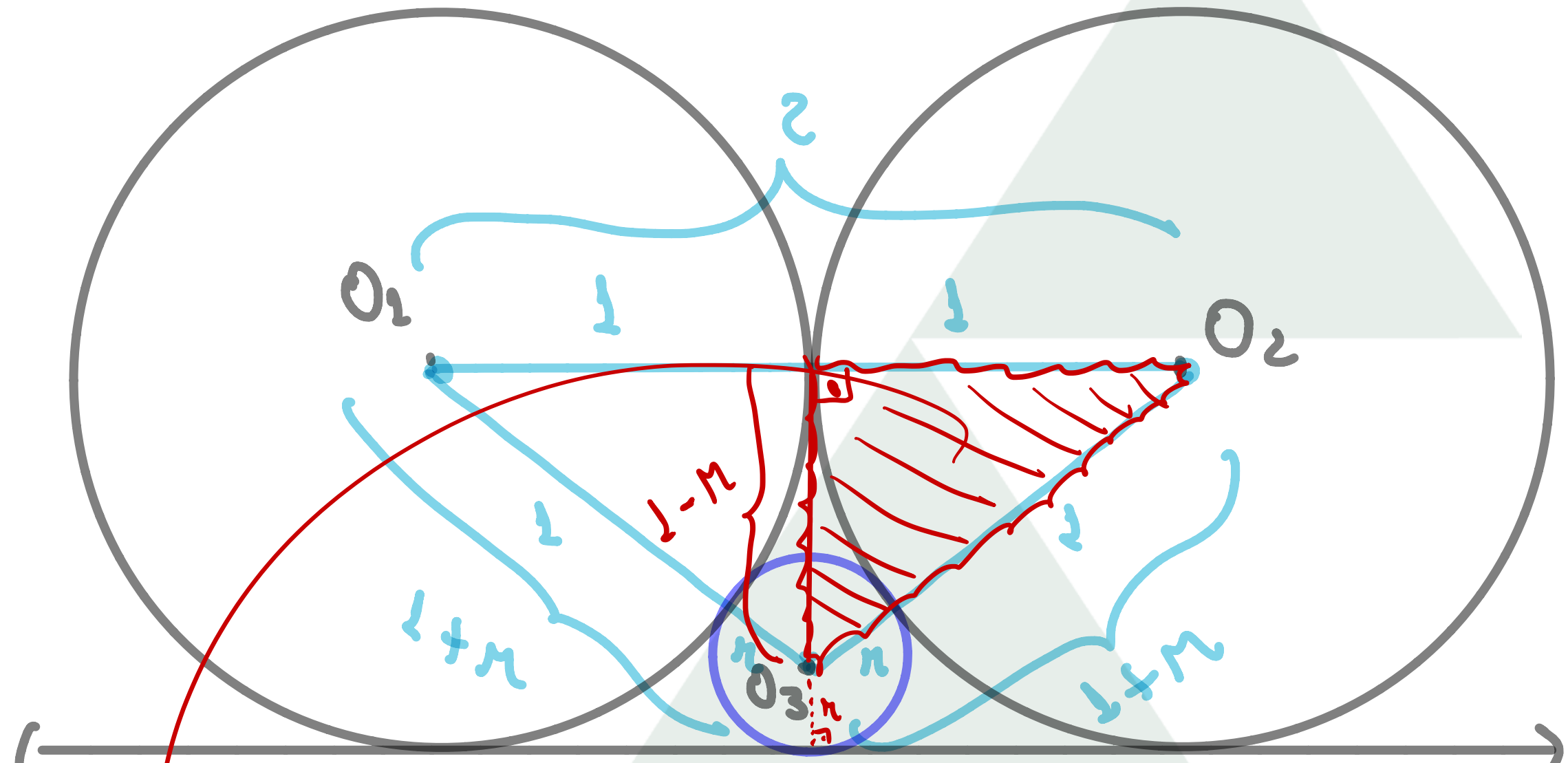
Círculos tangentes exteriores!



(Pit.)
 $13^2 = 5^2 + x^2$
 $169 = 25 + x^2$
 $144 = x^2$
 $x = 12\text{cm}$

Exemplo 6
(2ª clássica!)

