GEOMETRÍA

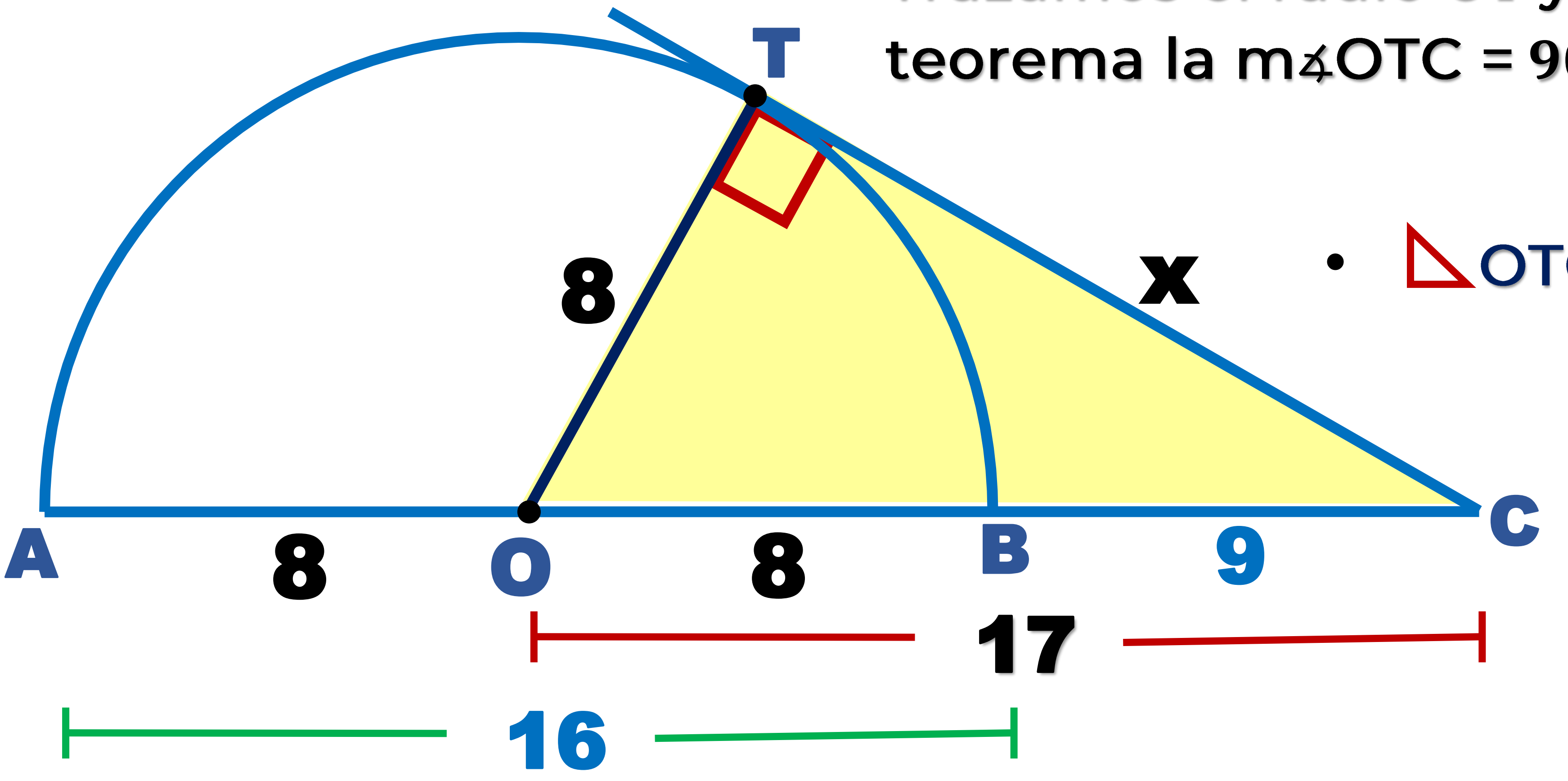
Tomo 3

4th
SECONDARY

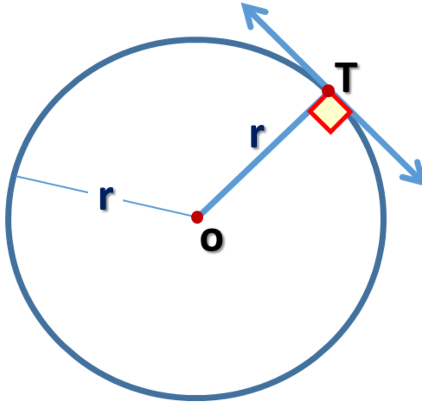
HELICOASESORÍA

SACO OLIVEROS

1. En la figura, O es centro, T es punto de tangencia, AB = 16 y BC = 9. Calcule CT.



- Trazamos el radio $\overline{OT}$ y por teorema la m∡OTC = 90^0



- ◺OTC :

