GEOMETRÍA

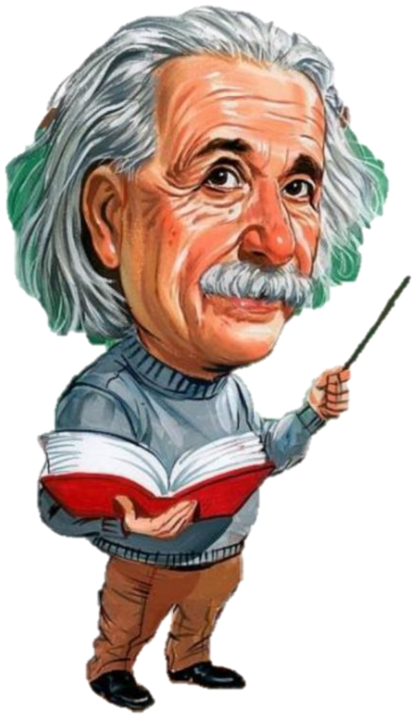
Capítulo 5

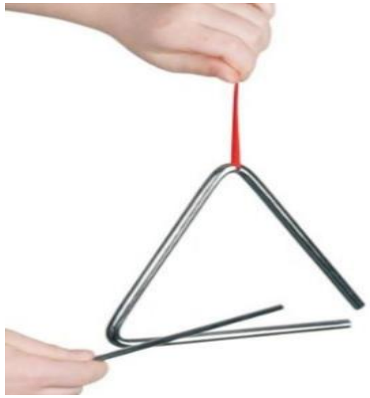
4th
SECONDARY

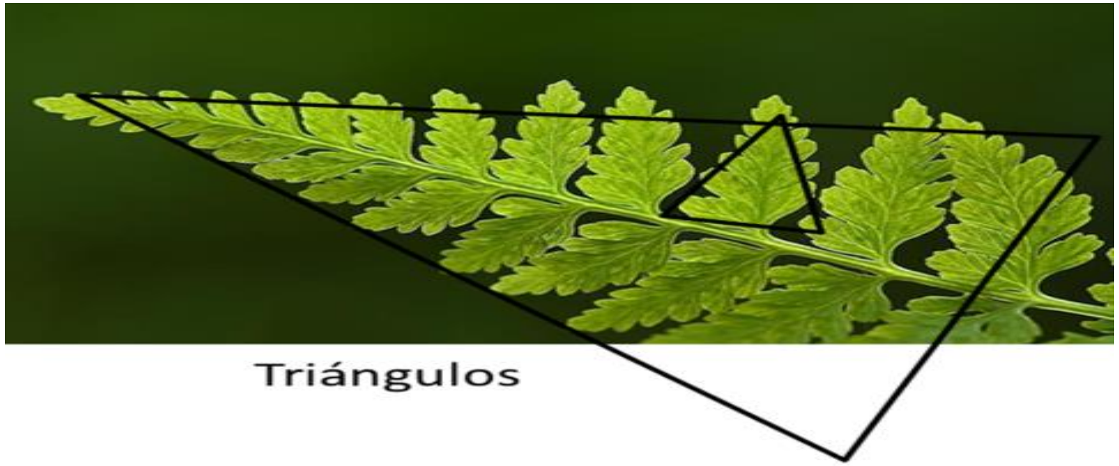
CUADRILÁTEROS

SACO OLIVEROS

El triángulo es una de las figuras geométricas elementales y, por lo tanto, el conocimiento de sus teoremas, clases, etc., es básico para comprender mejor a las demás figuras geométricas que estudiaremos posteriormente. Esta figura tiene en la actualidad diferentes usos y aplicaciones como podemos observar.