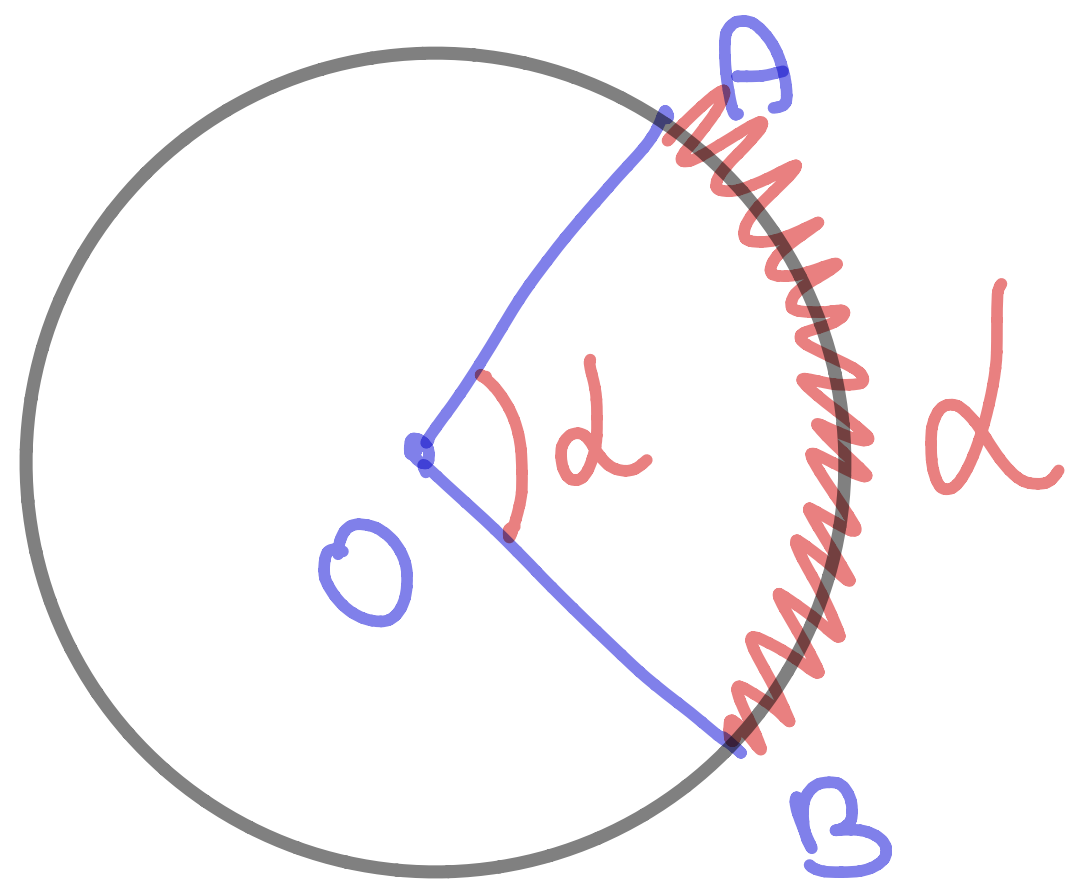
- $R = 1\text{cm}$
- $r = ?$



(Pit.)
 $(1+n)^2 = (1-n)^2 + 1^2$
 $1+2n+n^2 = 1-2n+n^2 + 1$
 $4n = 1$
 $n = \frac{1}{4}\text{cm}$