T. Pitágoras

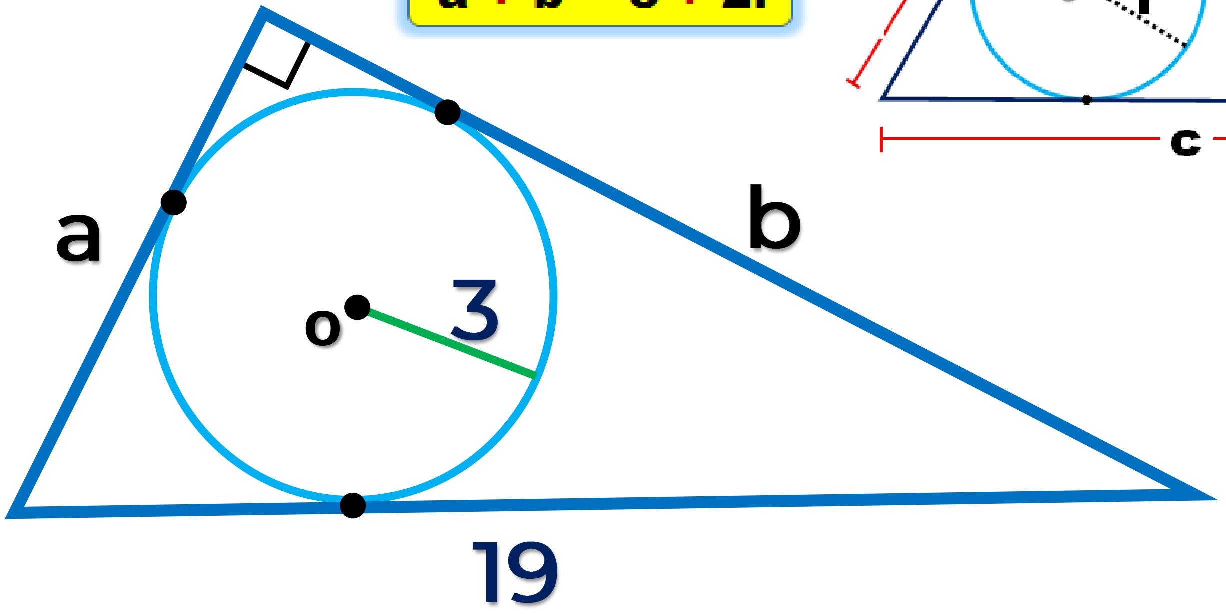
$17^2 = 8^2 + x^2$

$289 = 64 + x^2$

$225 = x^2$

$\boxed{15 = x}$

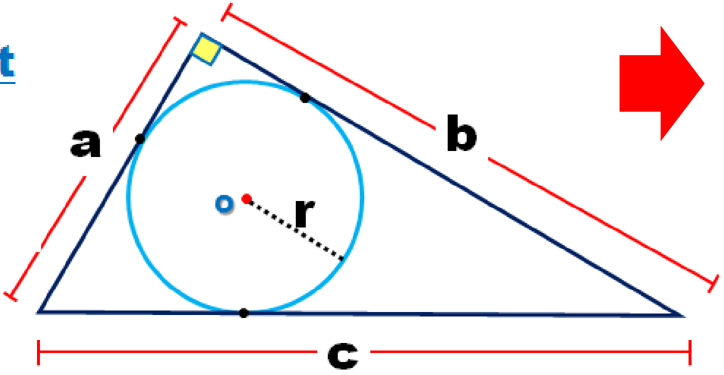
2. Calcule el perímetro de un triángulo rectángulo cuya longitud de la hipotenusa e inradio es de 19 y 3cm respectivamente.



Teorema de Poncelet

r: medida del inradio

$$\boxed{a + b = c + 2r}$$



$$a + b = 19 + 2(3)$$

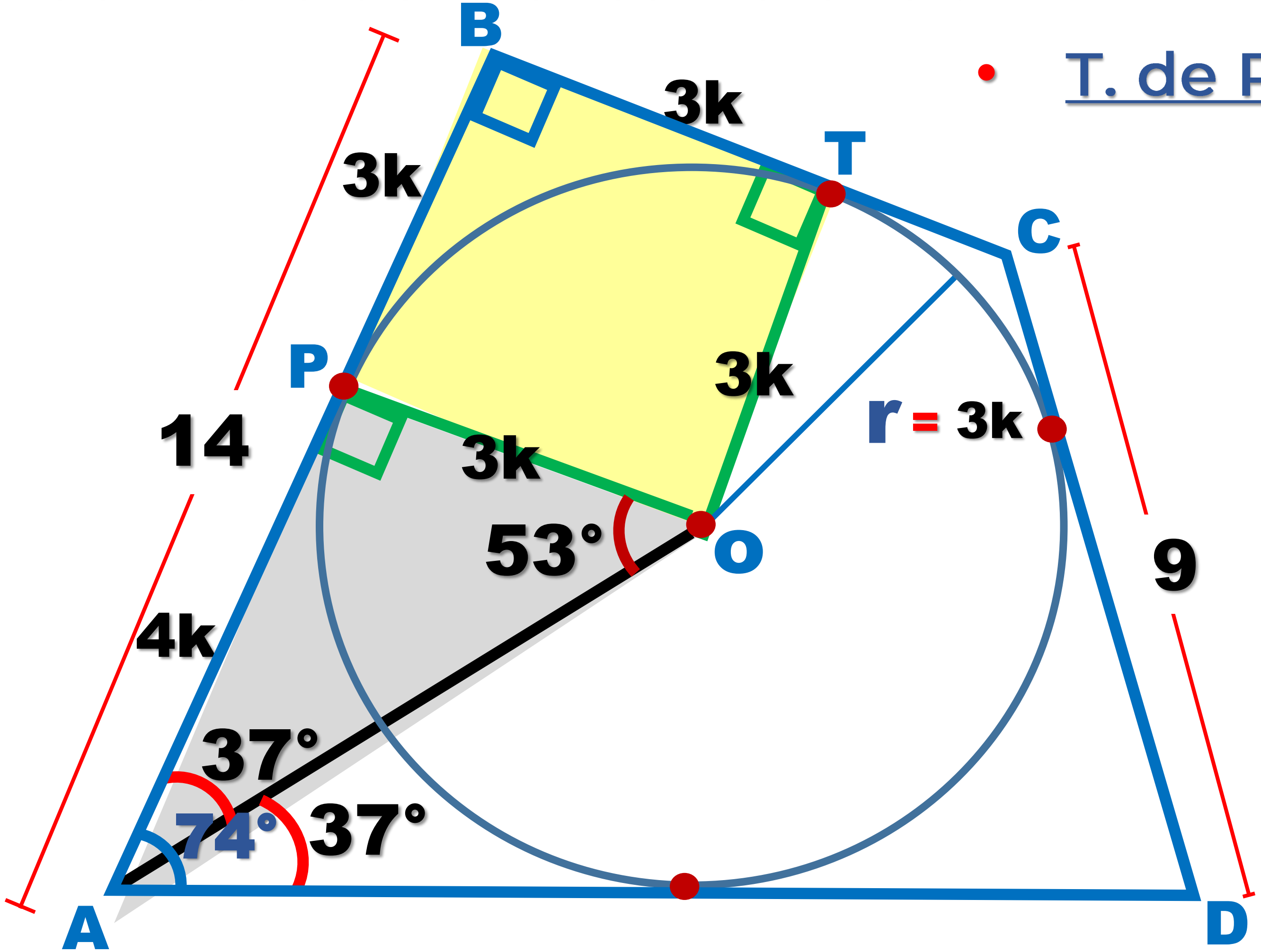
$$a + b = 25$$

Nos piden

$$2p_{\triangle} = \underbrace{a + b}_{25} + 19$$

$$\boxed{2p_{\triangle} = 44cm}$$

3. En un cuadrilátero ABCD, circunscrito a una circunferencia. Si m<BAD = 74°, m<ABC = 90°, AD + BC = 23 y CD = 9. Calcule la longitud del radio de la circunferencia.

