GEOMETRÍA

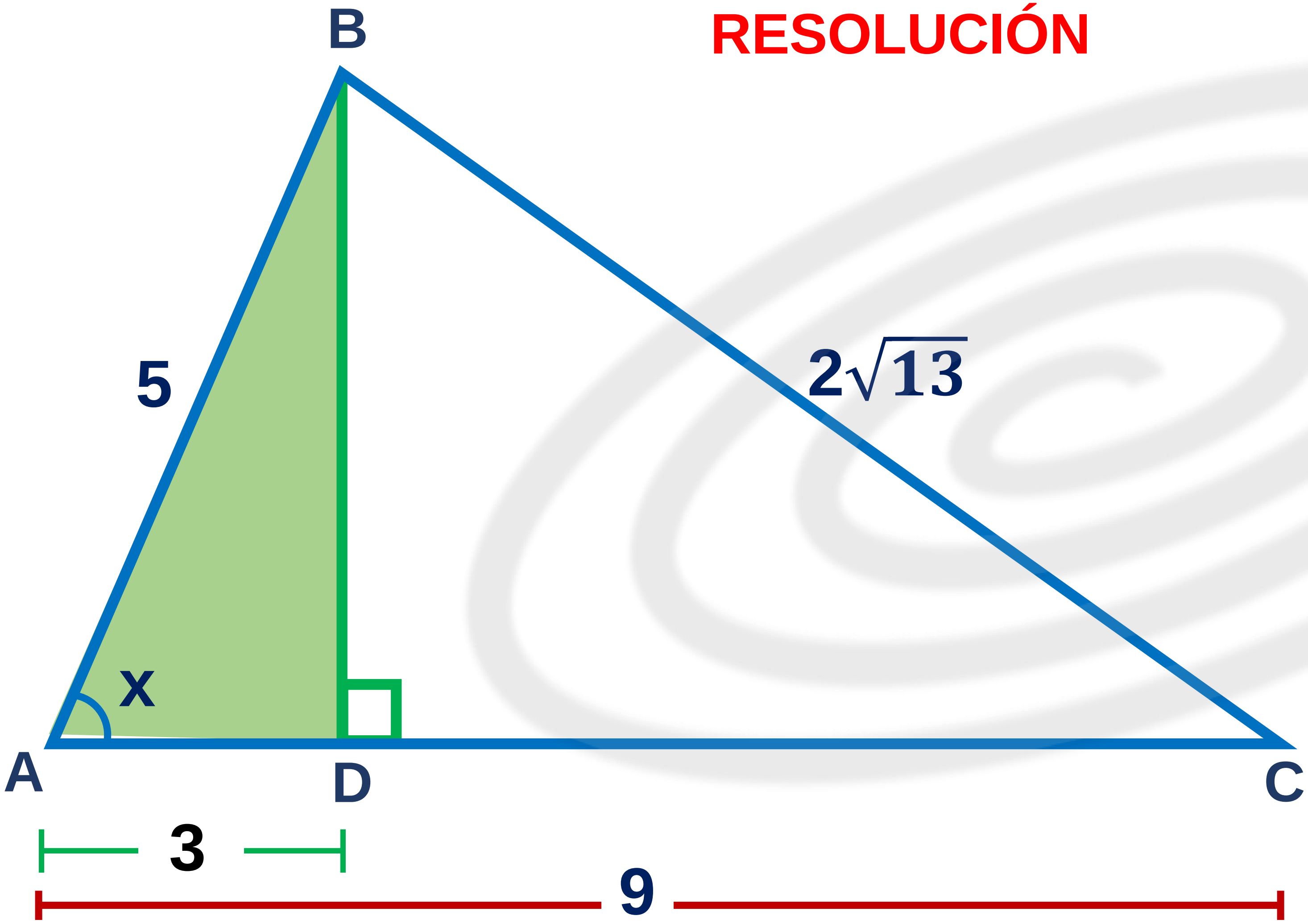
Tomo 4

5th
SECONDARY

RETROALIMENTACIÓN

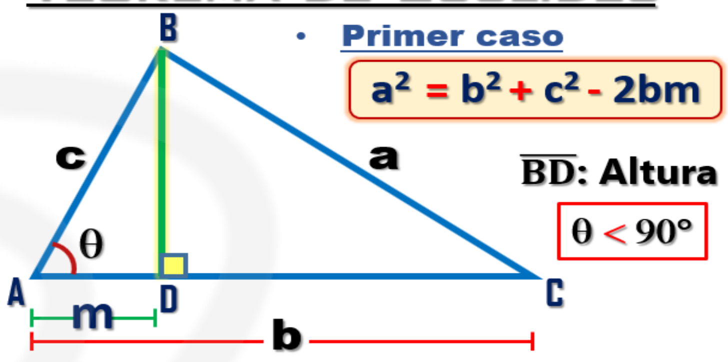
SACO OLIVEROS

1. En la figura, calcule x.



RESOLUCIÓN

- Se traza la altura $\overline{BD}$
  - **Teorema de Euclides**



$$(2\sqrt{13})^2 = 9^2 + 5^2 - 2(9)(m)$$

$$52 = 81 + 25 - 18m$$

$$18m = 54$$

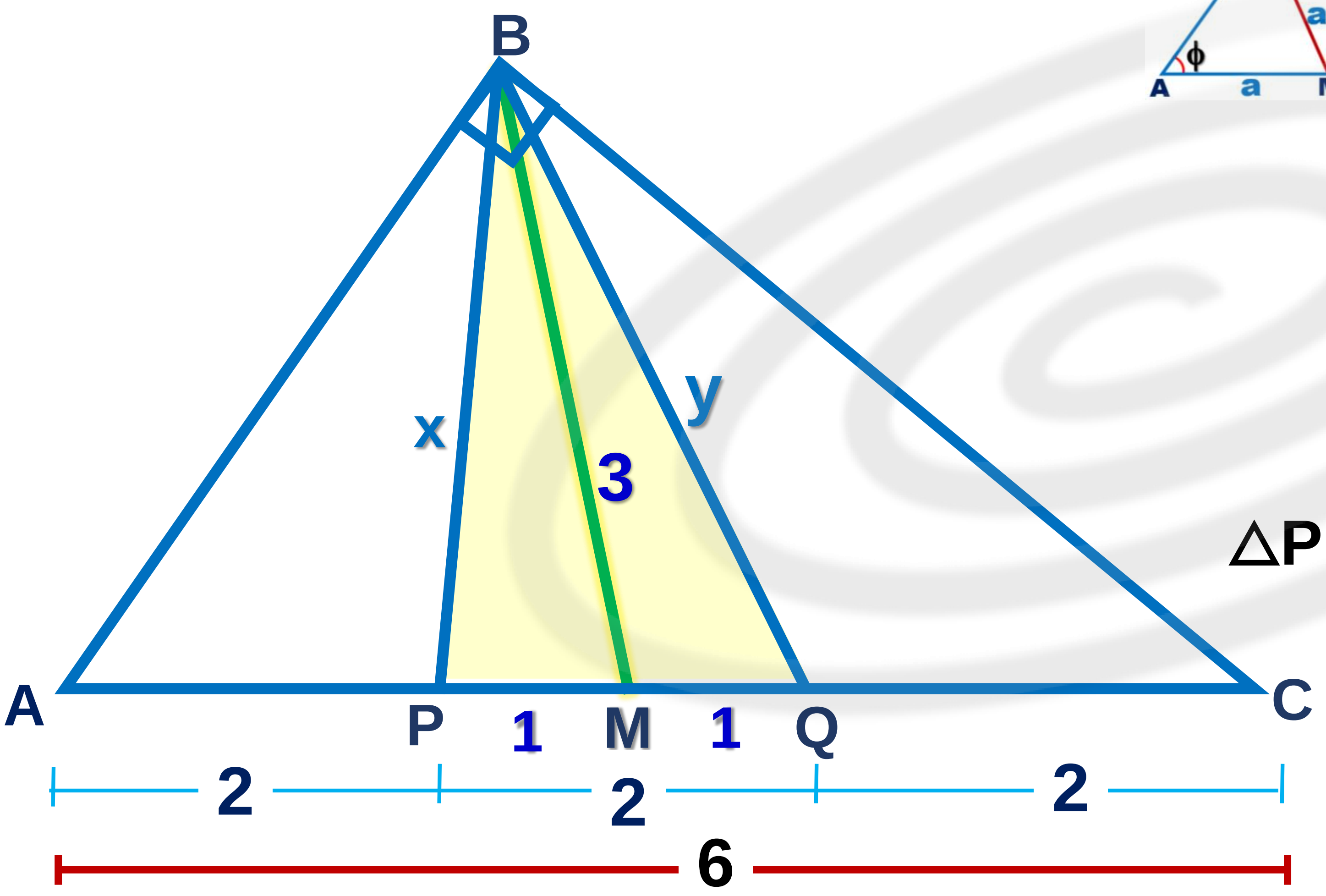
$$m = 3$$

◺ABD Notable de 37° y 53°