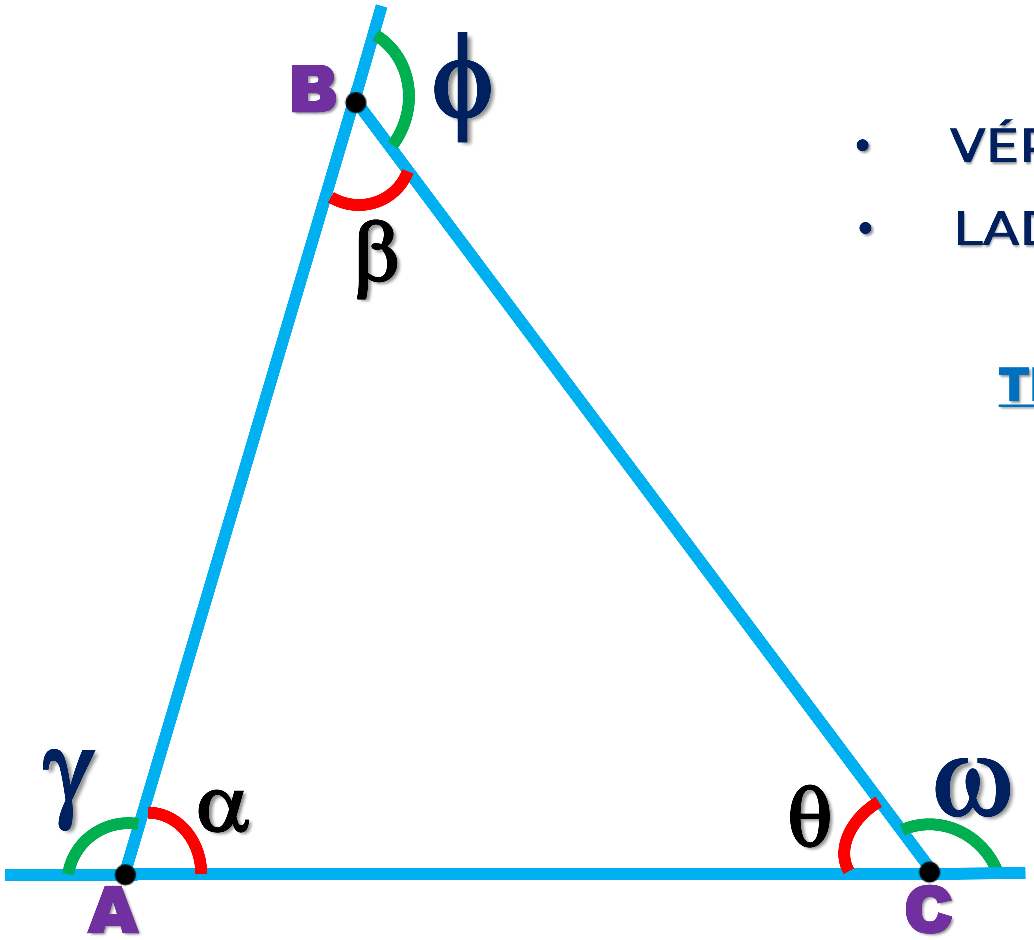




TRIÁNGULO

Definición: Es aquella figura geométrica formada al unir 3 puntos no colineales mediante segmento de recta.



- VÉRTICES : A, B y C
- LADOS : $\overline{AB}$, $\overline{BC}$ y $\overline{AC}$