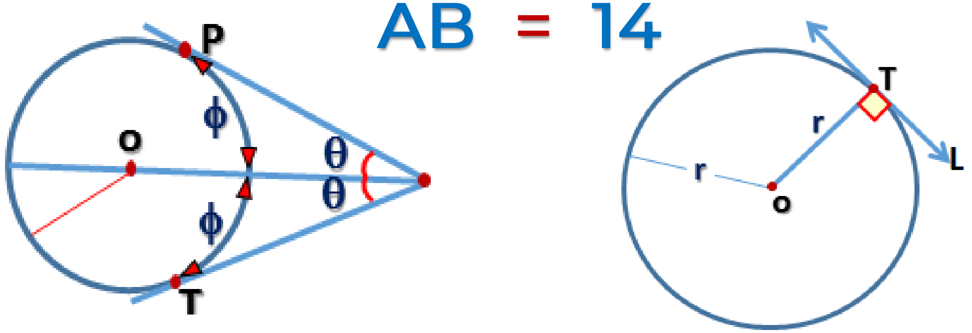


- T. de Pitot

AB + CD = AD + BC

AB + 9 = 23

AB = 14



- Por ◺notable 37°y 53°
- PBTO : Cuadrado
- En el $\overline{AB}$:

4k + 3k = 14

7k = 14

k = 2

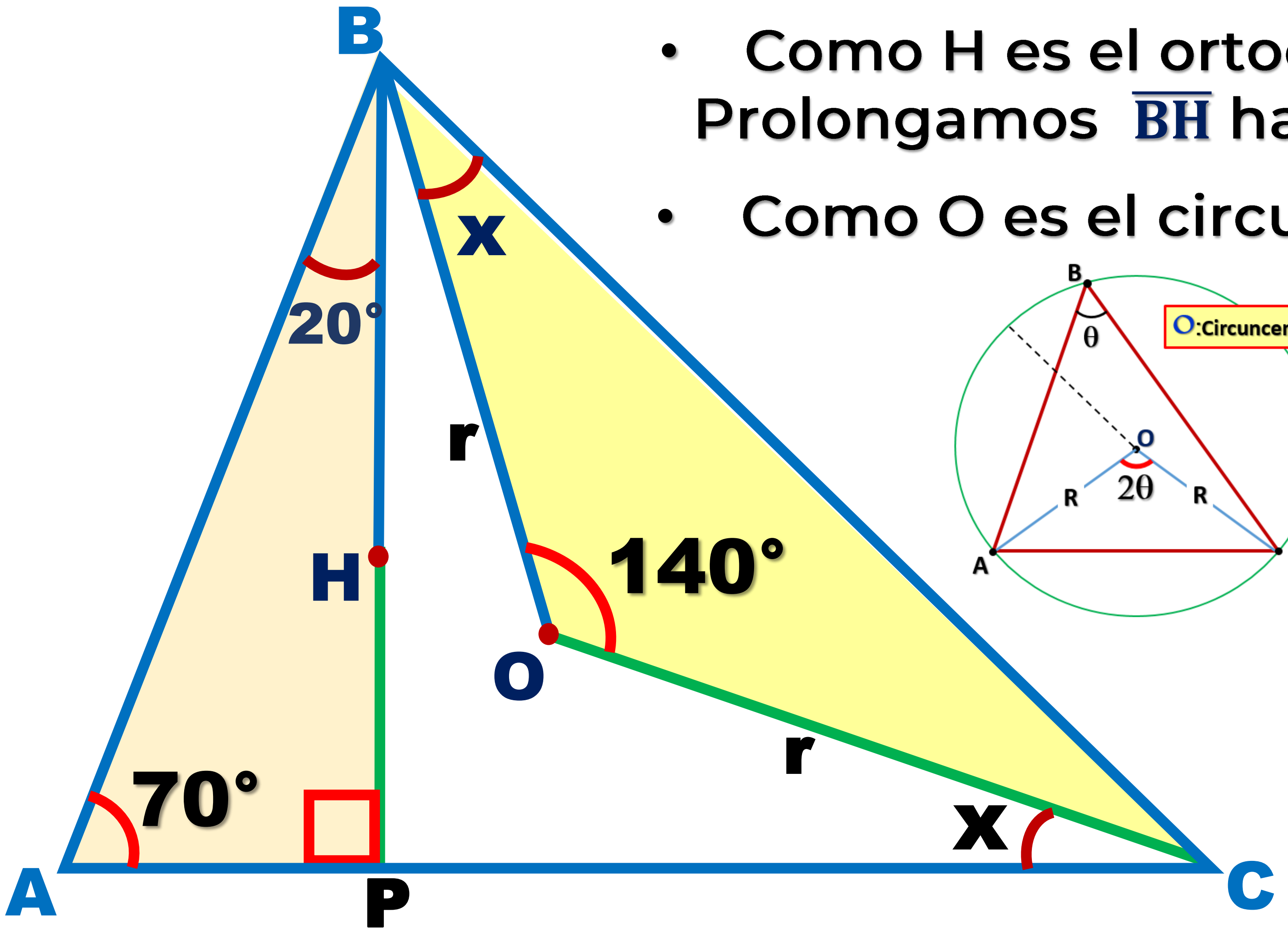
- Nos piden

r = 3k

r = 3(2)

r = 6

4. En la figura, H y O son ortocentro y circuncentro del triángulo ABC respectivamente. Calcule x.



- Como H es el ortocentro Prolongamos $\overline{BH}$ hasta P.

m<BAP = 70°

- Como O es el circuncentro trazamos $\overline{OC}$.