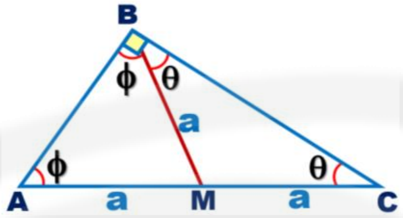
$$\boxed{x = 53°}$$

2. En la figura, calcule $x^2 + y^2$.

RESOLUCIÓN

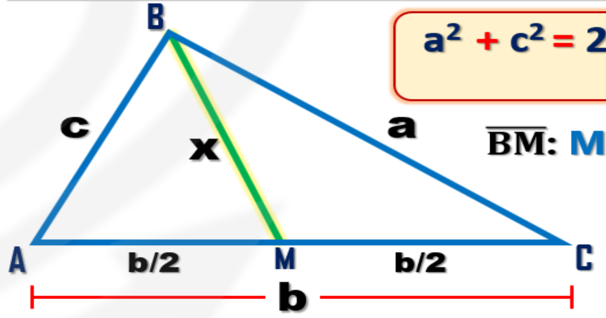


$\triangle ABC$, se traza la menor mediana $\overline{BM}$



$AM = MC = BM = 3$

TEOREMA DE LA MEDIANA



$$a^2 + c^2 = 2x^2 + \frac{b^2}{2}$$

$\overline{BM}$: Mediana

$\triangle PBQ$:

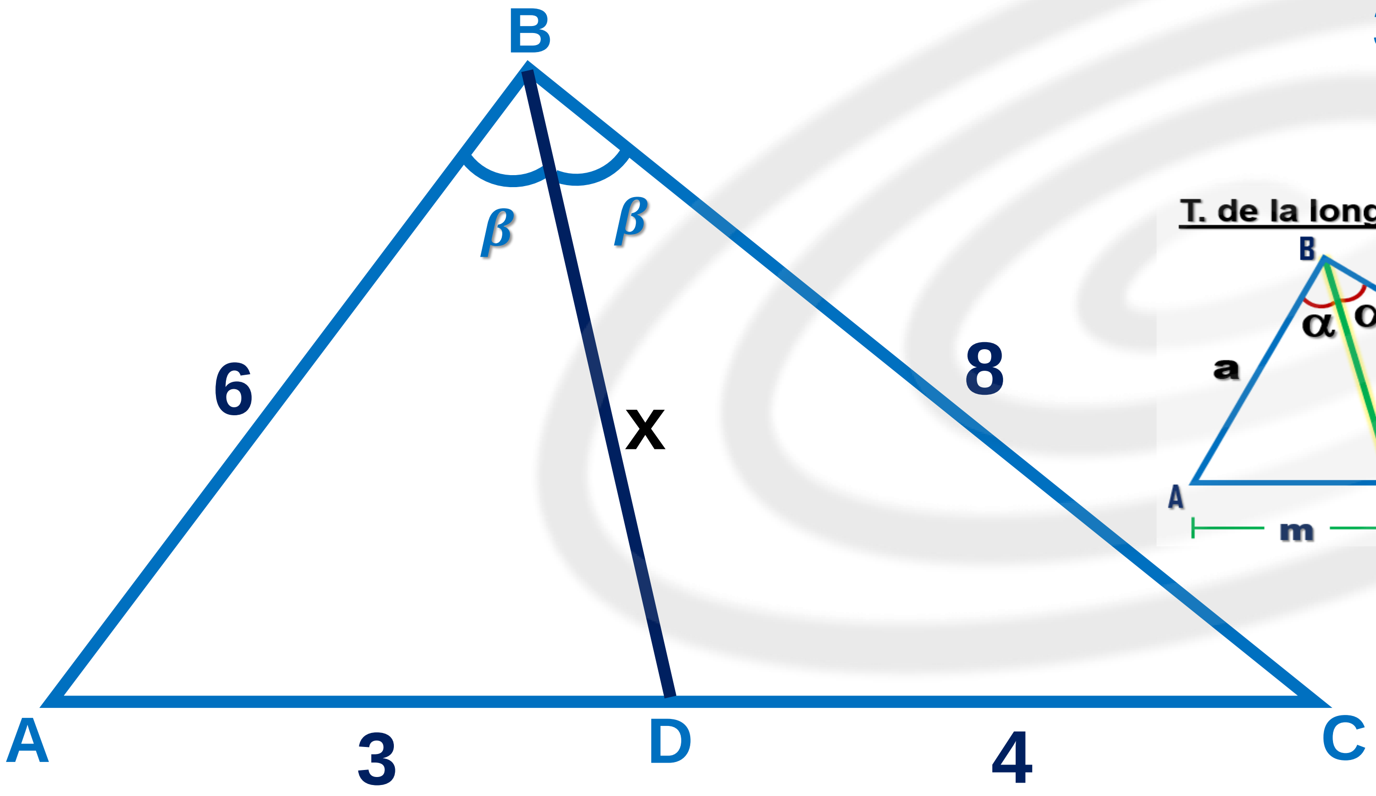
$$x^2 + y^2 = 2(3)^2 + \frac{(2)^2}{2}$$