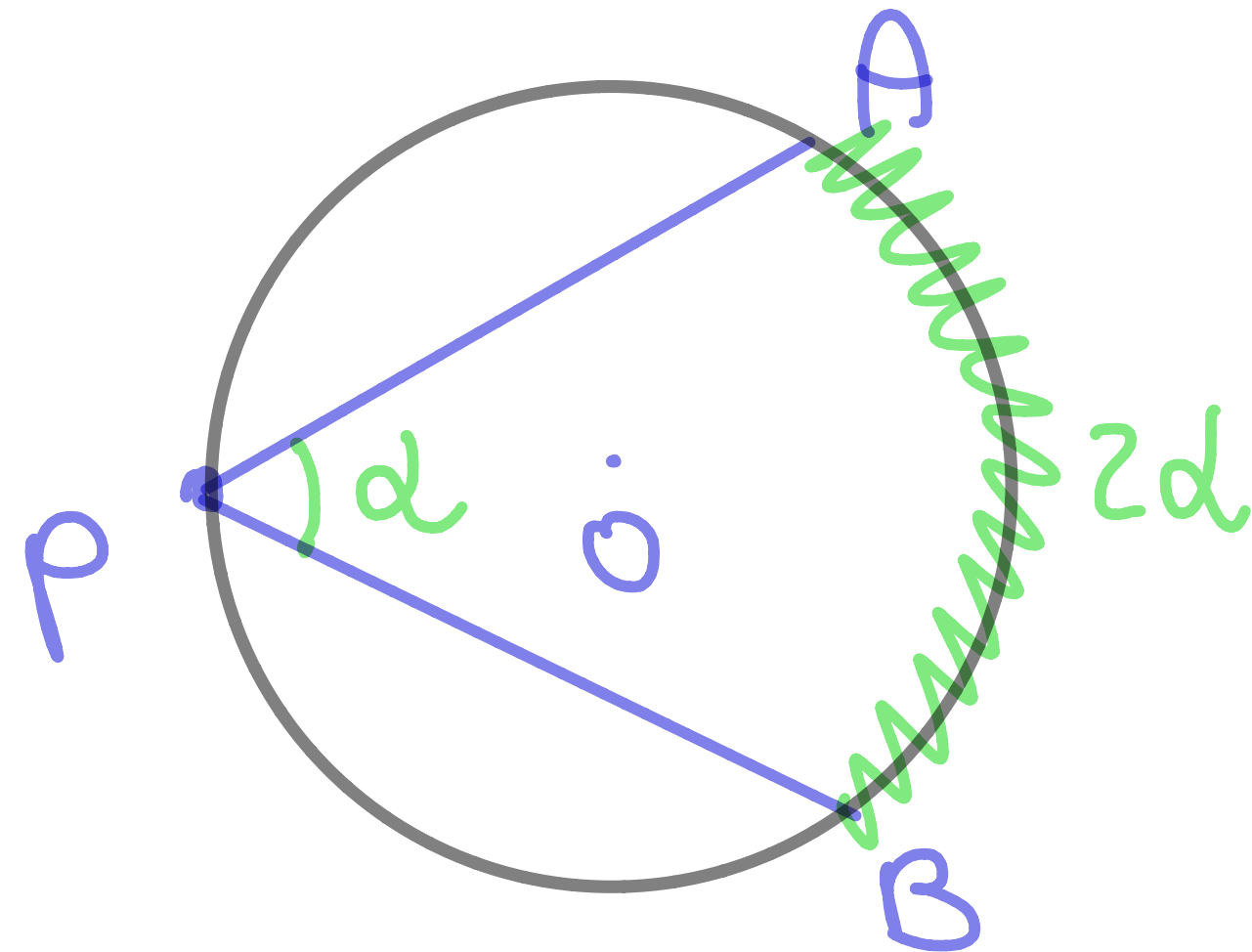
3 Ângulos/arcos na circunferência

3.1 Central



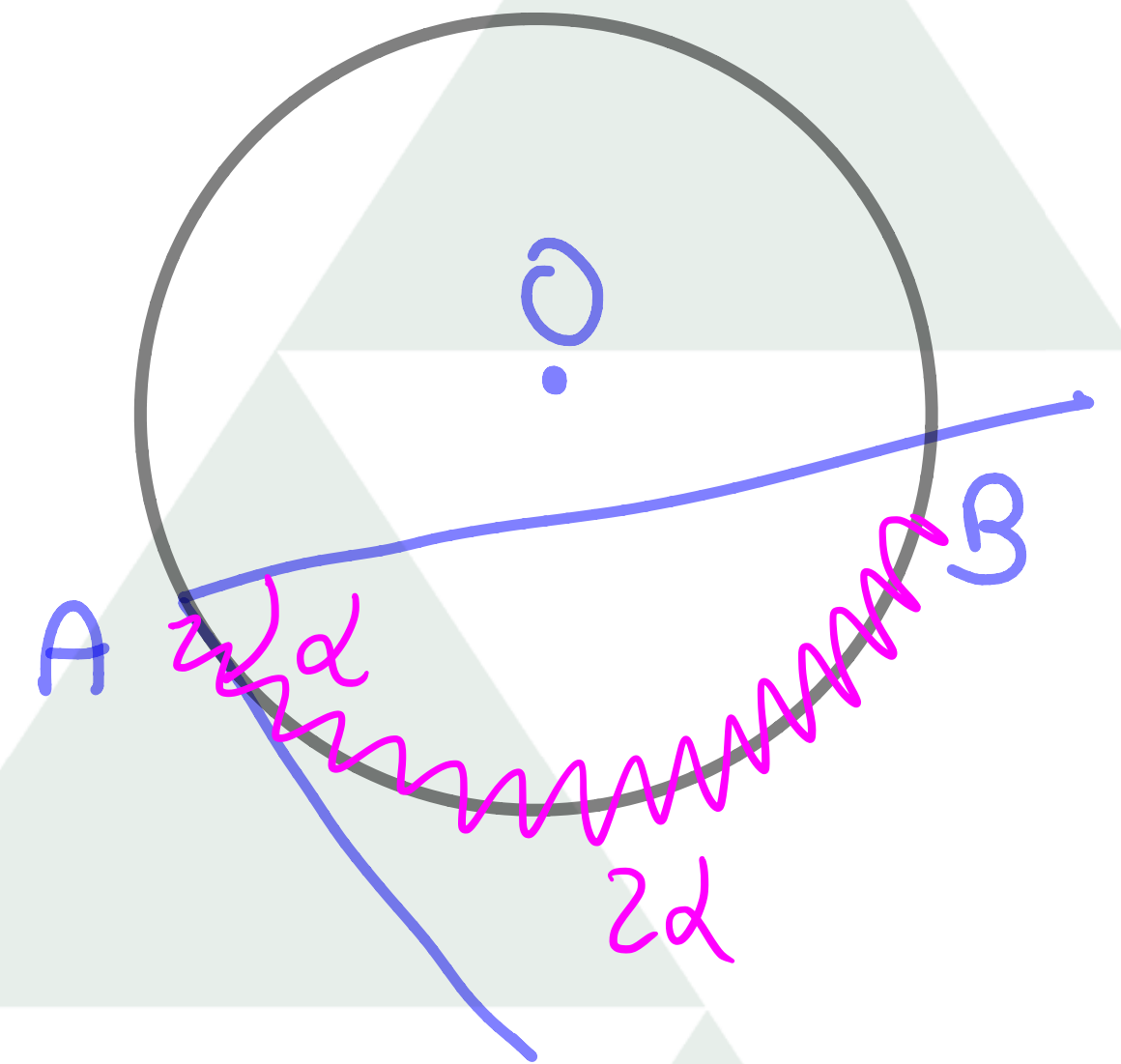
$$\widehat{AB} = d$$

3.2 Inscrito