m<BOC = 2(70°)

m<BOC = 140°

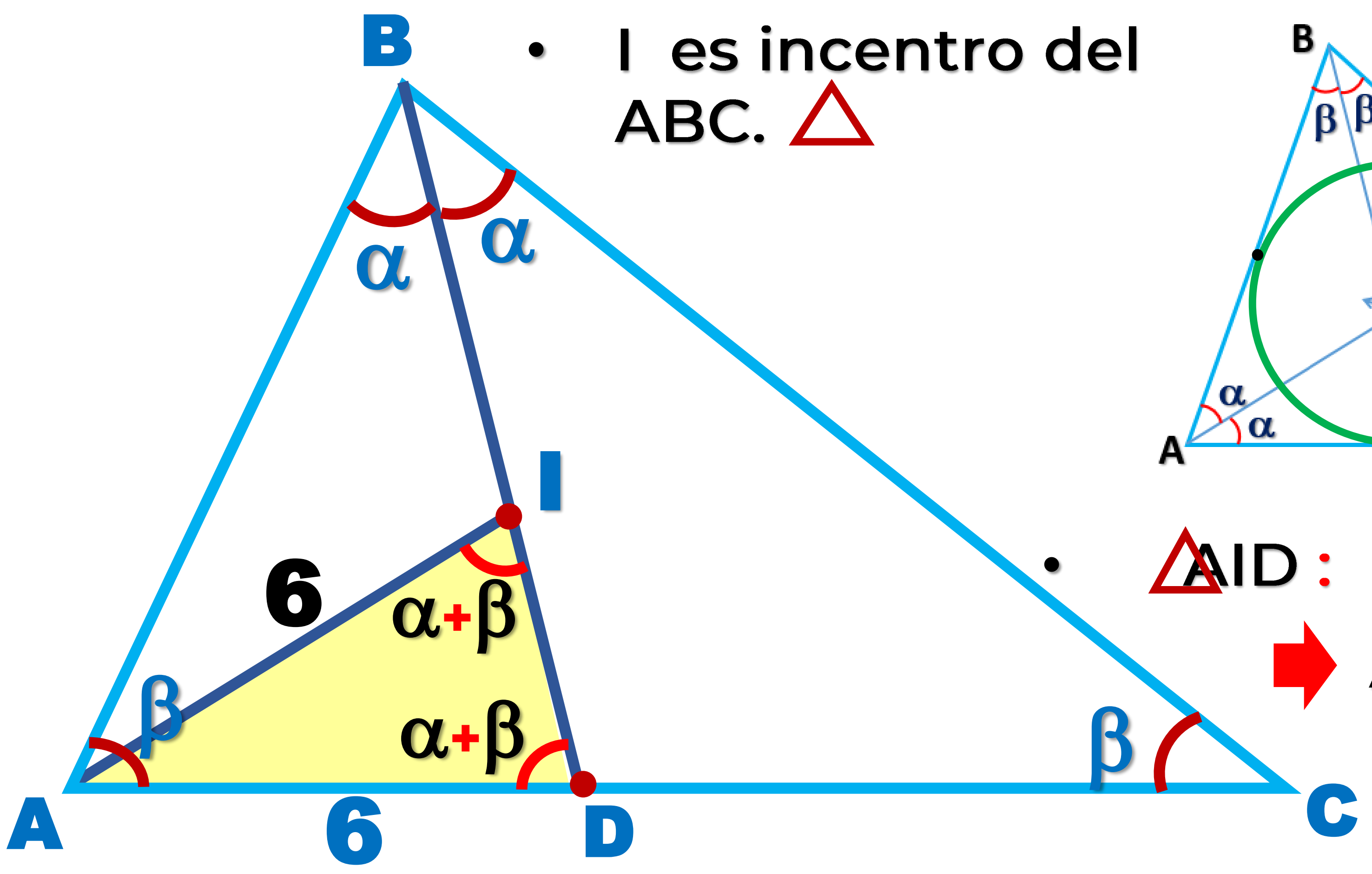
- △BOC : Isósceles

x + x + 140° = 180°

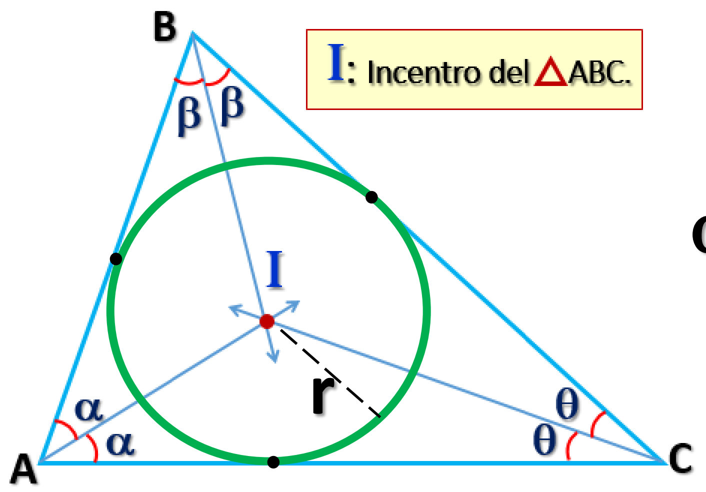
2x = 40°

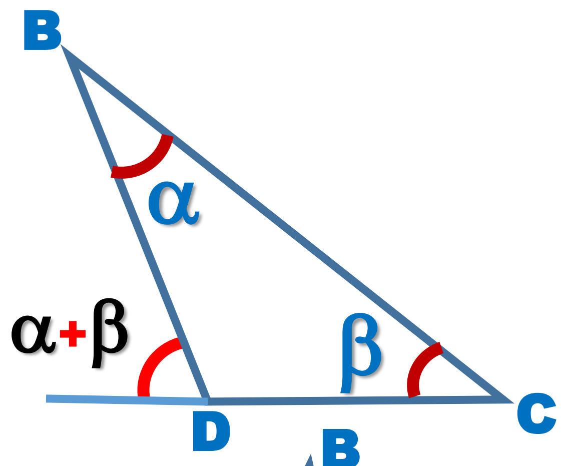
x = 20°

5. En un triángulo ABC de incentro I, se traza la ceviana $\overline{BD}$ que pasa por I, AD = 6 y m<BAI = m<BCD. Calcule AI.