$$x^2 + y^2 = 18 + 2$$

$$\boxed{x^2 + y^2 = 20}$$

3. En un triángulo ABC, se traza la bisectriz interior $\overline{BD}$. Si AB = 6, BC = 8 y DC = 4. Halle BD.

RESOLUCIÓN

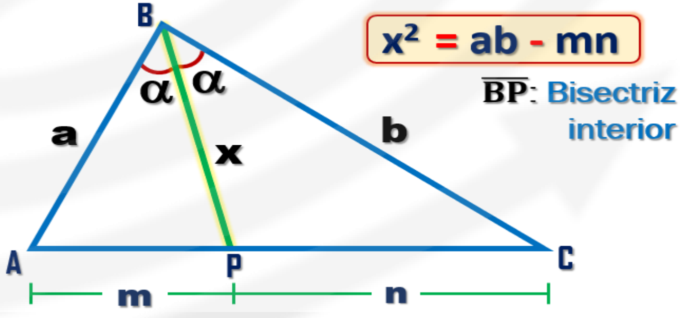


- $\overline{BD}$: bisectriz interior.
- T de la bisectriz interior (Proporcionalidad)

$$\frac{\overset{3}{\cancel{6}}}{\underset{4}{\cancel{8}}} = \frac{AD}{4}$$

AD = 3

T. de la longitud de la bisectriz interior



En el △ABC:

$$x^2 = 6.8 - 3.4$$

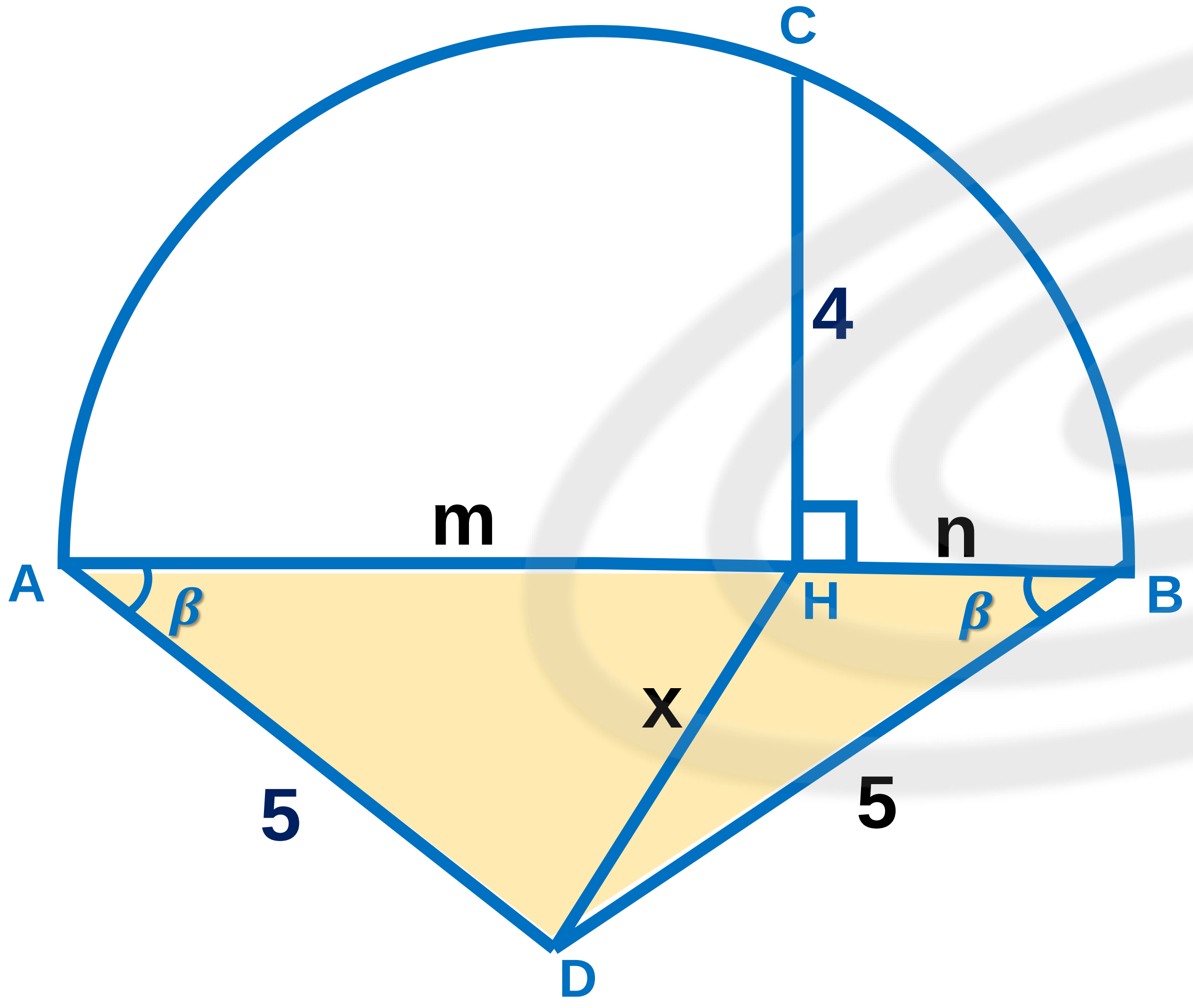
$$x^2 = 48 - 12$$

$$x^2 = 36$$

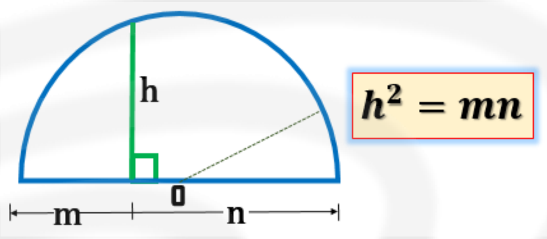
$$\boxed{x = 6}$$

4. En la figura, $\overline{AB}$ es diámetro, calcule DH.

RESOLUCIÓN



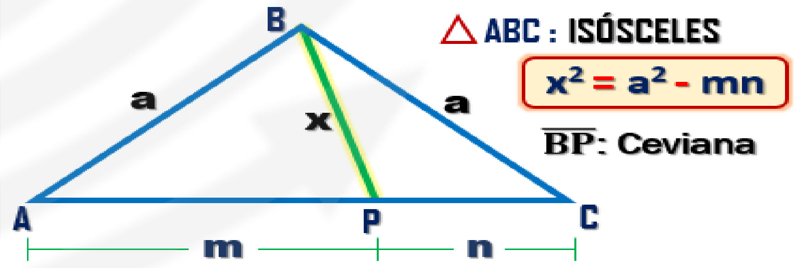
- **En la semicircunferencia**



$$4^2 = m.n$$

$$16 = m.n$$

Teorema de Stewart (para isósceles)



△ABD: $x^2 = 5^2 - \underbrace{m.n}$

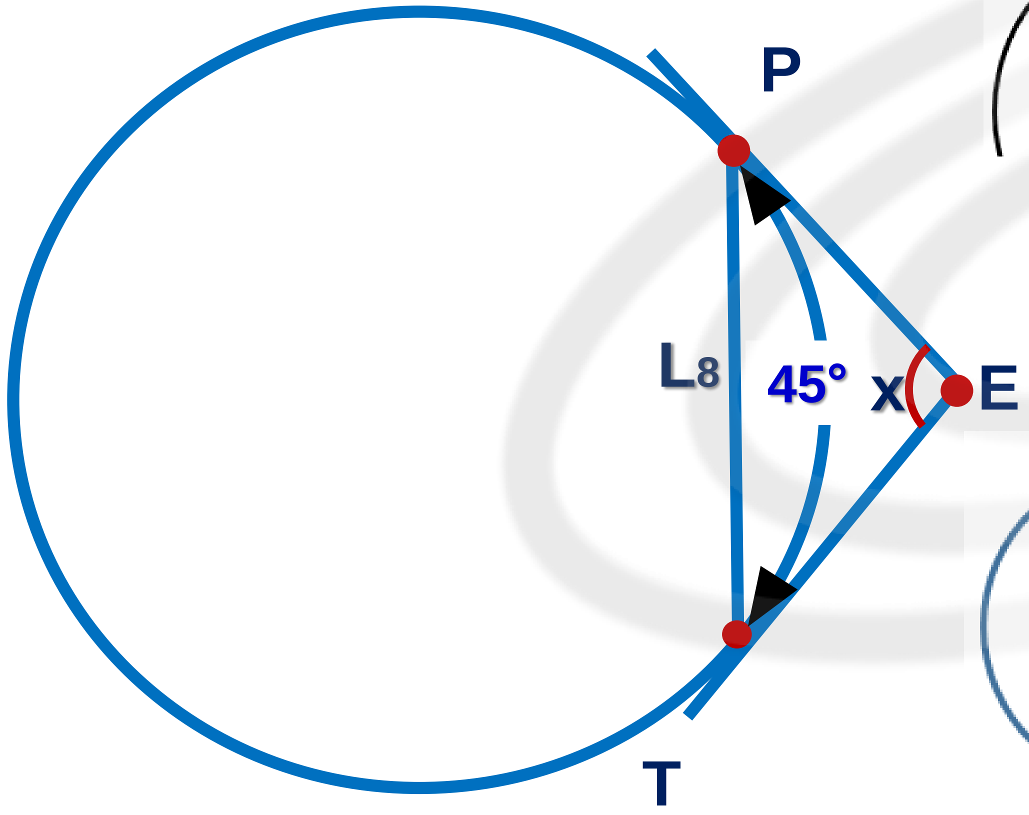
$$x^2 = 25 - 16$$

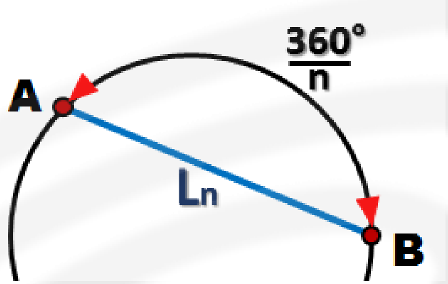
$$x^2 = 9$$

$$\boxed{x = 3}$$

5. Desde un punto E exterior a una circunferencia, se trazan los segmentos tangentes $\overline{ET}$ y $\overline{EP}$. Si PT = L_8, halle la m<PET.

