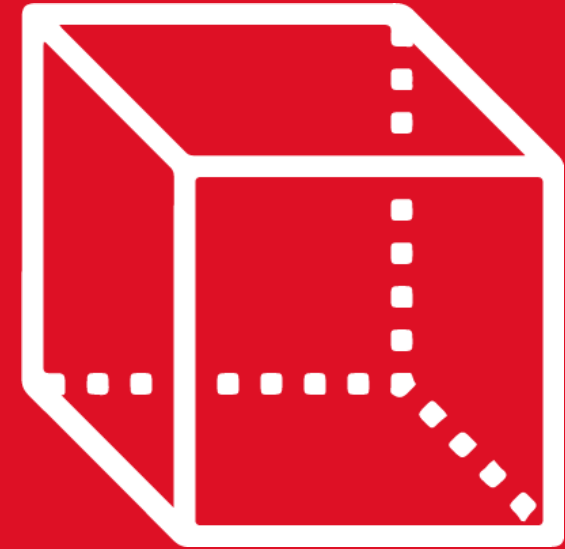




GEOMETRÍA

Capítulo 12

5th
SECONDARY



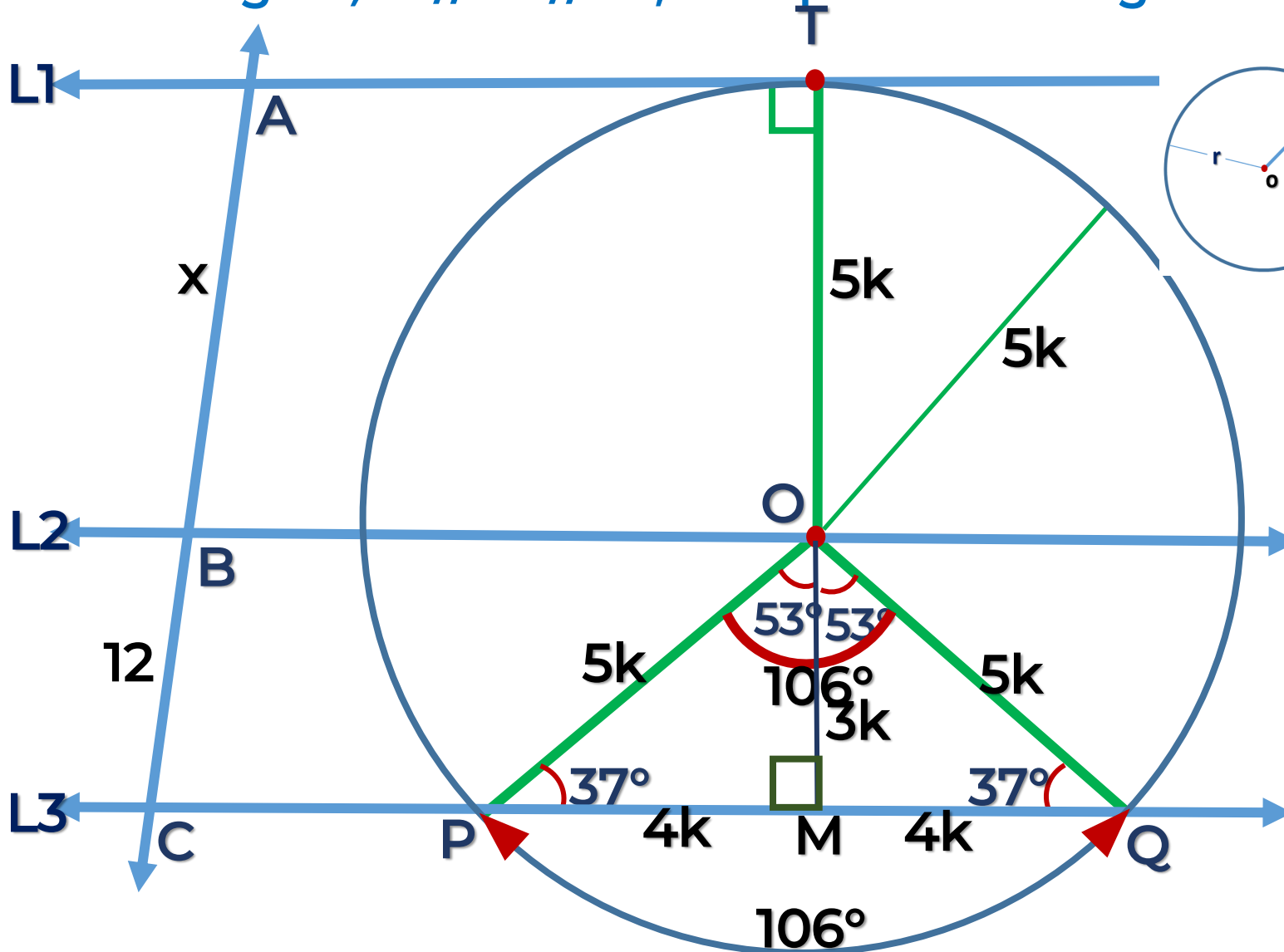
Tomo 3:

Helicoasesoría

 **SACO OLIVEROS**



1. En la figura, $L1 \parallel L2 \parallel L3$, T es punto de tangencia. Calcule x.



RESOLUCIÓN

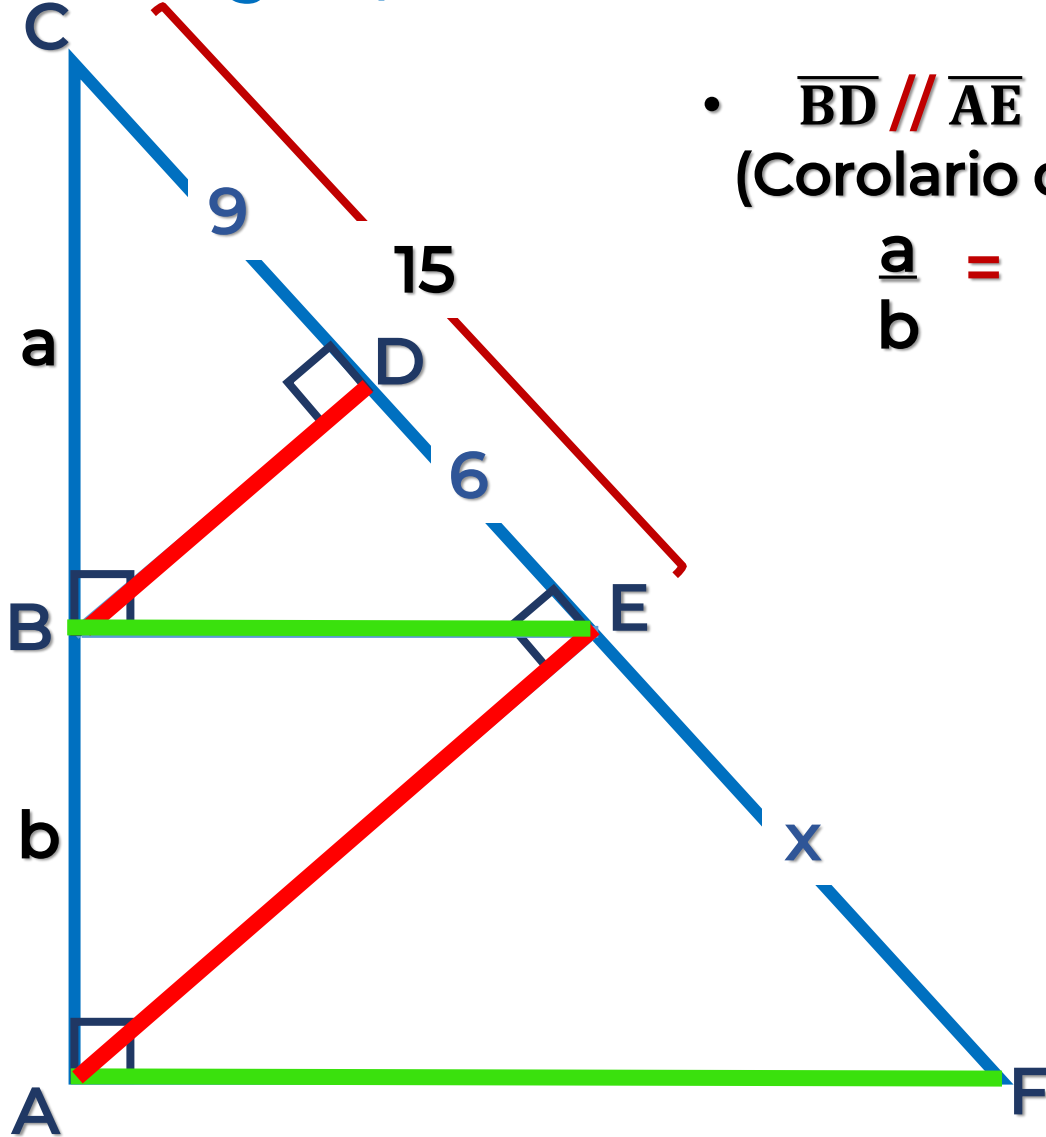
- Se traza el radio \overline{OT} y por teorema la $m\angle OTA = 90^\circ$
- La prolongación de \overline{TO} interseca a L_3 en M.
- \triangle notable de $37^\circ - 53^\circ$
- Teorema de TALES

$$\frac{x}{12} = \frac{5k}{3k}$$

$$x = \frac{60}{3}$$

$$x = 20$$

2. En la figura, calcule x.



RESOLUCIÓN

N

- $\overline{BD} \parallel \overline{AE}$
(Corolario de Tales)

$$\frac{a}{b} = \frac{9}{6} \dots\dots (1)$$

- $\overline{BE} \parallel \overline{AF}$
(Corolario de Tales)

$$\frac{a}{b} = \frac{15}{x} \dots\dots (2)$$

- Reemplazando (1) en (2)