TEOREMAS

$$\alpha + \beta + \theta = 180°$$

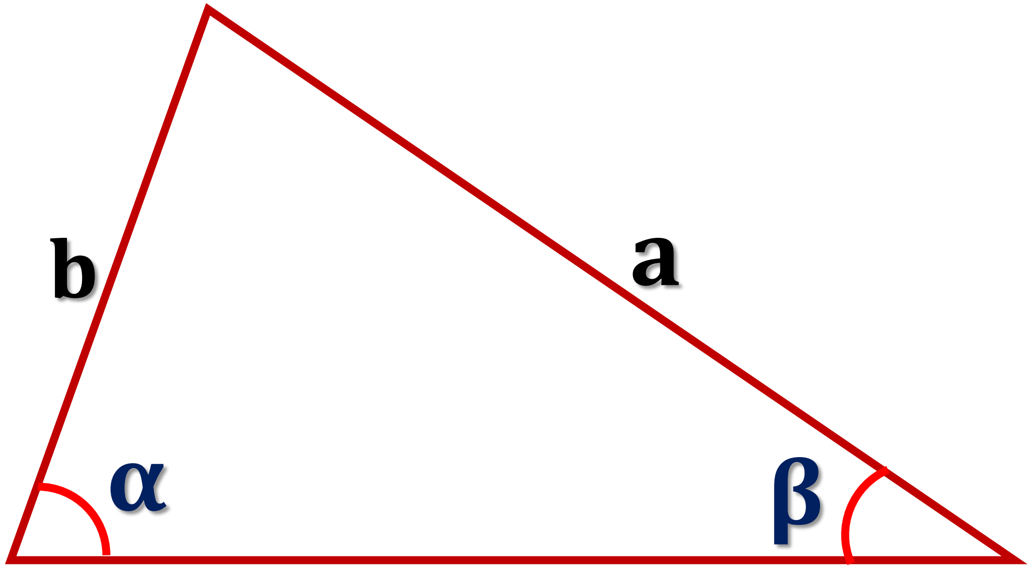
$$\omega + \phi + \gamma = 360°$$

$$\omega = \alpha + \beta$$

$$\phi = \alpha + \theta$$

$$\gamma = \beta + \theta$$

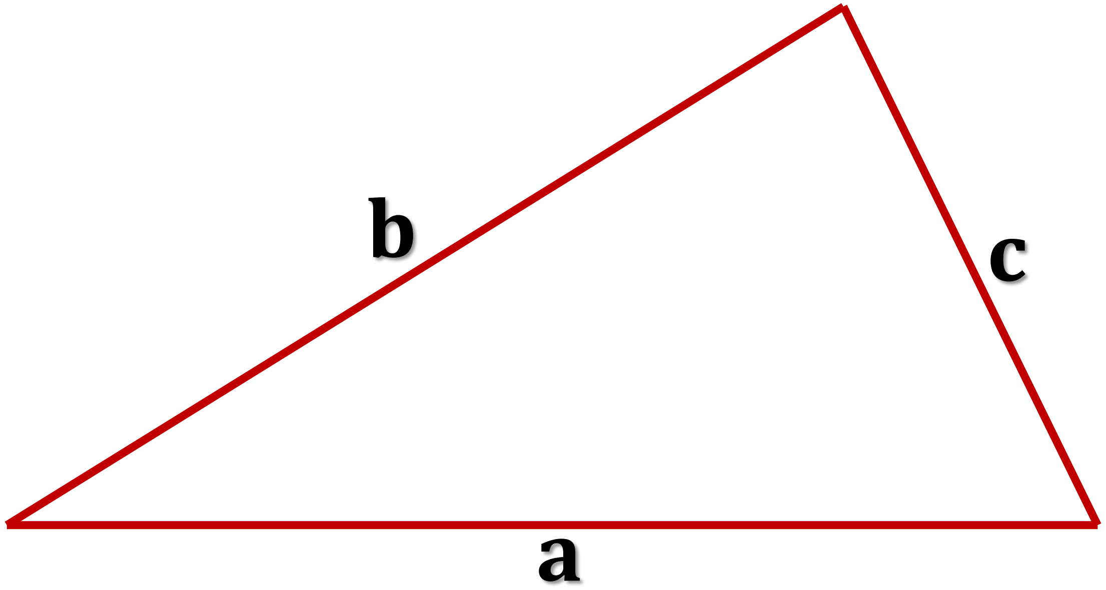
- **Teorema de la correspondencia**



Si: $\beta < \alpha$

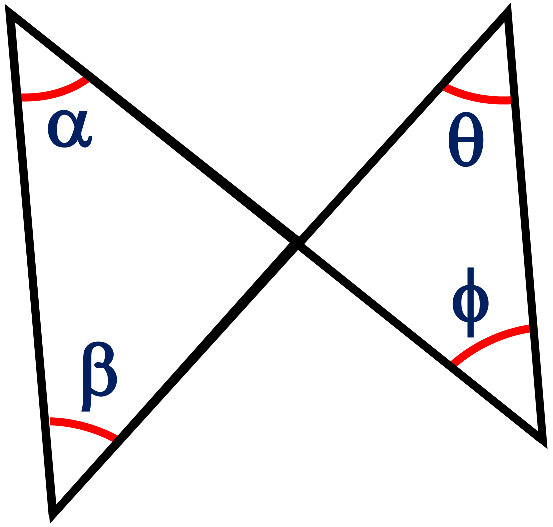