- I es incentro del ABC. △

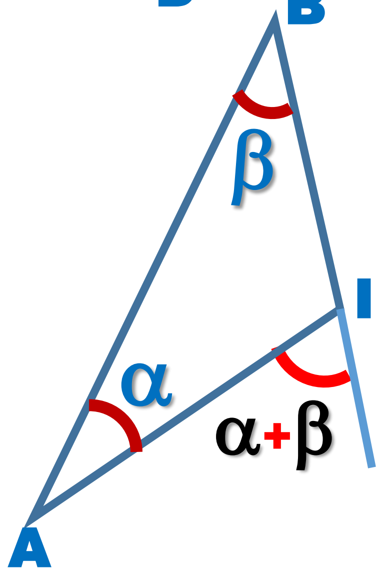




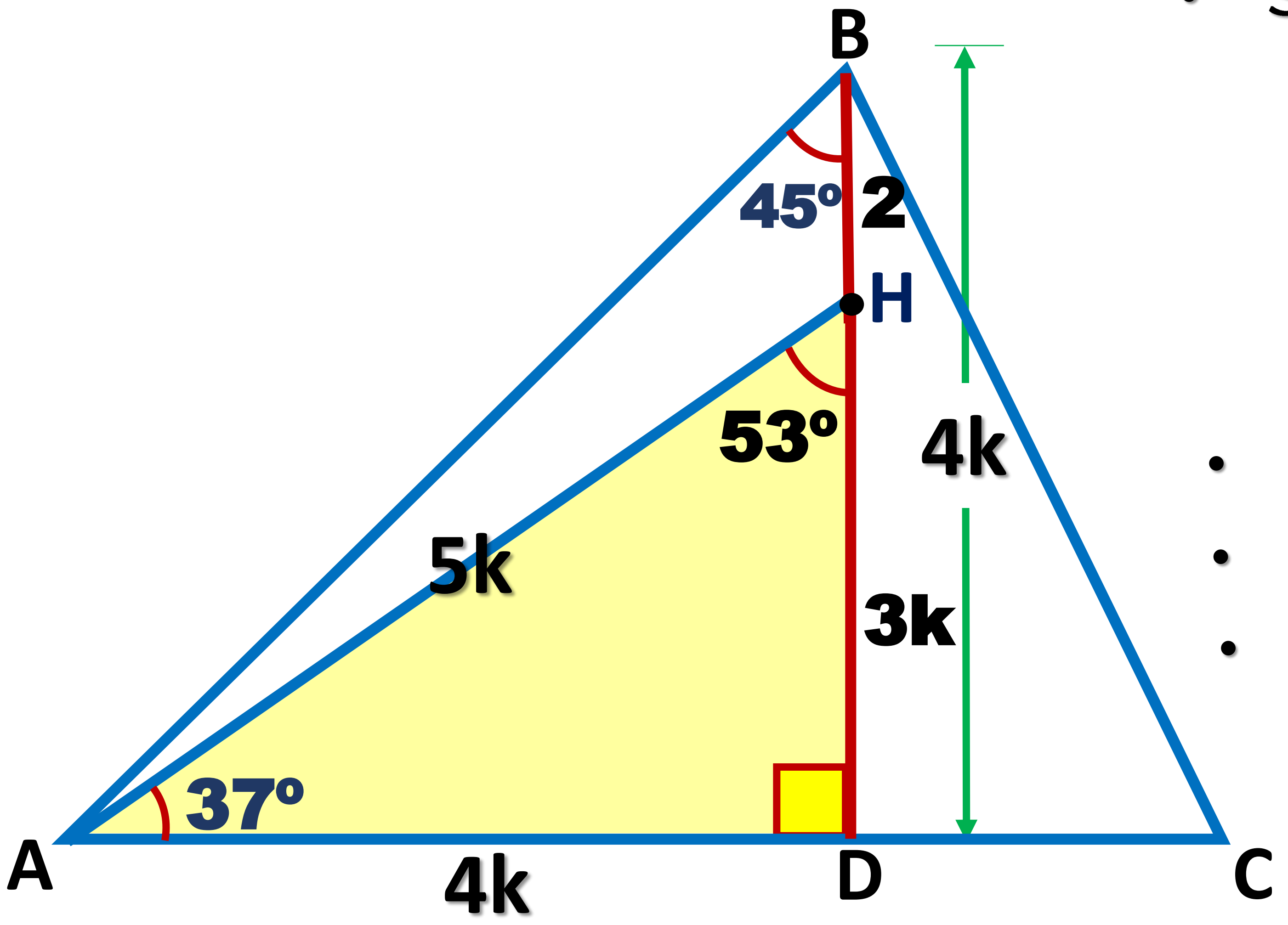
- △AID : Isósceles

➡ AI = AD = 6

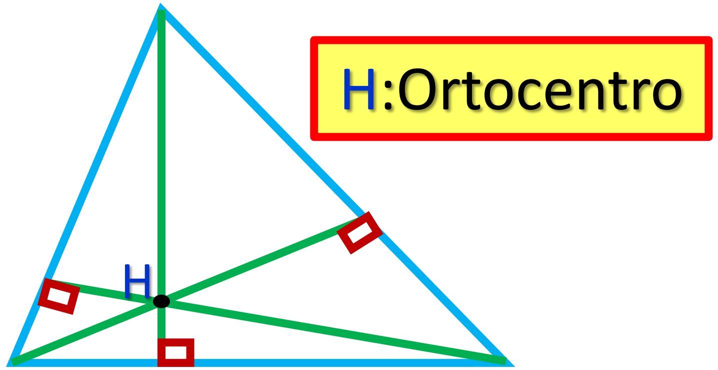
$\boxed{AI = 6}$



6. En un triángulo acutángulo ABC de ortocentro H, BH = 2 , m<ABH = 45° y m<HAC = 37°. Calcule AH.



- Se prolonga $\overline{BH}$ hasta D



- Por notables de 37° y 53°.
- Por notables de 45° y 45°.
- En el $\overline{BD}$:

$4k = 3k + 2$

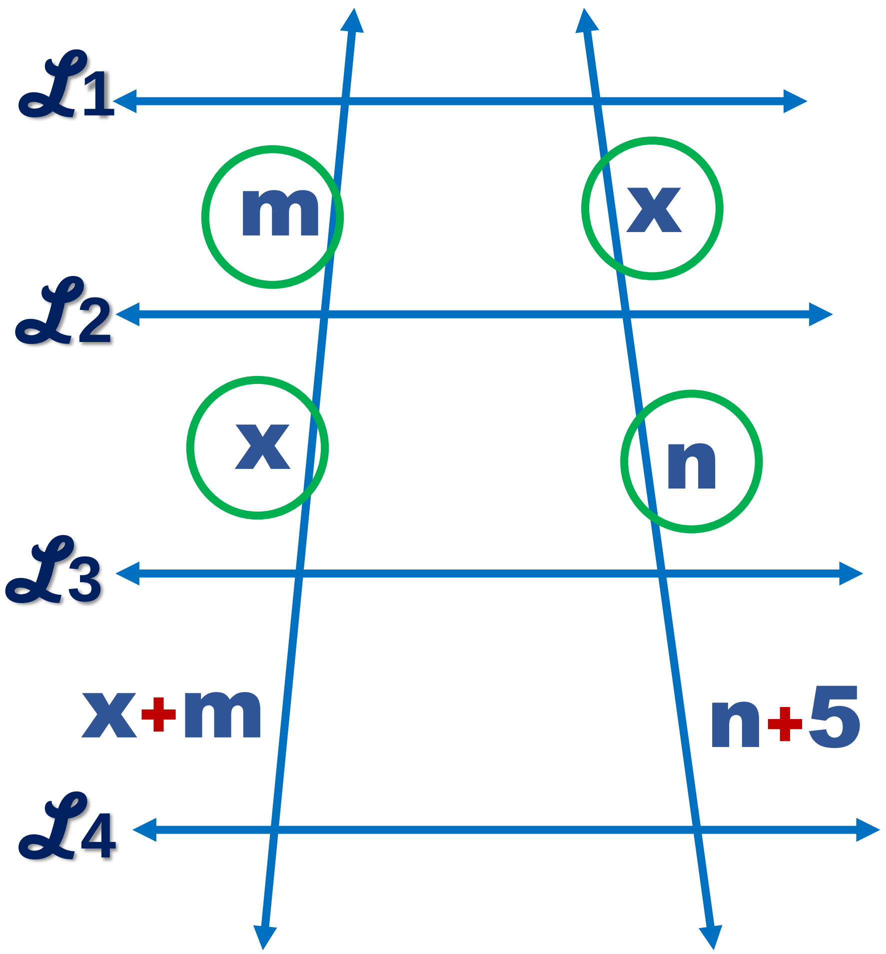
$k = 2$

- Nos piden:

AH = 5(2

$\boxed{AH = 10}$

7. Del gráfico; si $\overleftrightarrow{L1} \parallel \overleftrightarrow{L2} \parallel \overleftrightarrow{L3} \parallel \overleftrightarrow{L4}$, calcule x.