$$\frac{3}{2} \cdot \frac{9}{6} = \frac{15}{x}$$

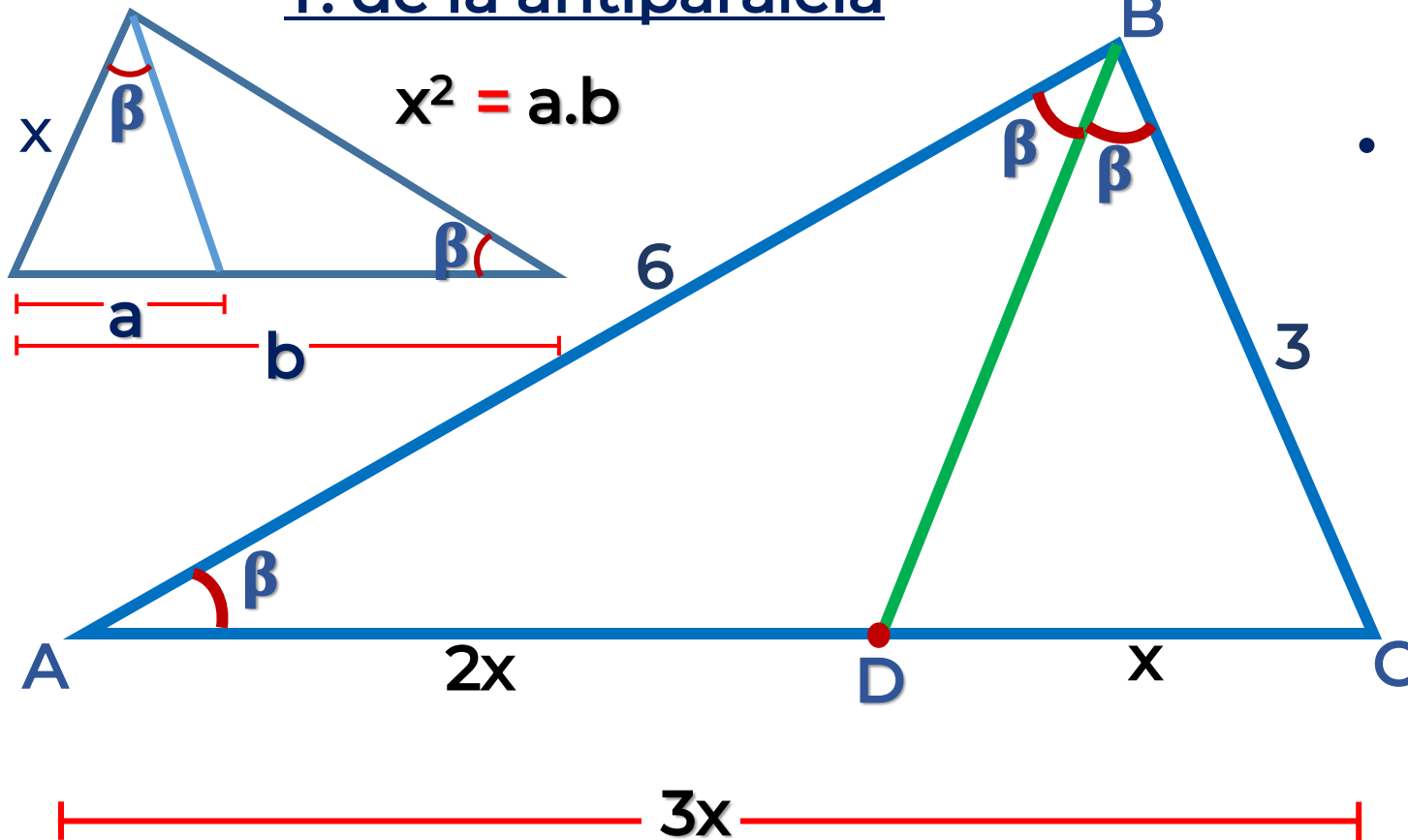
$$3x = 30$$

$$x = 10$$



3. En un triángulo ABC, $AB = 6$, $BC = 3$, se traza la bisectriz interior \overline{BD} y $AD = BD$. Calcule CD .

- T. de la antiparalela



RESOLUCIÓN

- $\triangle ABD$: isósceles
Calcule $CD = x$
- T. de la bisectriz interior

$$\frac{26}{13} = \frac{AD}{CD} \quad 2(CD) = AD$$

$$CD = x \quad AD = 2x$$

- T. de la antiparalela

$$3^2 = (x)(3x)$$

$$9 = 3x^2$$

$$3 = x^2$$

$$\sqrt{3} = x$$



4. En la figura, O es centro de la semicircunferencia y $PC = 2(AC)$.

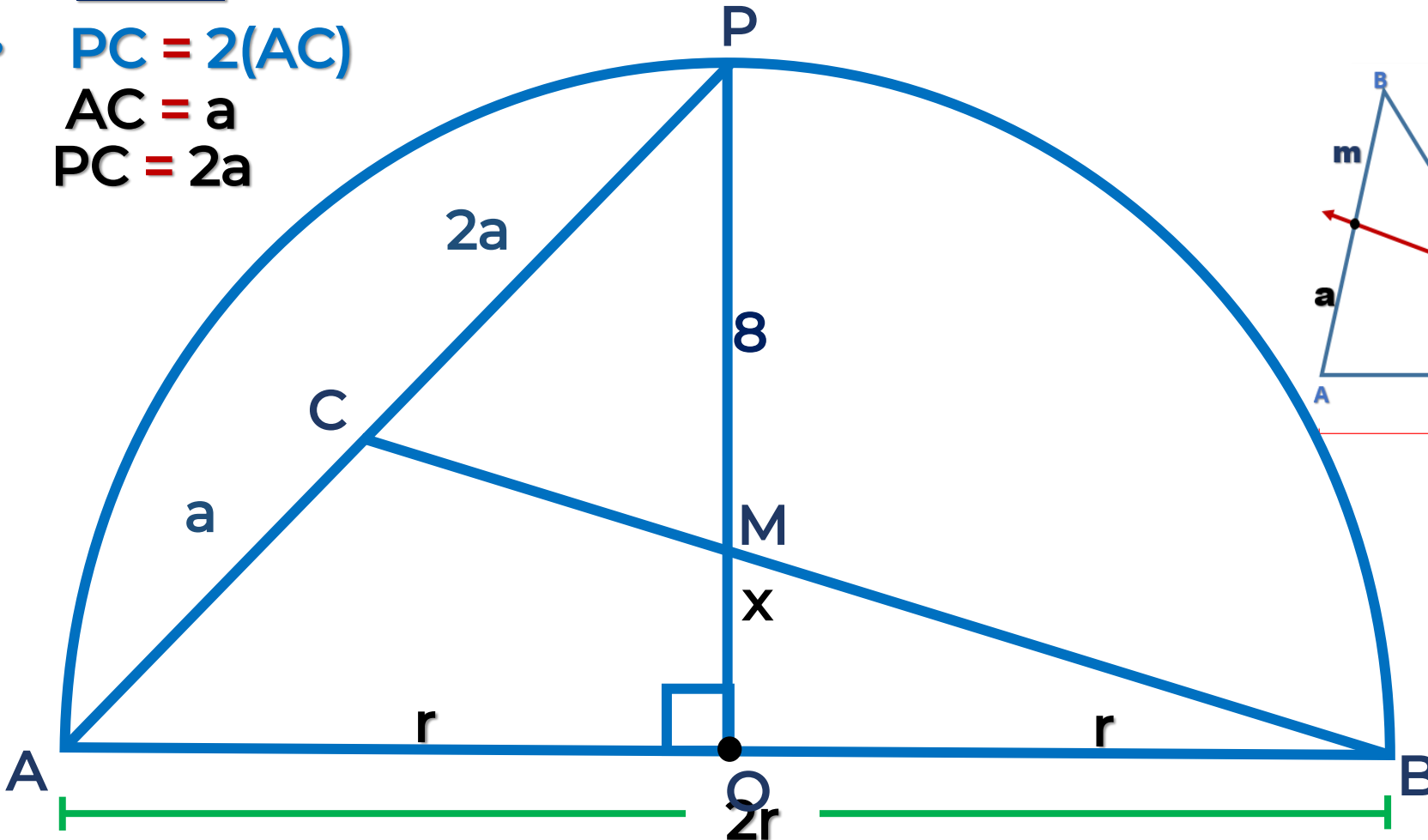
Calcule OM.