RESOLUCIÓN



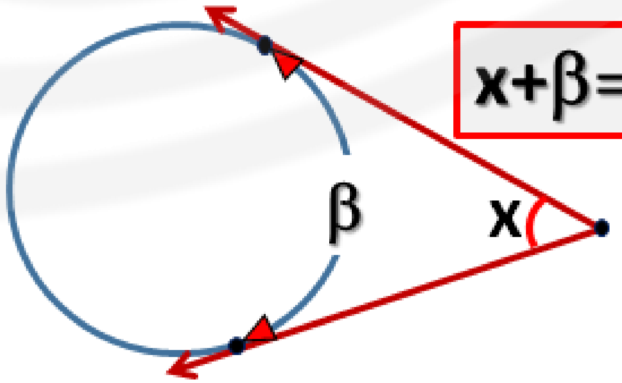


$$m\overset{\frown}{AB} = \frac{360°}{n}$$

$$n = 5$$

$$m\overset{\frown}{PT} = \frac{360°}{8}$$

$$\boxed{m\overset{\frown}{PT} = 45°}$$



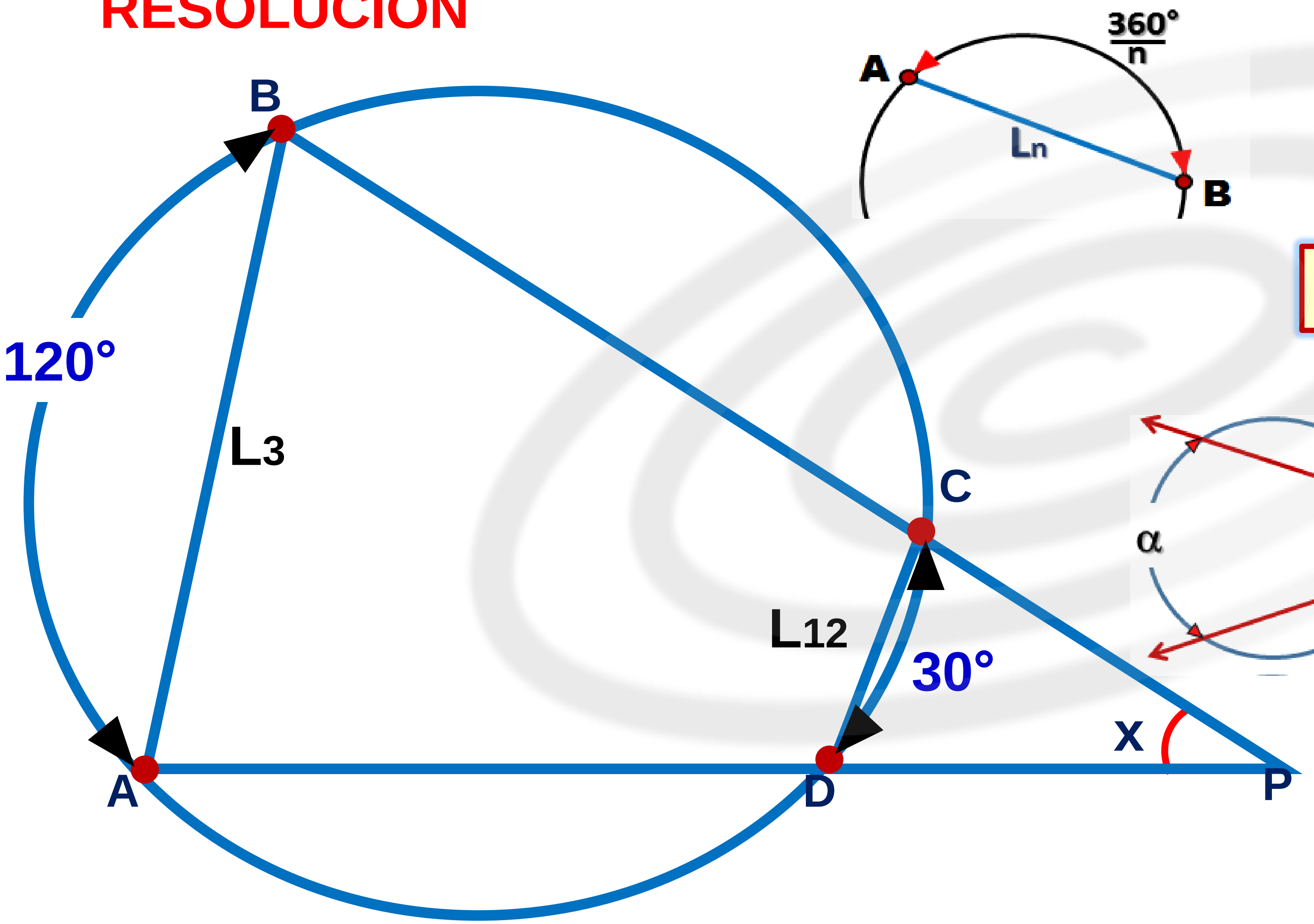
$$x + \beta = 180°$$

$$x + 45° = 180°$$

$$\boxed{x = 135°}$$

6. Calcule x, si AB = L_3 y CD = L_{12}.

RESOLUCIÓN



n = 3

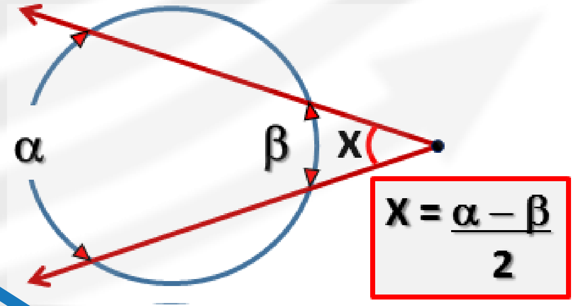
$$m\overset{\frown}{AB} = \frac{360°}{3}$$