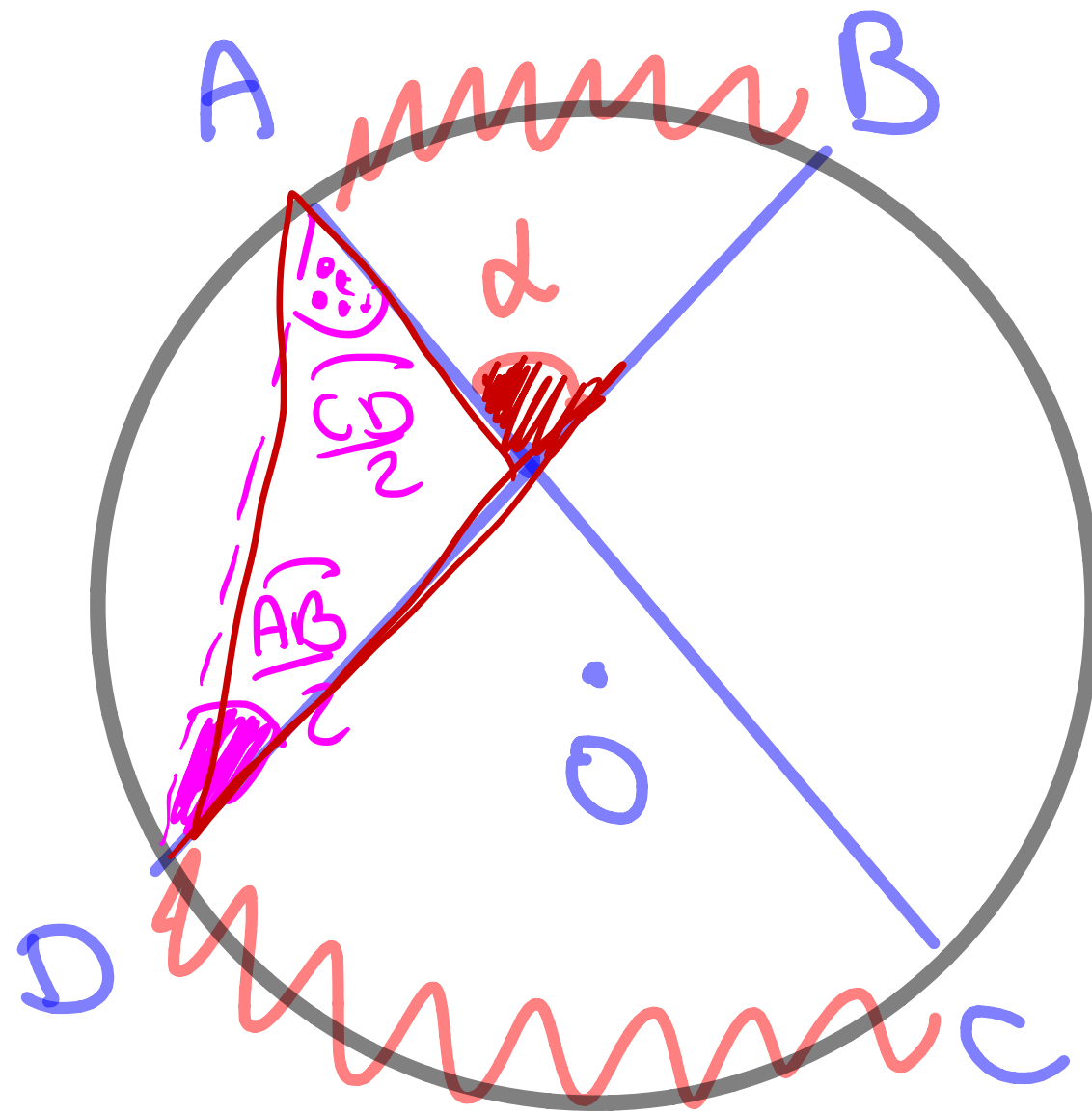
$$\widehat{AB} = 2d$$

3.3 Semi-inscrito



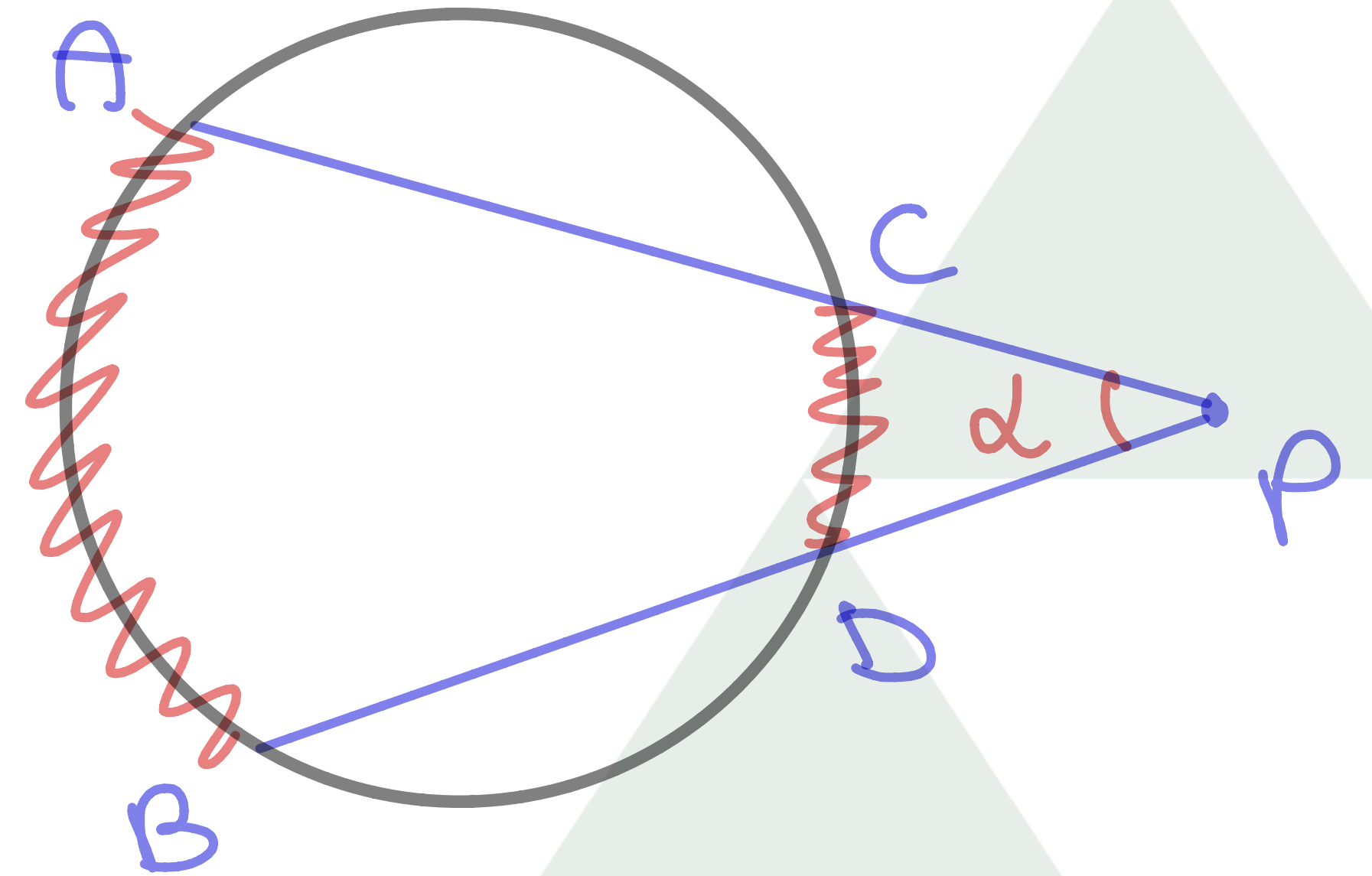
$$\widehat{AB} = 2d$$