Dato

$PC = 2(AC)$

$AC = a$

$PC = 2a$

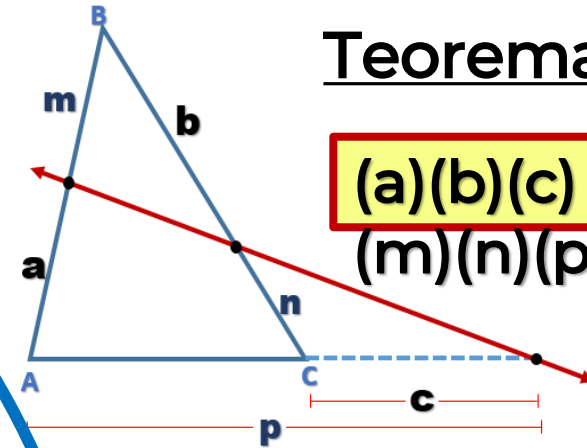


RESOLUCIÓN

Calcule $OM = x$

Teorema de Menelao

$$(a)(b)(c) = (m)(n)(p)$$



Se aplica en el problema

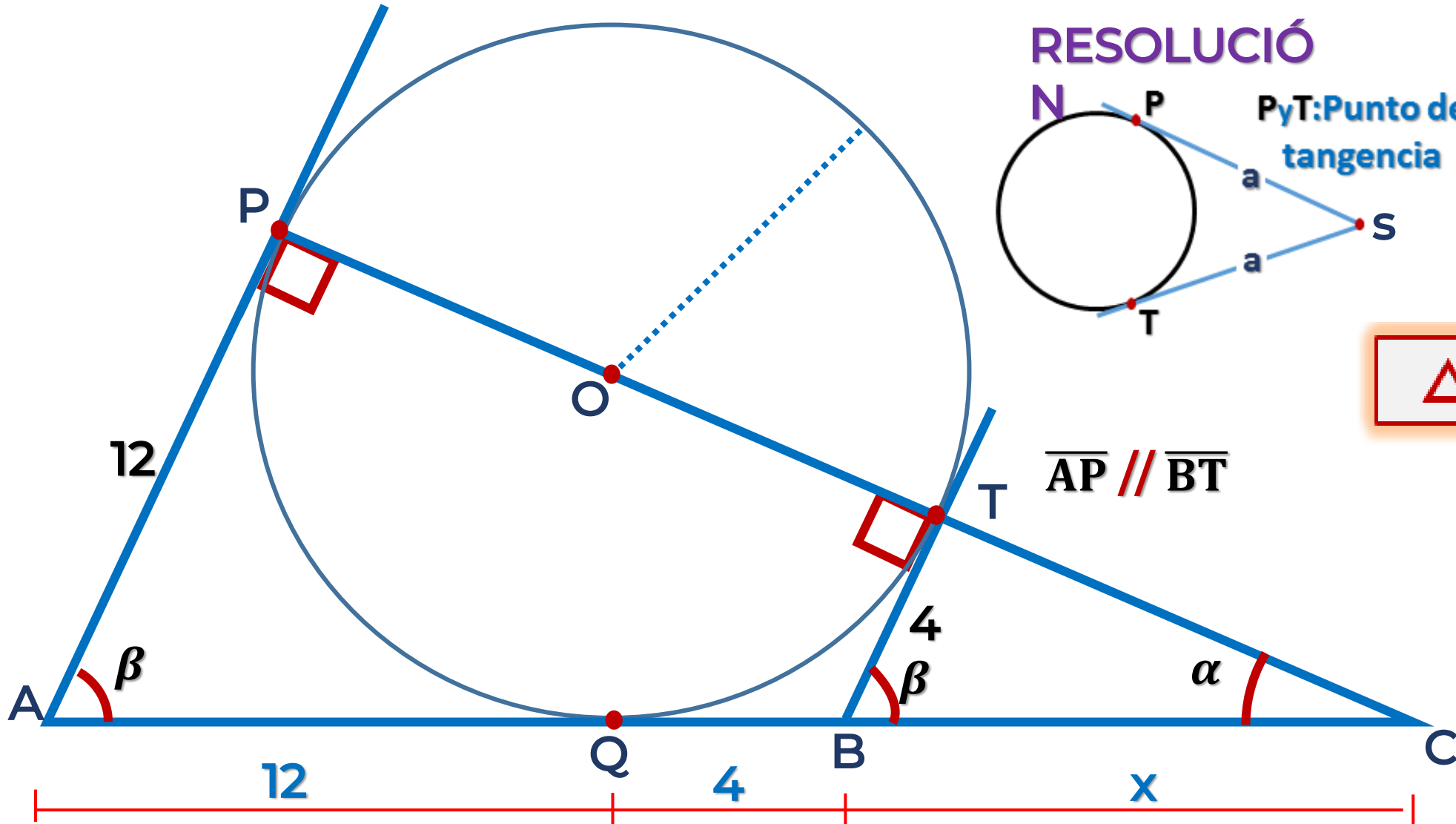
$$(a)(8)(r) = (2a)(x)(2r)$$

$$8 = 4x$$

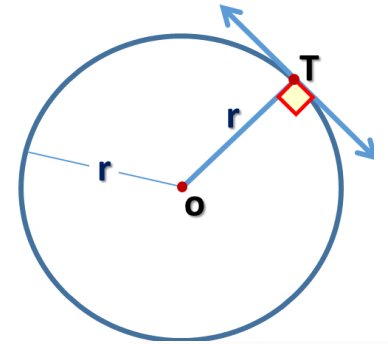
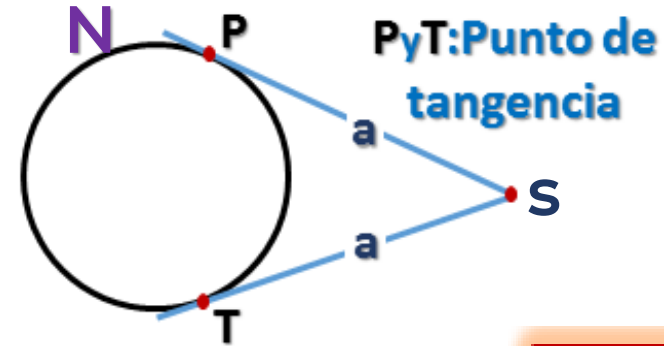
$$2 = x$$