Teorema de Tales

- $\dfrac{m}{x} = \dfrac{x}{n}$

  $m.n = x^2$

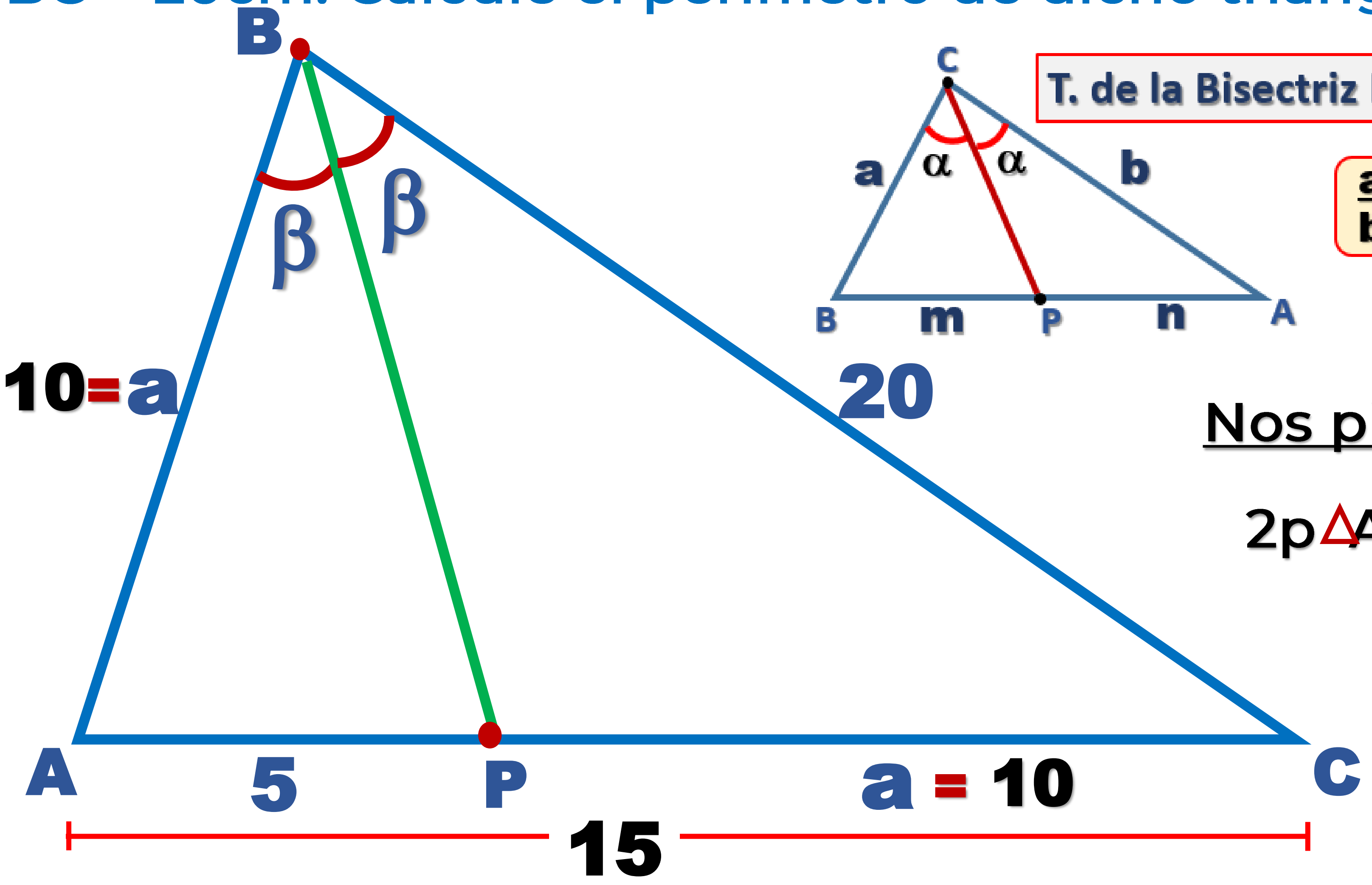
- $\dfrac{x}{x+m} = \dfrac{n}{n+5}$

  $\cancel{xn} + 5x = \underbrace{mn} + \cancel{xn}$

  $\cancel{5x} = \cancel{x^2}$ Reemplazando

  $\boxed{5 = x}$

8. En un triángulo ABC, se traza la bisectriz interior $\overline{BP}$, AB = PC, AP = 5cm y BC = 20cm. Calcule el perímetro de dicho triángulo.



T. de la Bisectriz Interior

$$\frac{a}{b} = \frac{m}{n}$$

$$\frac{a}{20} = \frac{5}{a}$$

$$a^2 = 100$$

$$a = 10$$

Nos piden

$$2p\triangle ABC = 10 + 20 + 15$$

$$\boxed{2p\triangle ABC = 45cm}$$

9. En la figura, BC = AC + 4 y AE = 2(AB), calcule AC.

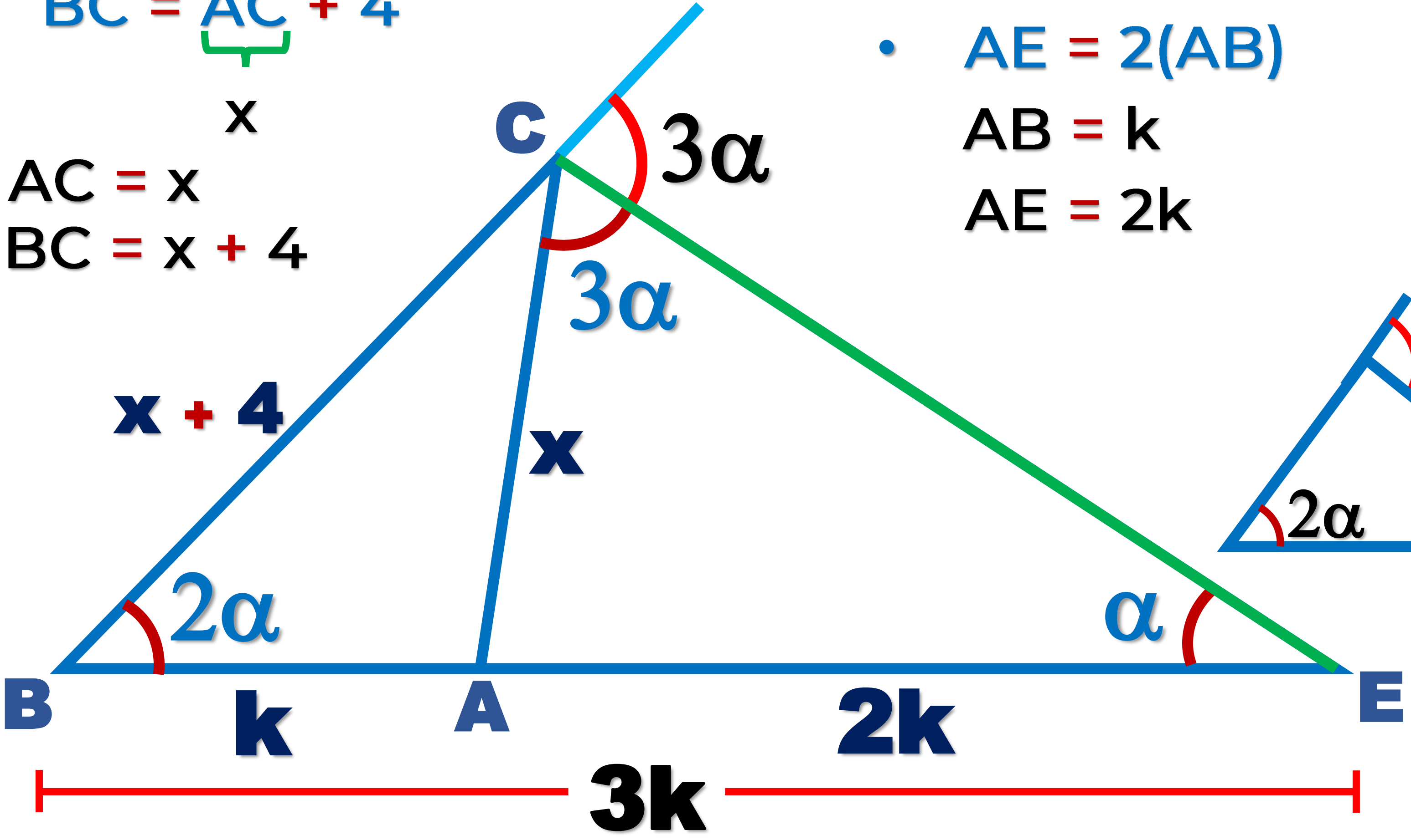
Por dato

- $BC = \underbrace{AC}_{x} + 4$

$AC = x$

$BC = x + 4$

$\overline{CE}$: bisectriz exterior.