3.4 Vértice interno
(excêntrico interno)



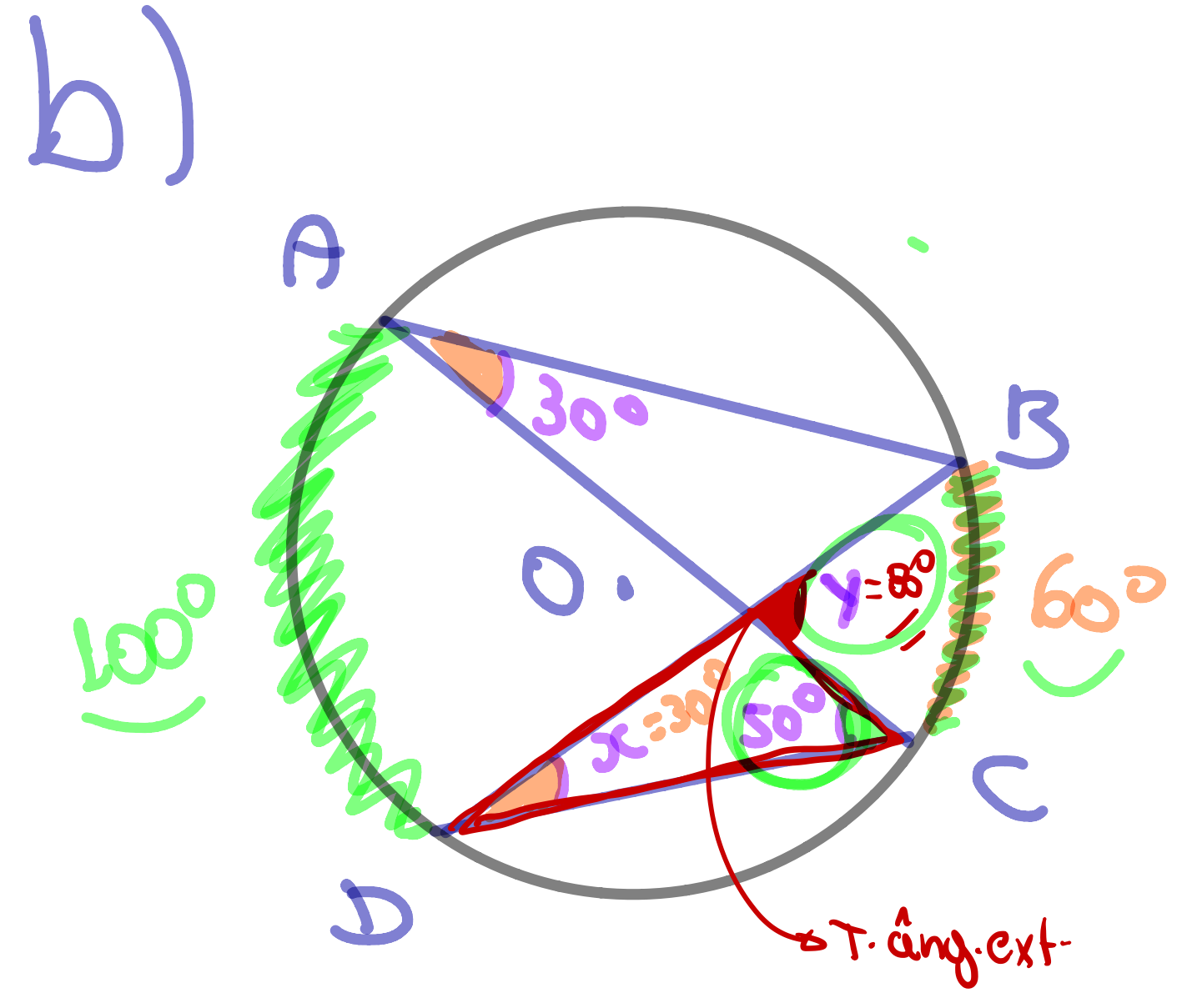
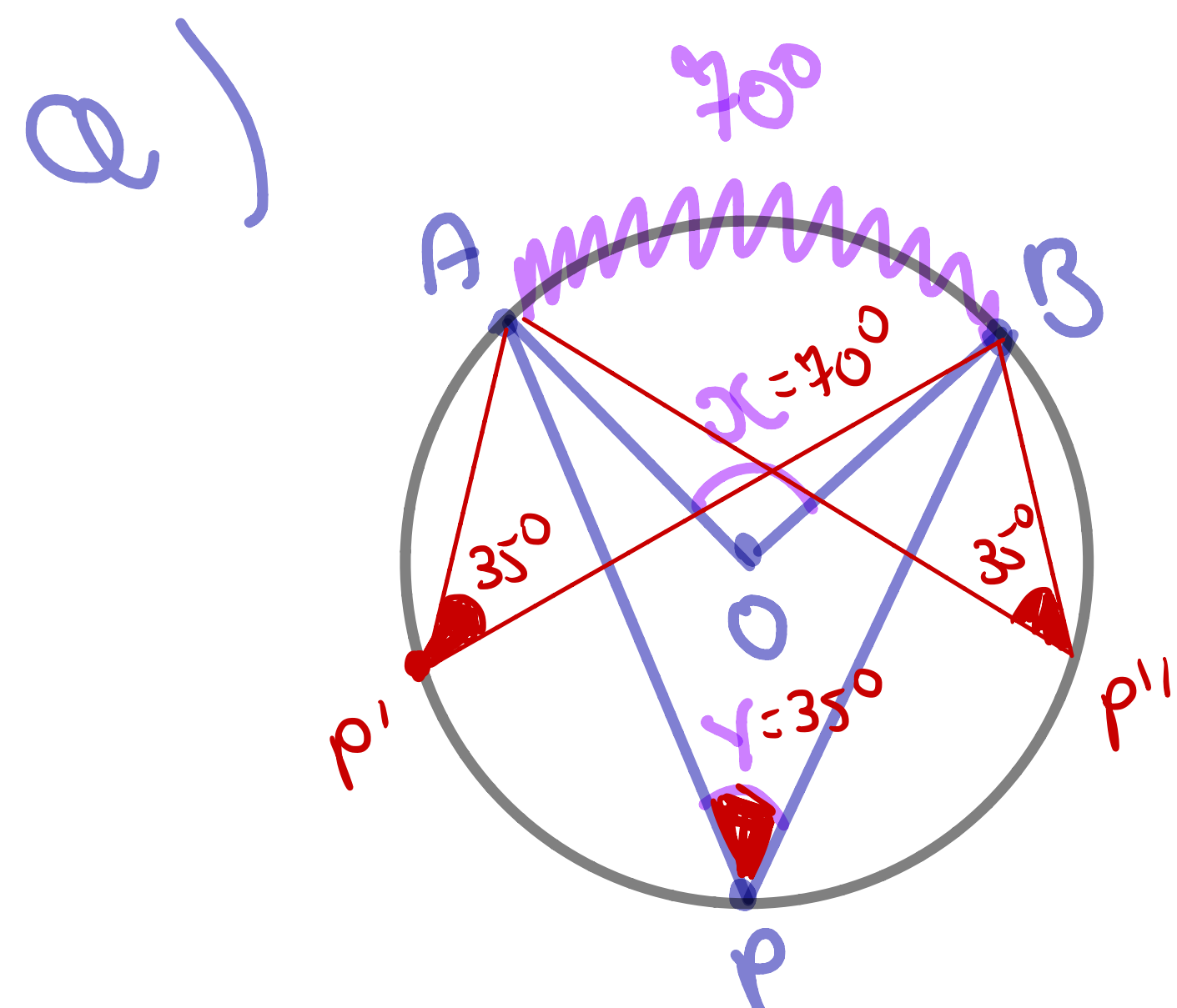
$$d = \frac{\widehat{AB} + \widehat{CD}}{2}$$