5. En la figura, P, Q y T son puntos de tangencias, calcule x.



RESOLUCIÓN



$$\triangle BTC \sim \triangle APC$$

$$\frac{1}{3} = \frac{x}{x+16}$$

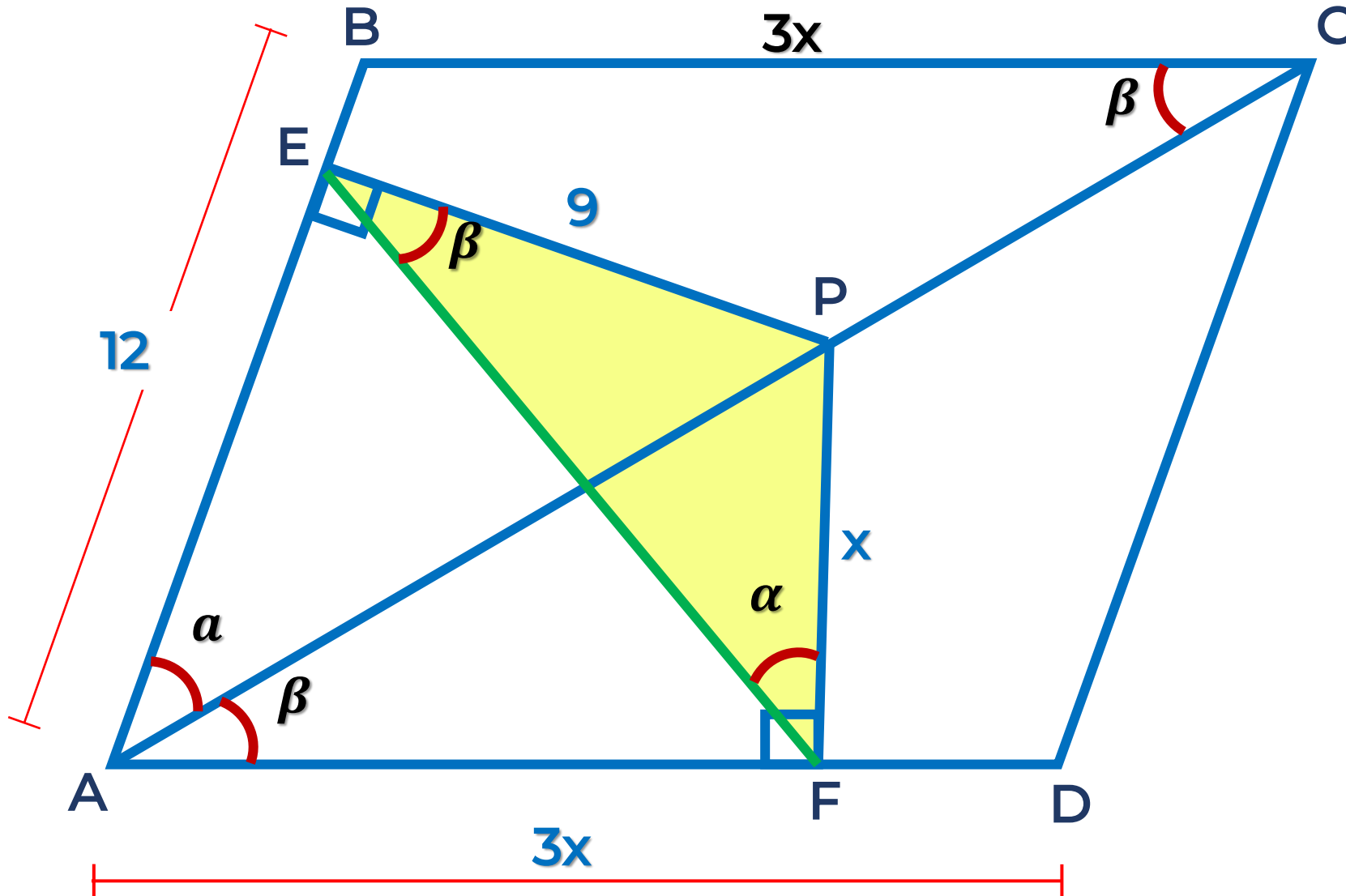
$$x + 16 = 3x$$

$$16 = 2x$$

$$8 = x$$



6. En la figura, ABCD es un romboide, calcule x.



RESOLUCIÓN

ABCD es romboide
AEPF es inscriptible

- Se Traza \overline{EF} .