$$\boxed{m\overset{\frown}{AB} = 120°}$$

n = 12

$$m\overset{\frown}{CD} = \frac{360°}{12}$$

$$\boxed{m\overset{\frown}{CD} = 30°}$$



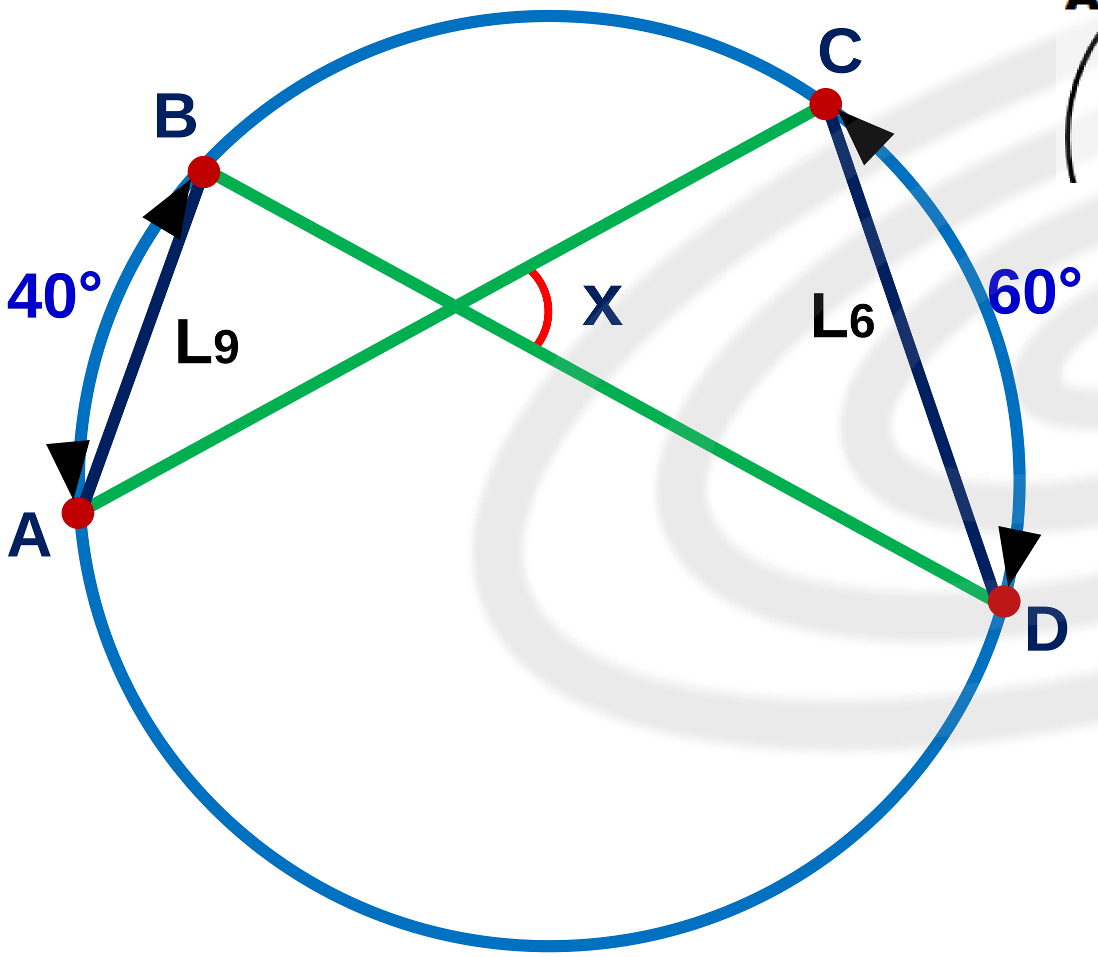
Ángulo exterior

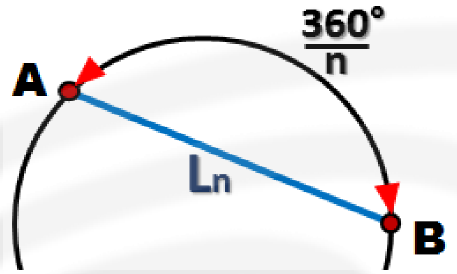
$$x = \frac{120° - 30°}{2}$$

$$\boxed{x = 45°}$$

7. Si AB = L_9 y CD = L_6, calcule la medida del ángulo que forman $\overline{BD}$ y $\overline{AC}$.

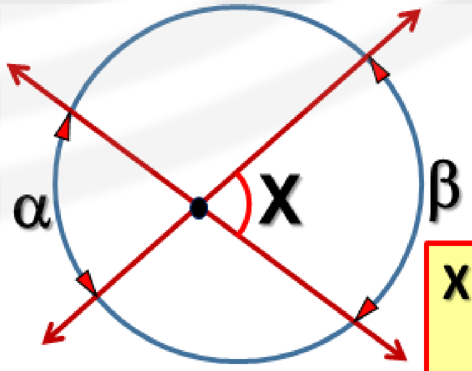
RESOLUCIÓN





n = 9	n = 6
$m\overset{\frown}{AB} = \dfrac{360°}{9}$	$m\overset{\frown}{CD} = \dfrac{360°}{6}$
$\boxed{m\overset{\frown}{AB} = 40°}$	$\boxed{m\overset{\frown}{CD} = 60°}$