$\Rightarrow$ $\boxed{b < a}$

- **Teorema de la existencia**

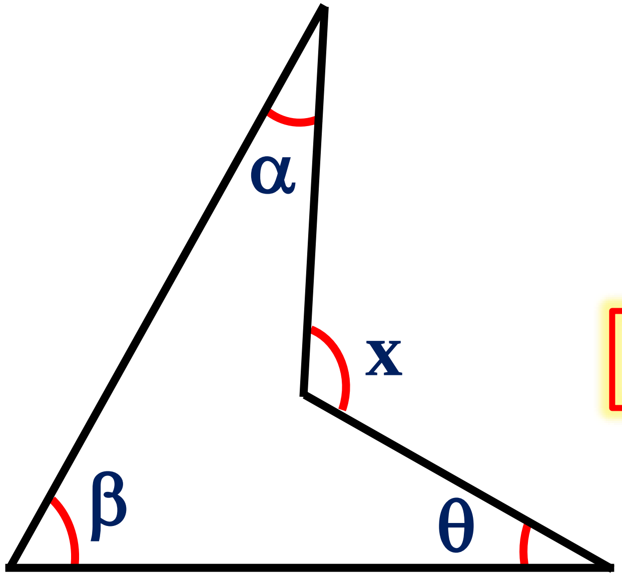


donde: $c < b < a$

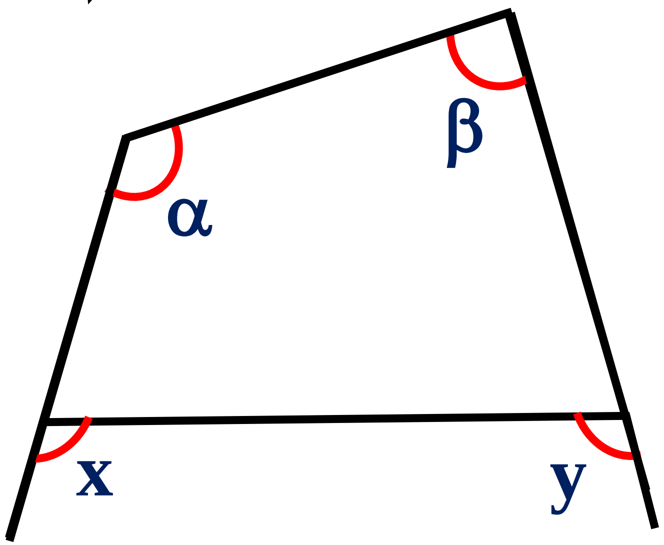
$\boxed{b - c < a < b + c}$



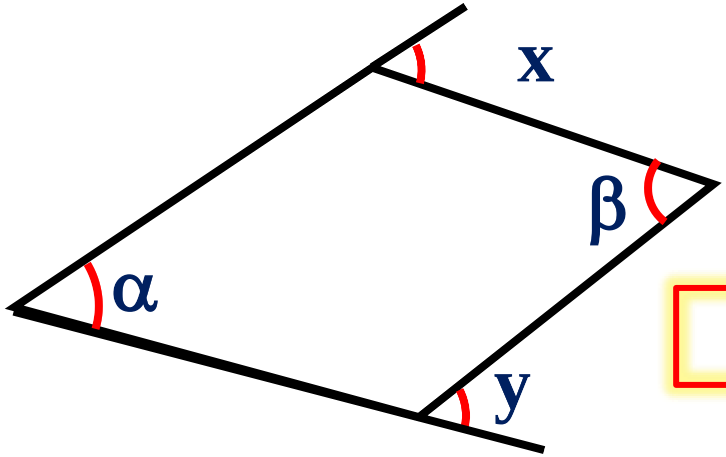
$$\alpha + \beta = \theta + \phi$$



$$x = \alpha + \beta + \theta$$



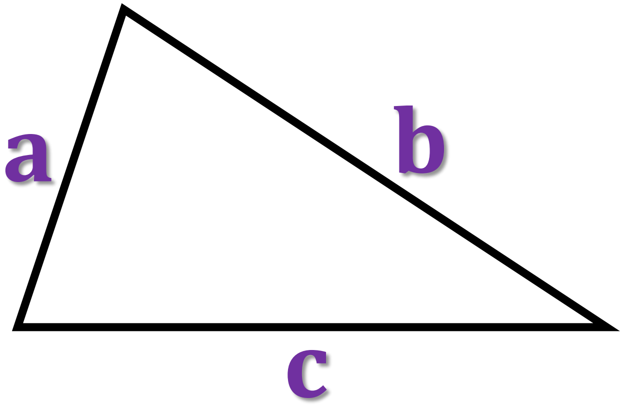