$$\triangle ABC \sim \triangle EPF$$

$$\frac{3x}{9} = \frac{12}{x}$$

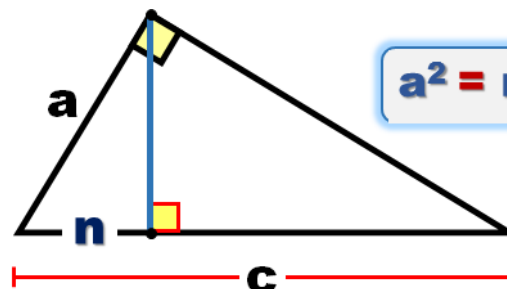
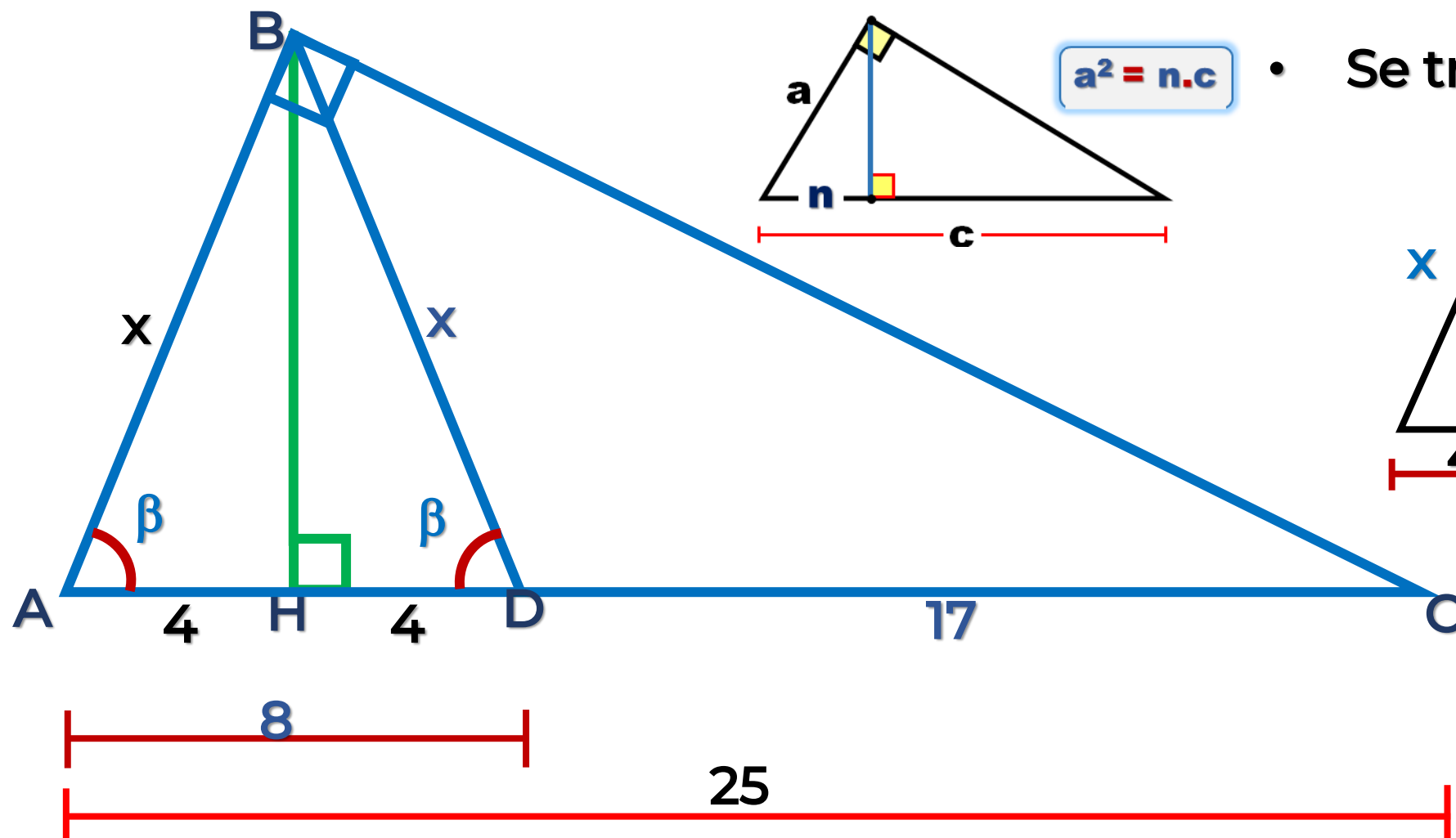
$$x^2 = 36$$