Ángulo interior



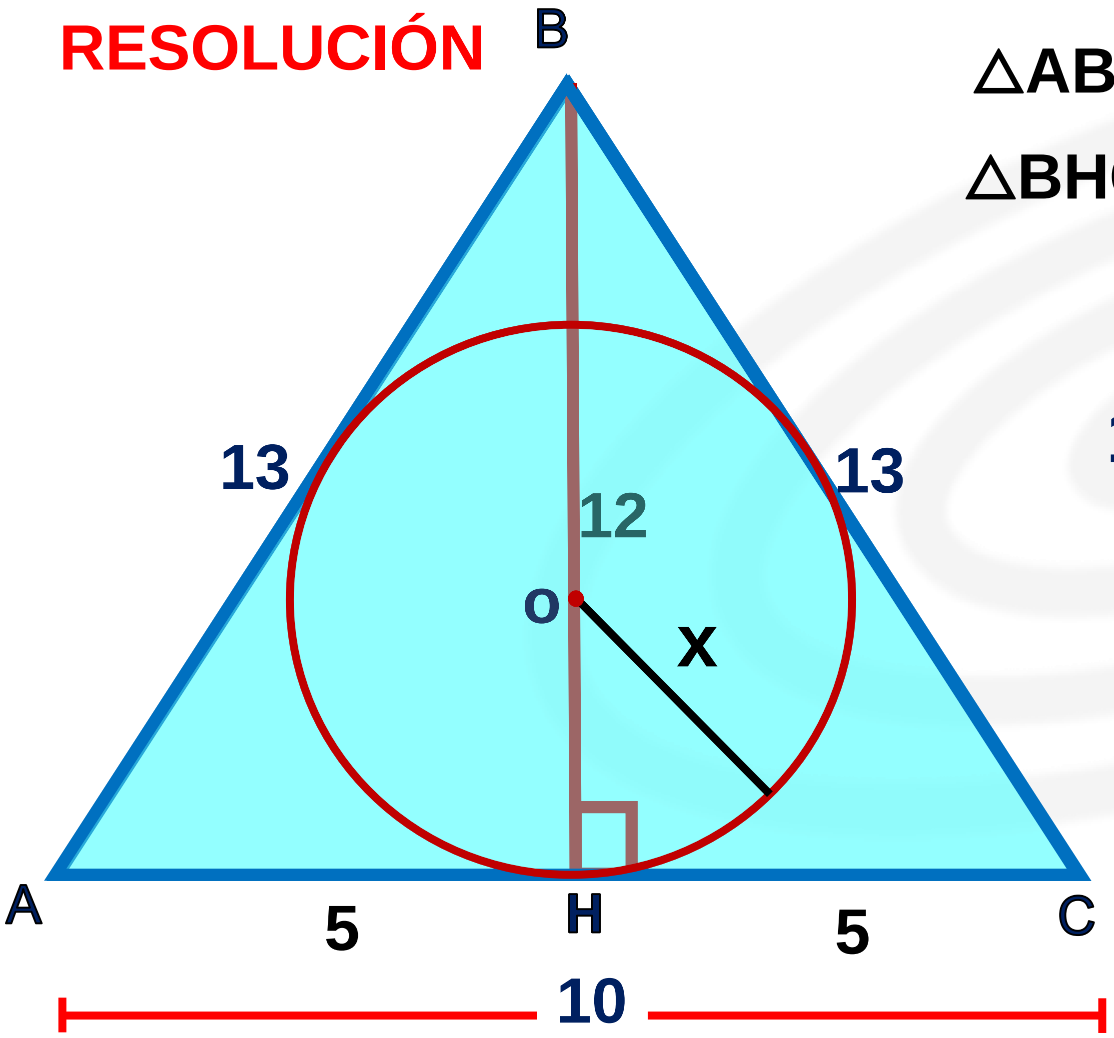
$$\boxed{X = \frac{\alpha+\beta}{2}}$$

$$x = \frac{40° + 60°}{2}$$

$$\boxed{x = 50°}$$

8. Las longitudes de los lados del triángulo son: 13; 13 y 10. Calcule la longitud de su inradio.

RESOLUCIÓN



△ABC es isósceles

△BHC: T. Pitágoras

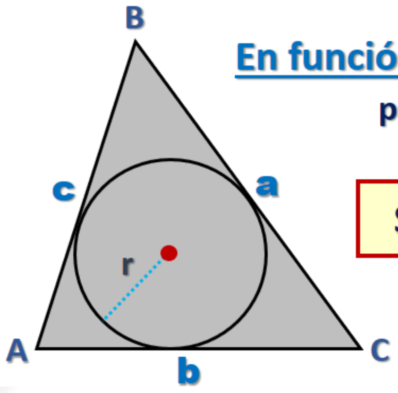
$$13^2 = (BH)^2 + 5^2$$

$$144 = (BH)^2$$

$$12 = BH$$

$$S_{(ABC)} = \frac{10 \cdot 12}{2}$$

$$S_{(ABC)} = 60u^2$$



En función al inradio

$$p = \frac{a+b+c}{2}$$

$$\boxed{S_{ABC} = p.r}$$

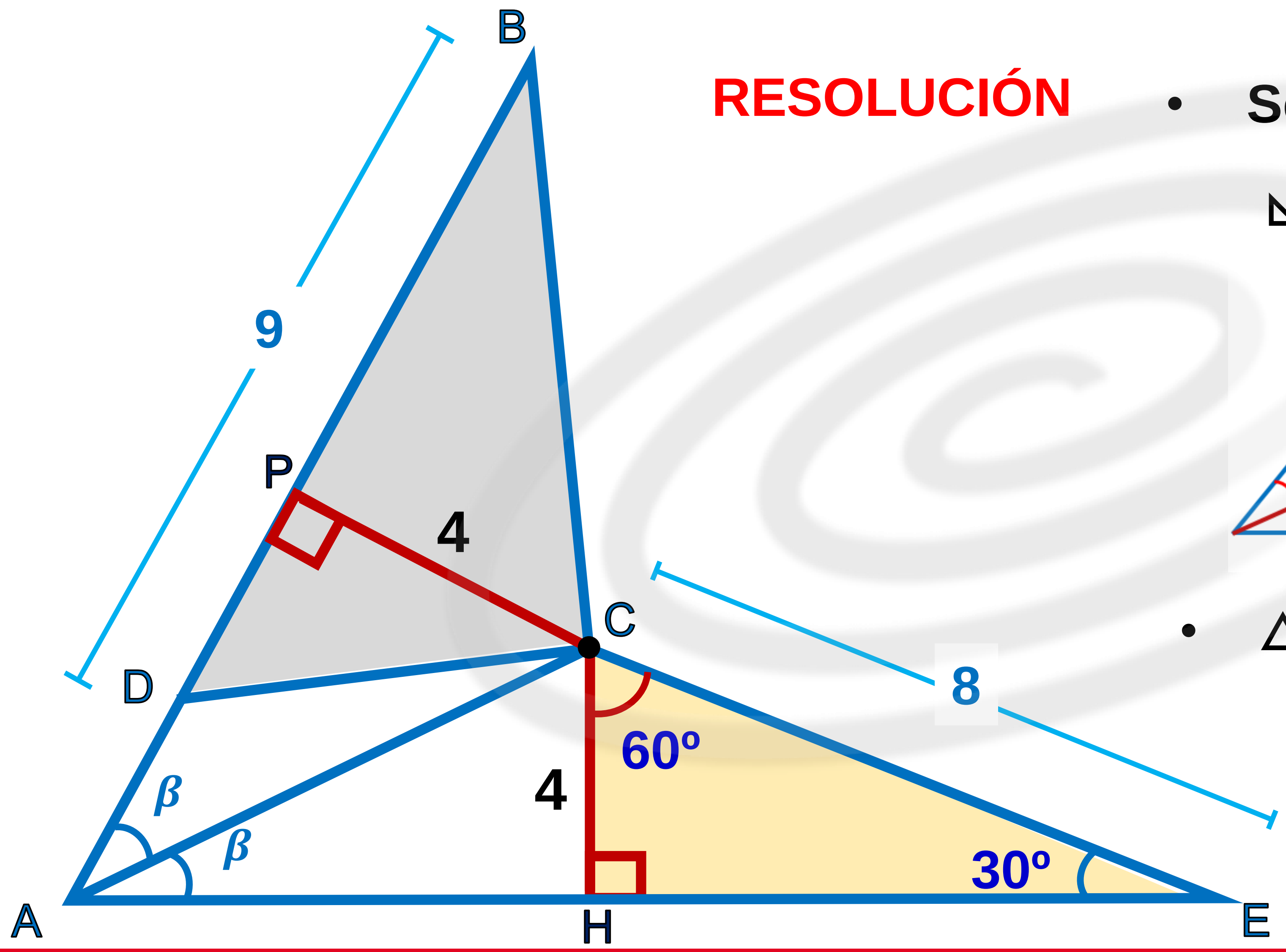
$$S_{\triangle ABC} = \frac{(13+13+10)}{2}.x$$