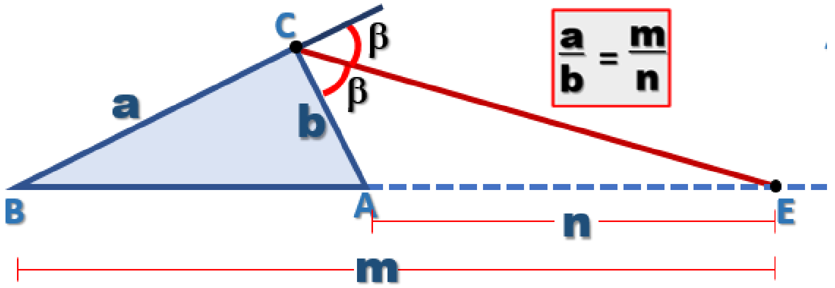


- $AE = 2(AB)$

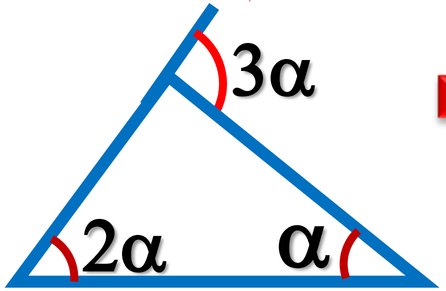
$AB = k$

$AE = 2k$

T. de la Bisectriz Exterior



$\frac{a}{b} = \frac{m}{n}$



$\frac{x+4}{x} = \frac{3\cancel{k}}{2\cancel{k}}$

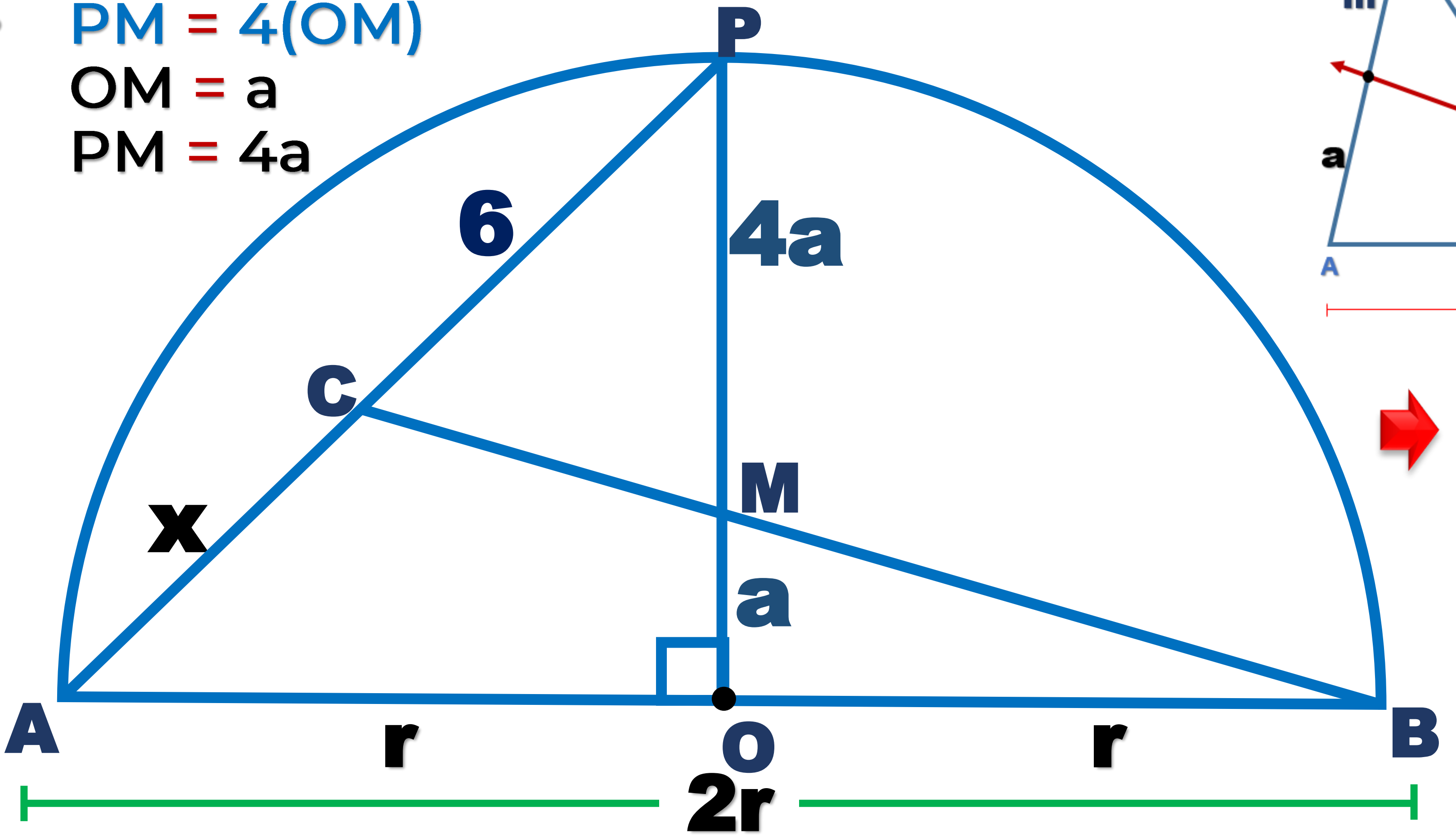
$2x + 8 = 3x$

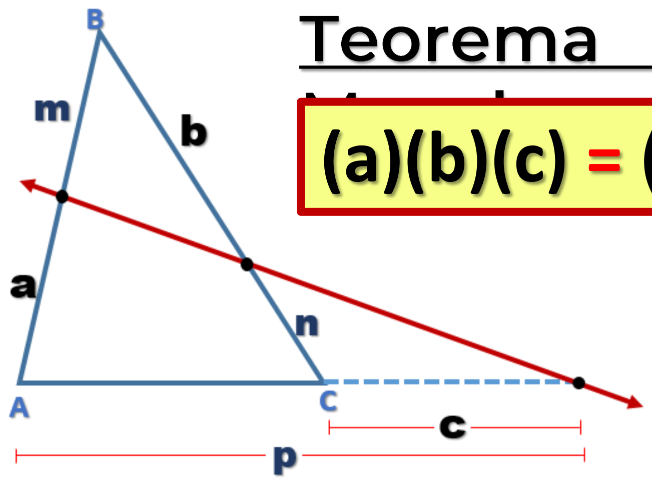
$\boxed{8 = x}$

10. En la figura, O es centro de la semicircunferencia y PM = 4(OM). Calcular AC.

Por dato

- PM = 4(OM)
  OM = a
  PM = 4a





Teorema de

$$\boxed{(a)(b)(c) = (m)(n)(p)}$$

$$(x)(\cancel{4a})(\cancel{r}) = (6)(\cancel{a})(\cancel{2r})$$

$$4x = 12$$

$$\boxed{x = 3}$$