$$x = 6$$



7. En la figura, calcular x.

RESOLUCIÓN

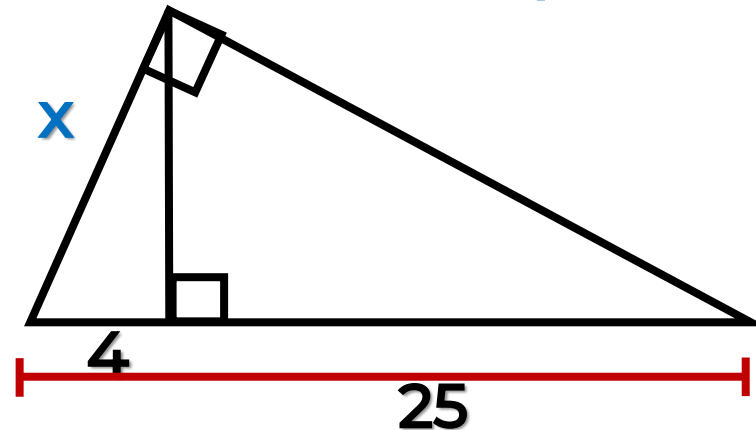


$\triangle ABD$ es isósceles

$$AB = BD = x$$

Se traza la altura \overline{BH}

$$AH = HD = 4$$

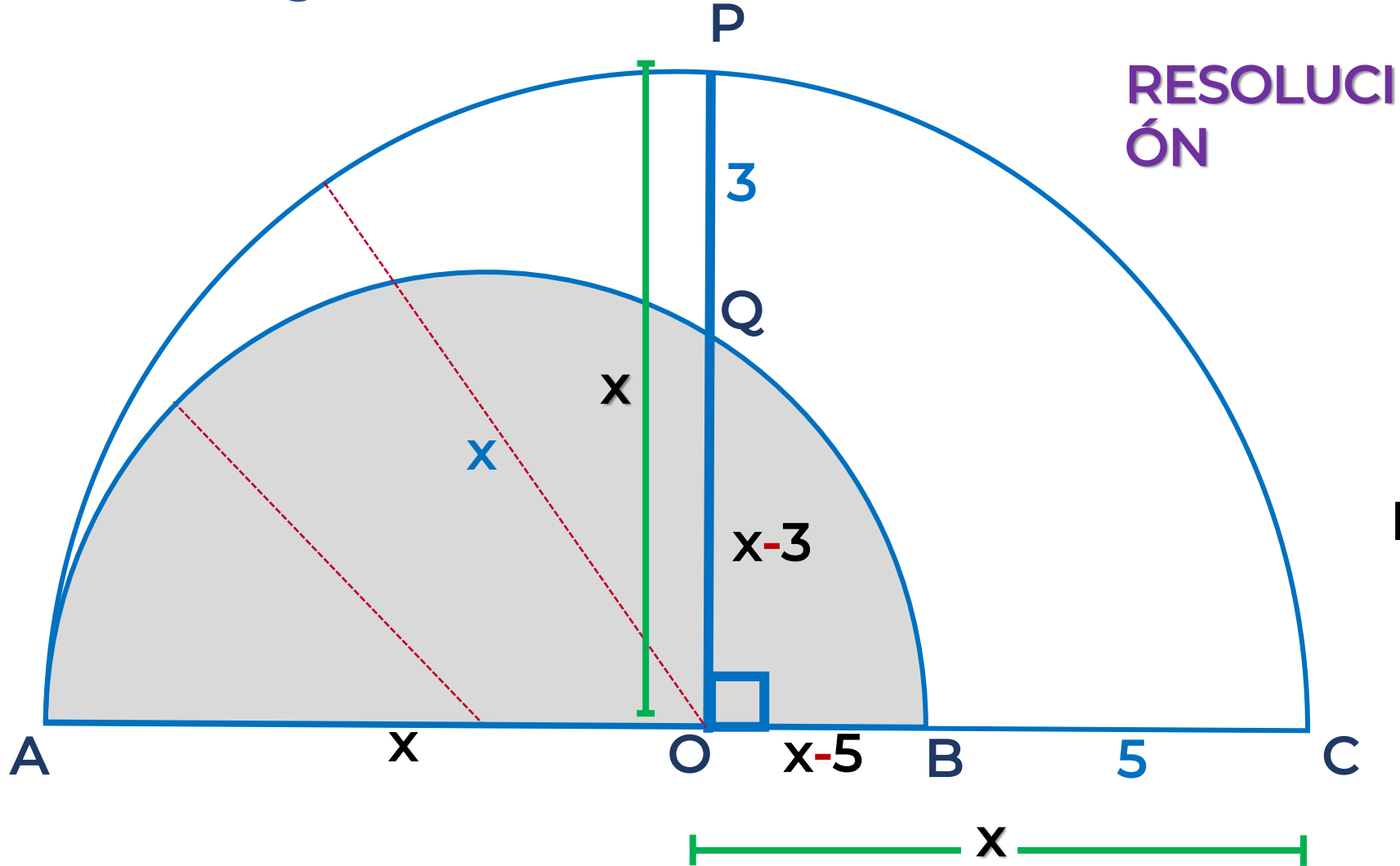


$$x^2 = 4(25)$$

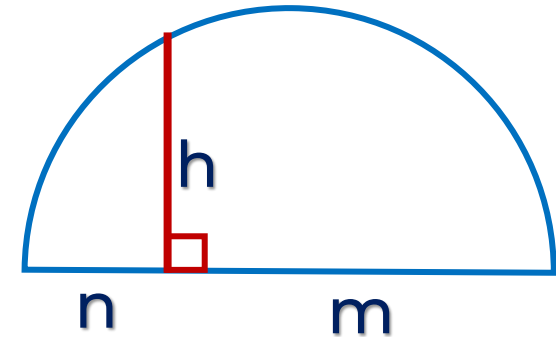
$$x^2 = 100$$

$$x = 10$$

8. En las siguientes semicircunferencias, calcule x.



RESOLUCIÓN



$$h^2 = n \cdot m$$

En el problema

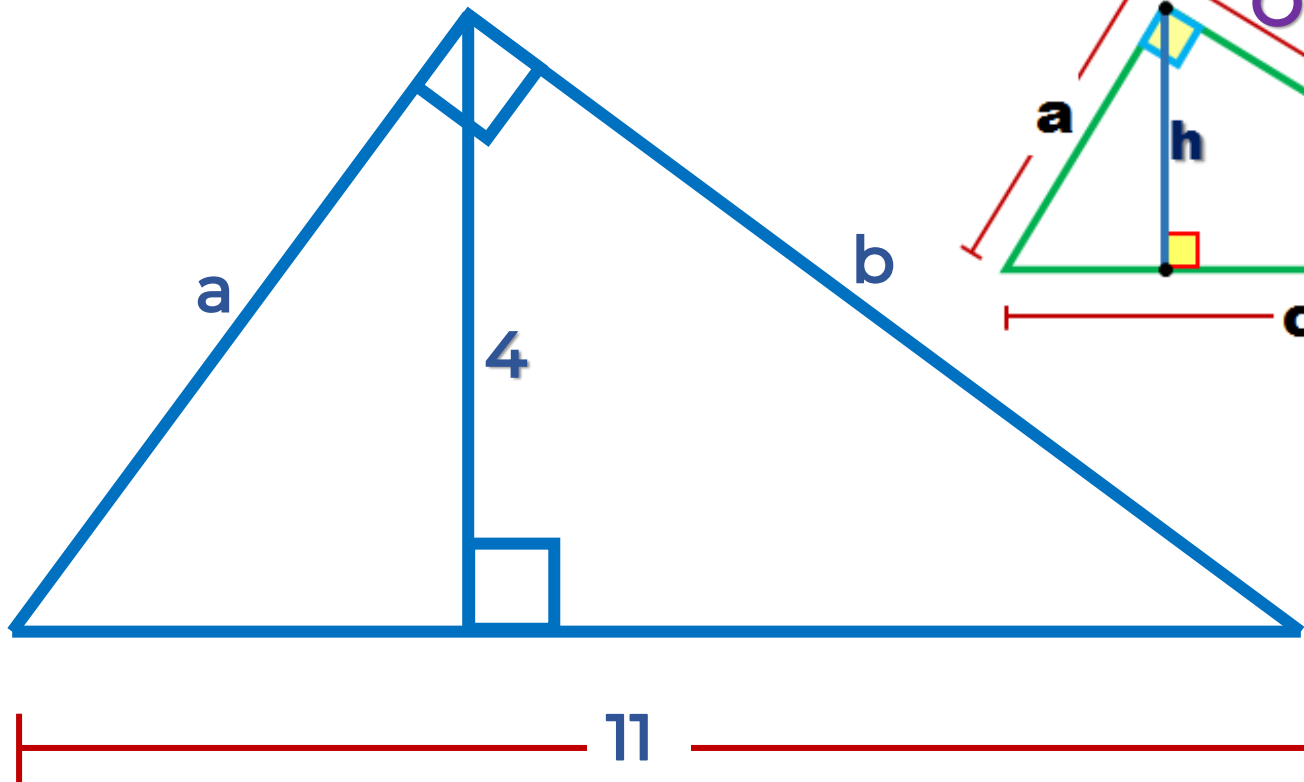
$$(x - 3)^2 = x(x - 5)$$

$$\cancel{x^2} - 6x + 9 = \cancel{x^2} - 5x$$

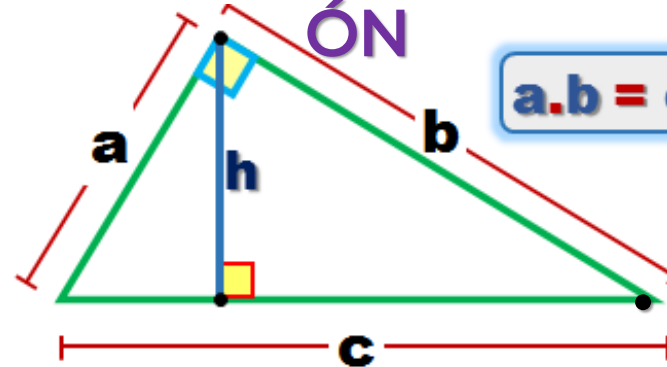
$$9 = x$$



9. En la figura, calcular $a + b$.



RESOLUCIÓN



• T. Pitágoras

$$11^2 = a^2 + b^2$$