$$\underbrace{S_{\triangle ABC}}_{60} = (18).x$$

$$\cancel{6}0 = 1\cancel{8}x$$

$$\boxed{10/3 = x}$$

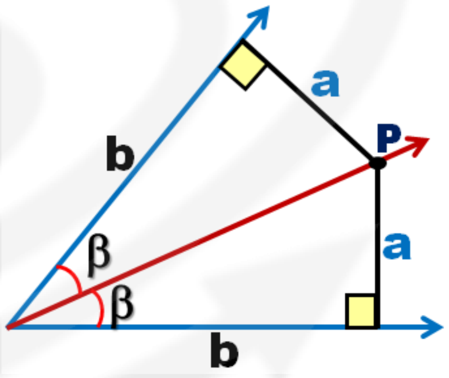
9. En el gráfico, BD = 9 y CE= 8, calcule el área de la región sombreada.



RESOLUCIÓN

- Se traza la altura $\overline{CH}$.

◺CHE es notable de 30° y 60°



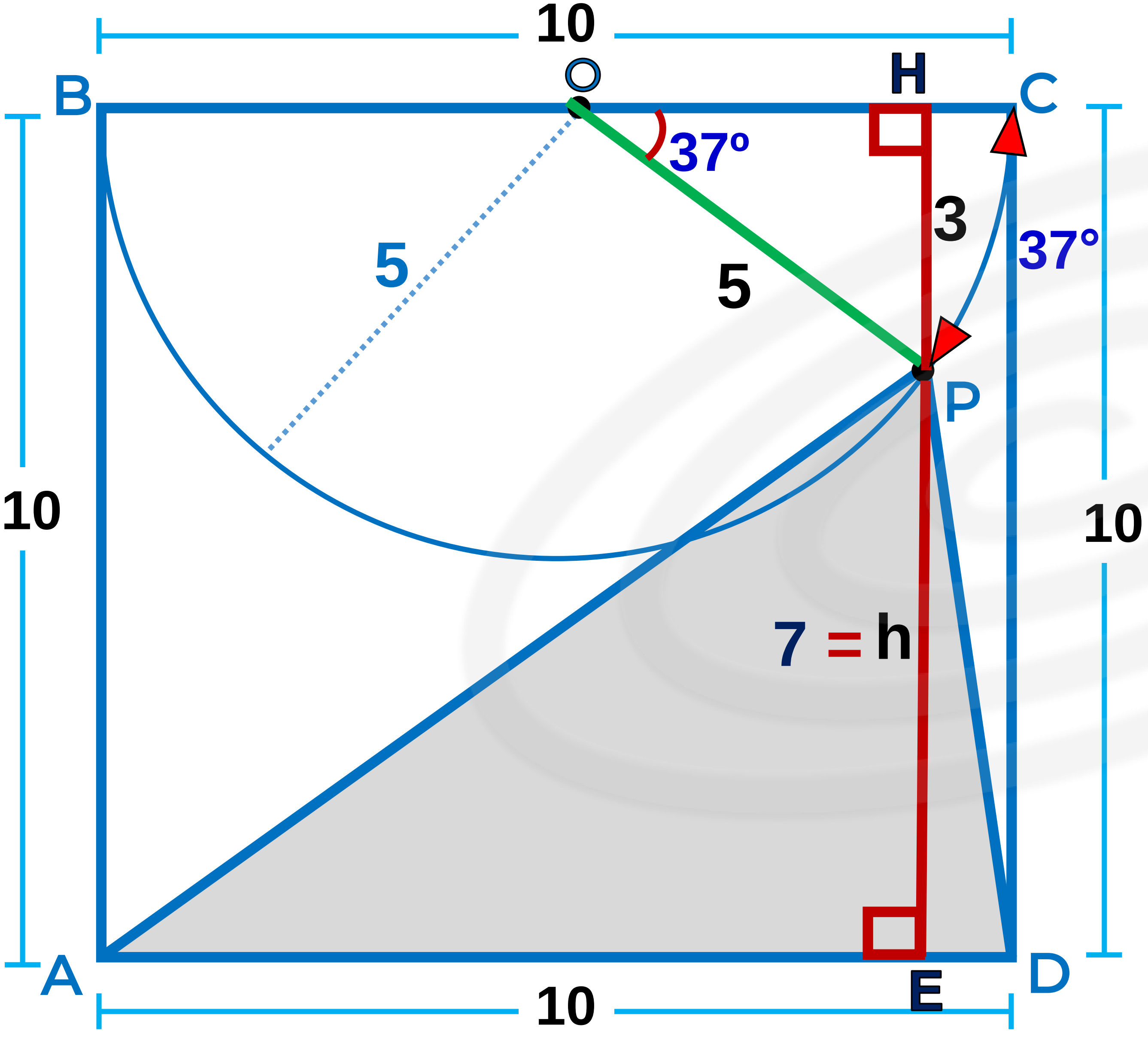
CH = CP = 4

- △BCD, teorema

$$S_{\triangle BCD} = \frac{9 \cdot 4}{2}$$

$$\boxed{S_{\triangle} BCD = 18u^2}$$

10. ABCD es un cuadrado, si $m\overset{\frown}{CP} = 37°$, calcule el área de la región sombreada.



RESOLUCIÓN

- Se traza $\overline{OP}$.
- Se traza $\overline{PH}$ perpendicular a $\overline{BC}$.

⊿OHP es aproximado de 37° y 53°

- Se prolonga $\overline{HP}$ hasta E.
- CDEH es rectángulo

HE = CD = 10

h + 3 = 10

h = 7

- Teorema

$$S_{(APD)} = \frac{10 \cdot 7}{2}$$

$$\boxed{S_{(APD)} = 35\ u^2}$$