3.5 Vértice externo
(excêntrico externo)

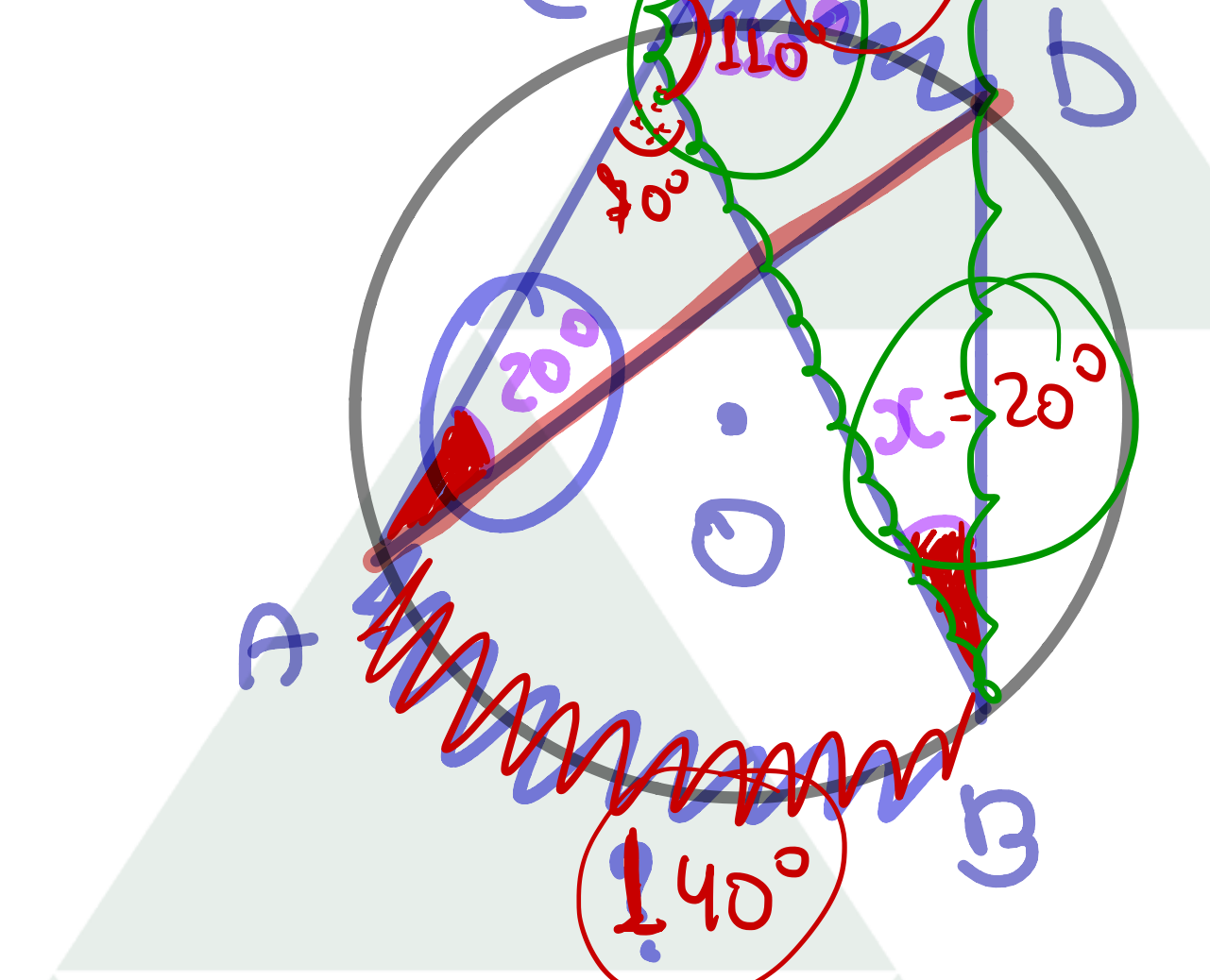


$$d = \frac{\widehat{AB} - \widehat{CD}}{2}$$

Exemplo 7 Calcule os valores de x e y nos círculos abaixo:



Si = 180°
 $110^\circ + 20^\circ + y = 180^\circ$
 $y = 50^\circ$

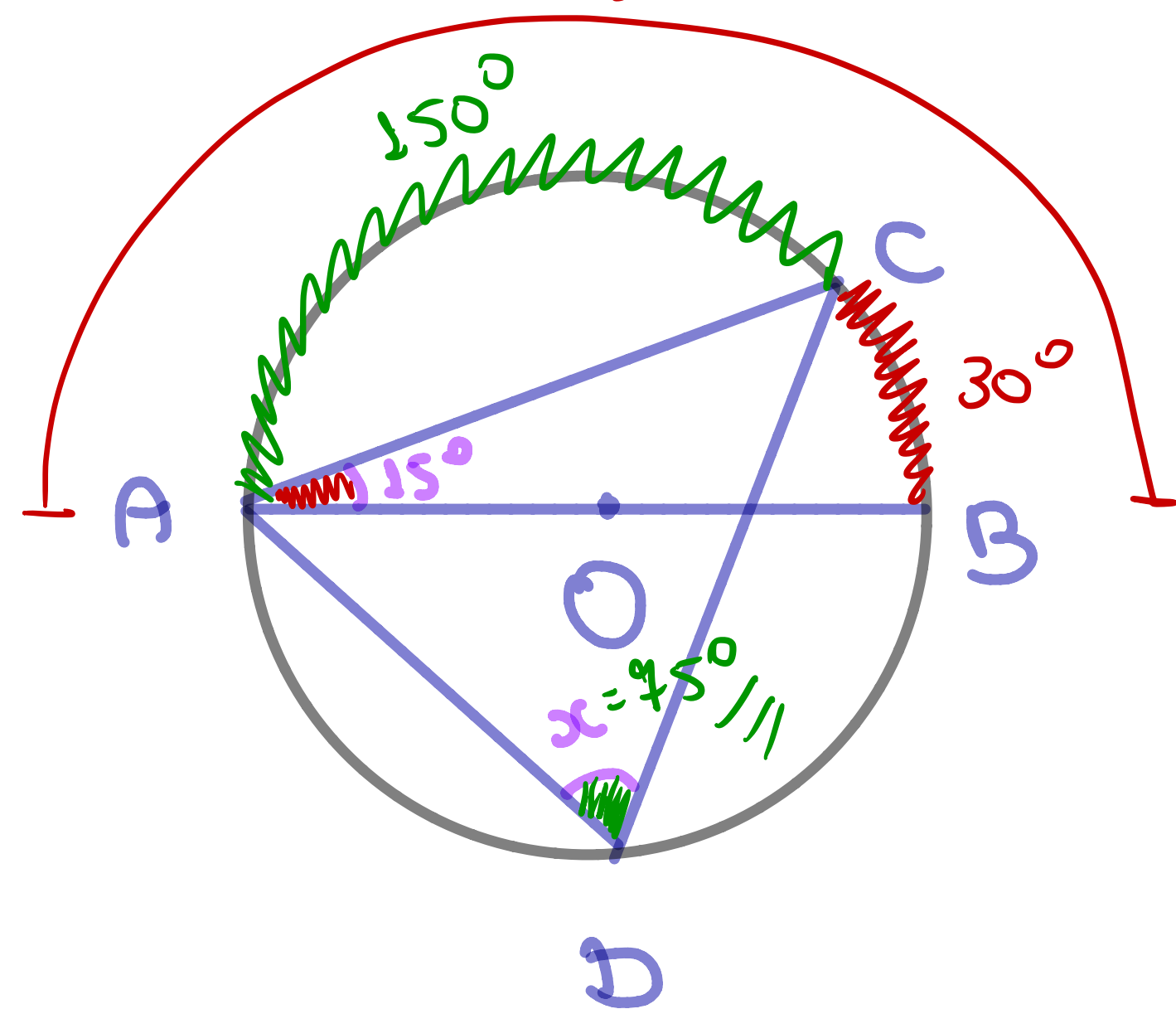


OBS: Ângulos inscritos no mesmo arco são congruentes!!!

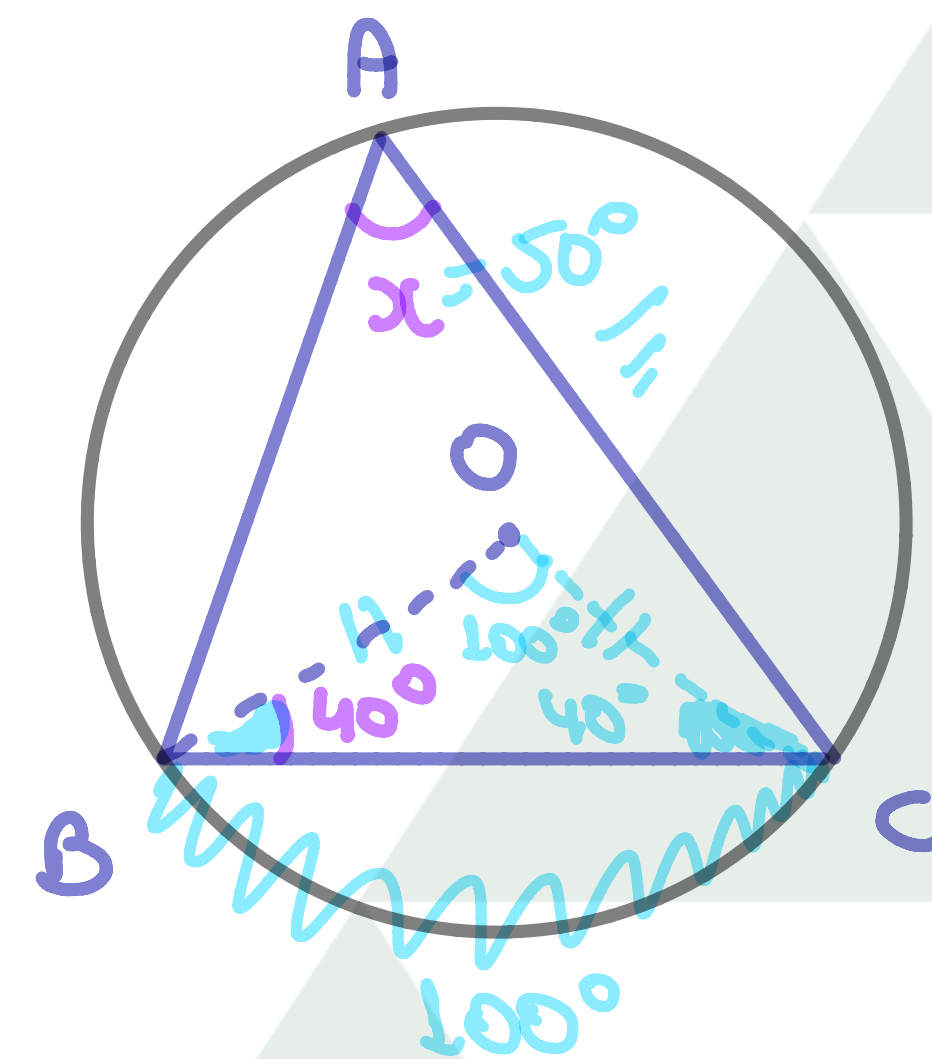
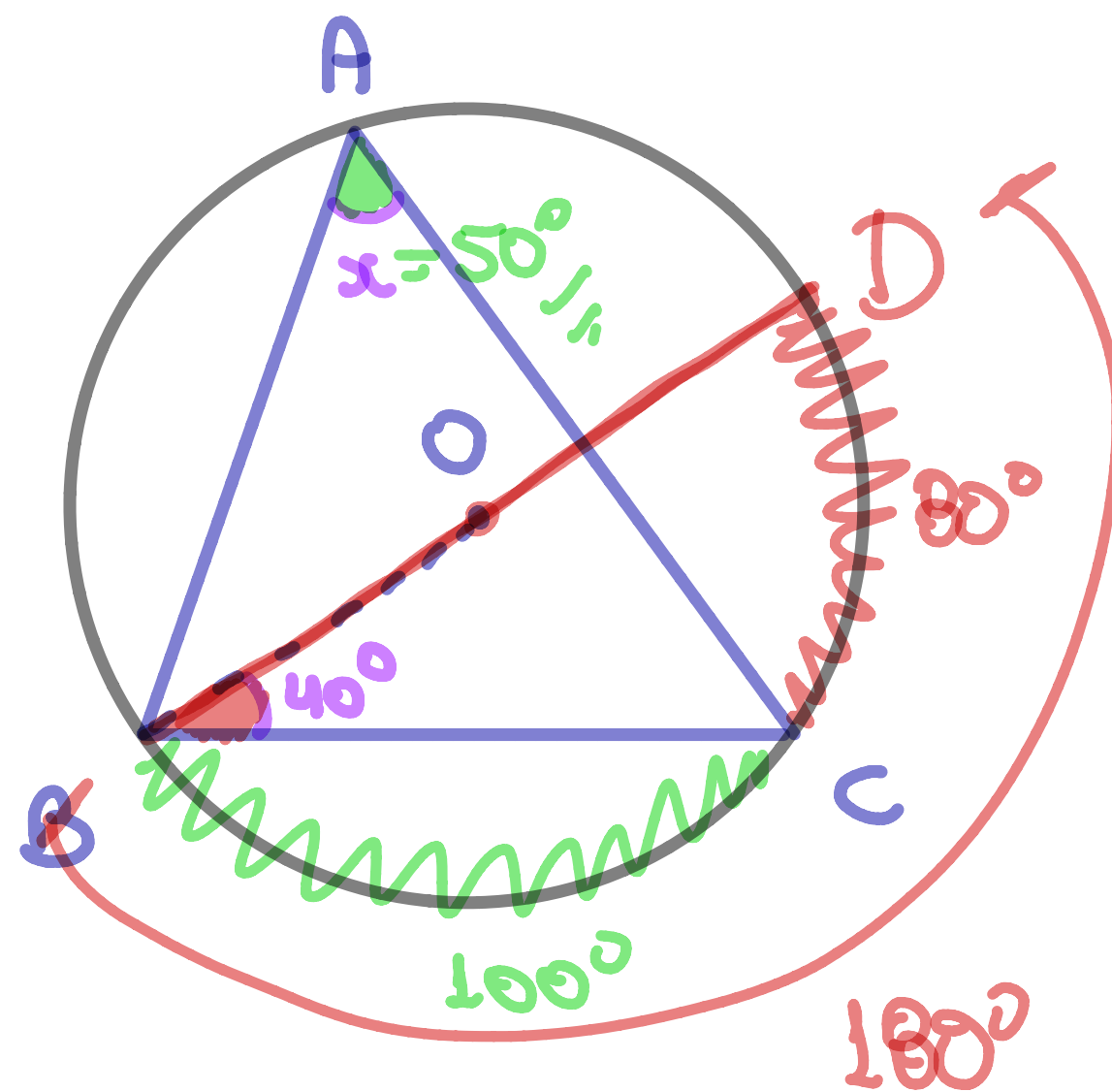
ou $y = \frac{100^\circ + 60^\circ}{2} = \frac{160^\circ}{2} = 80^\circ$