$$121 = a^2 + b^2 \dots$$

(1)

Teorema: $a.b = 11.4$

$$a.b = 44 \dots$$

• Binomio al cuadrado

$$(a + b)^2 = a^2 + b^2 + 2ab \dots (3)$$

Reemplazando (1) y (2) en (3)

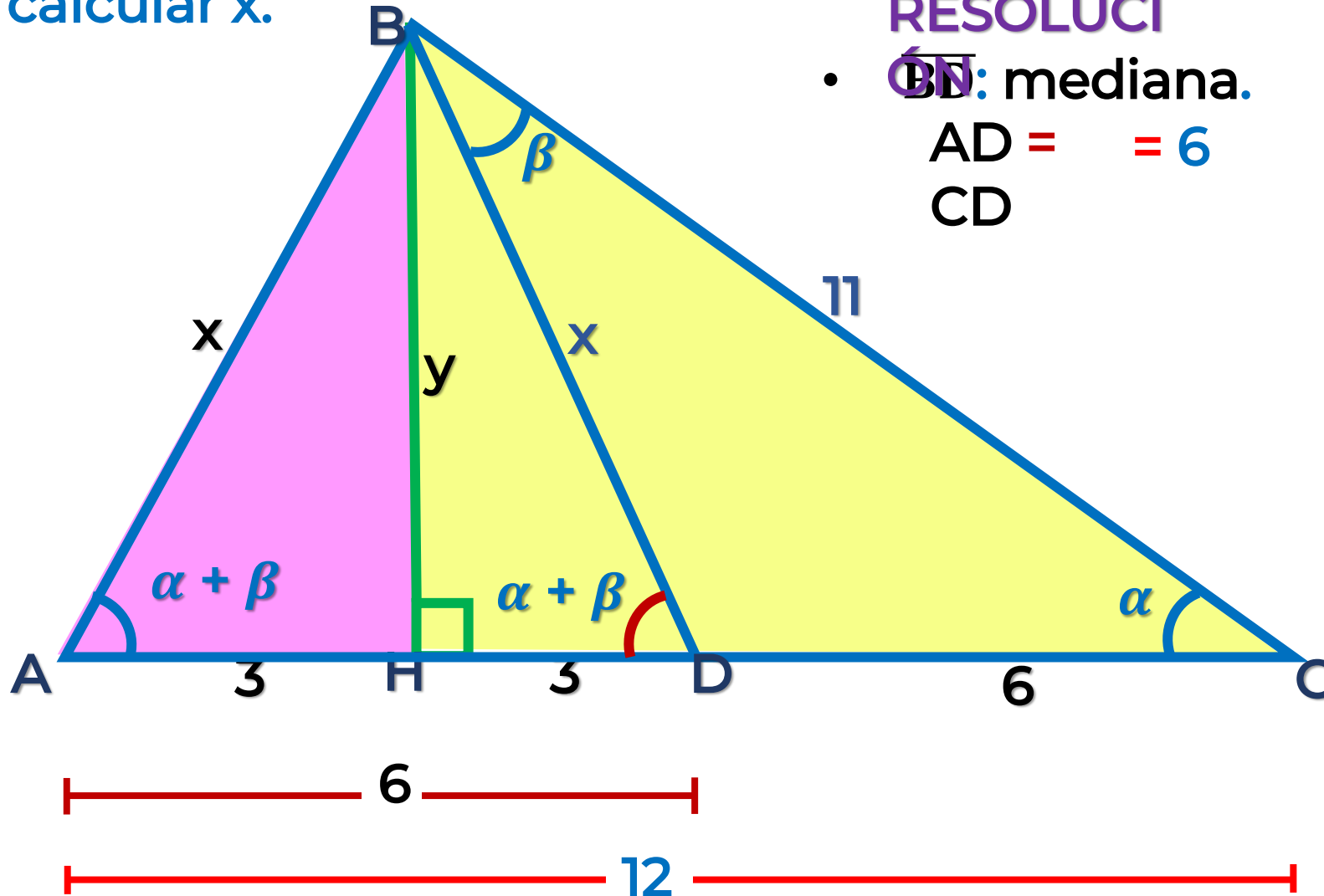
$$(a + b)^2 = 121 + 2(44)$$

$$(a + b)^2 = 209$$

$$a + b = \sqrt{209}$$



10. En la figura, \overline{BD} es una mediana del triángulo ABC, calcular x.



RESOLUCIÓN

- \overline{BD} : mediana.

$$AD = DC = 6$$

$\triangle ABD$ es isósceles

$$AB = BD = x$$

- Se traza la altura \overline{BH}

$$AH = 3$$

HD

$\triangle BCH$, T. Pitágoras

$$11^2 = 9^2 + y^2 \quad 40 = y^2$$

$\triangle AHB$, T. Pitágoras

$$x^2 = 3^2 + y^2$$

$$x^2 = 3^2 + 40$$

$$x^2 = 49$$

$$x = 7$$