ou $y = \frac{140^\circ - 40^\circ}{2} = \frac{100^\circ}{2}$
 $y = 50^\circ$

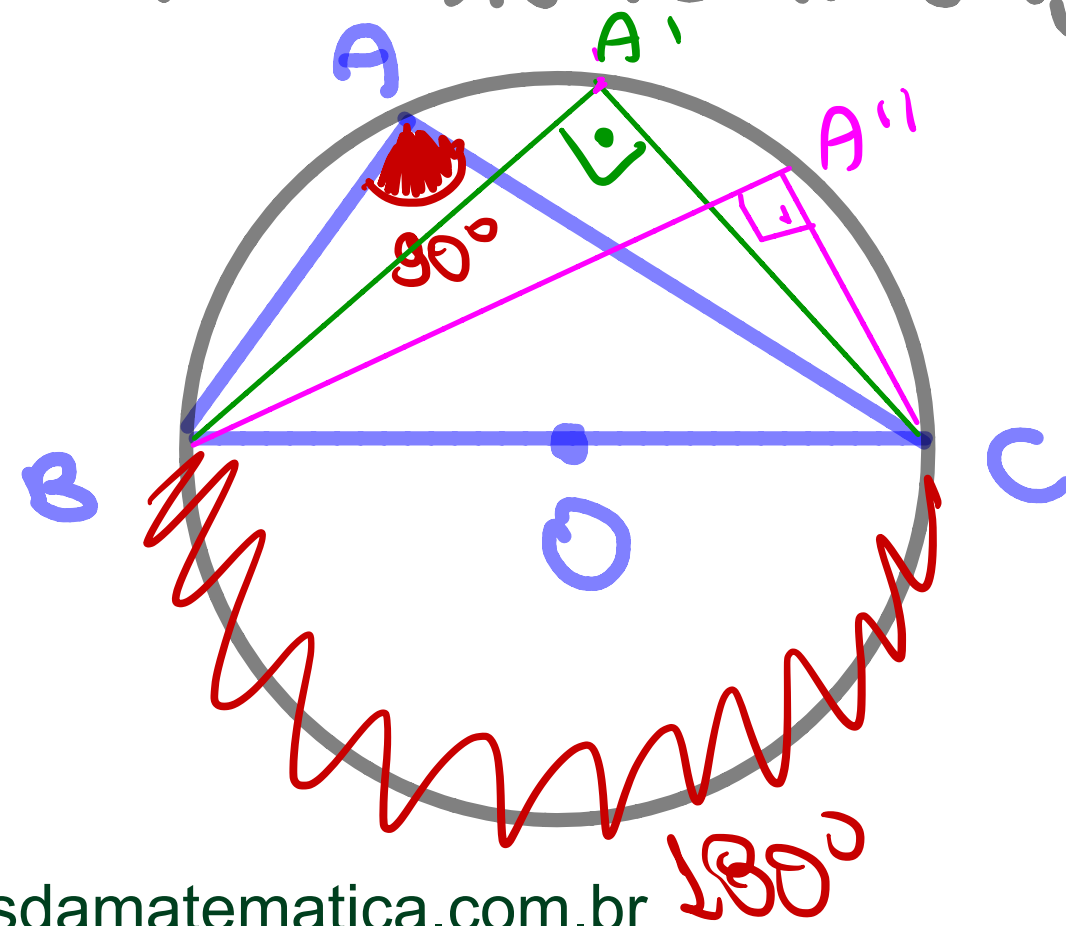
d) \overline{AB} é diâmetro!



e)



OBS: IMPORTANTÍSSIMO!



Todo Δ inscrito em um semicírculo no qual um dos lados é o diâmetro, tem soma retangular!