$$x + y = \alpha + \beta$$



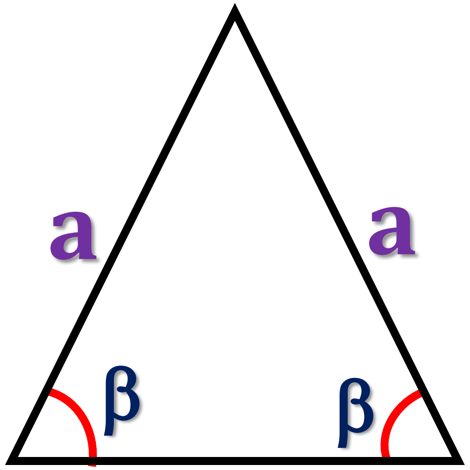
$$x + y = \alpha + \beta$$

Clasificación

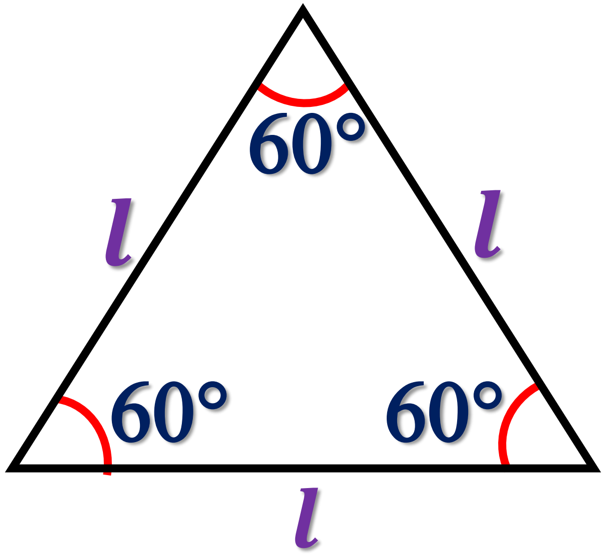
1. Según las medidas de los lados.



Δ Escaleno



Δ Isósceles

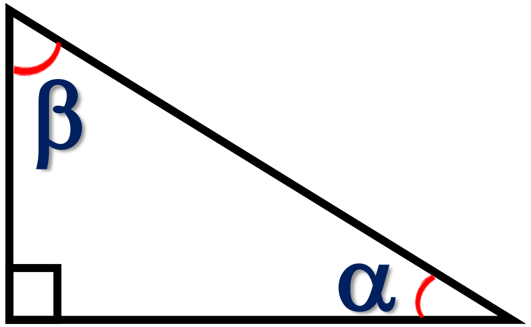


Δ Equilátero

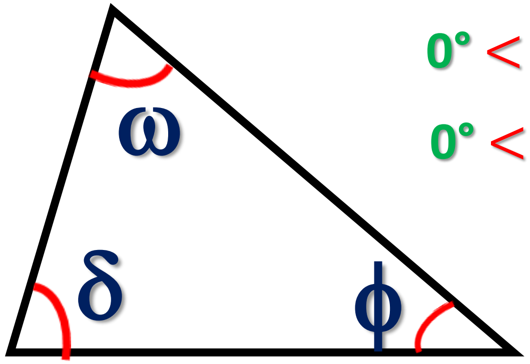
2.Clasificación según las medidas de sus ángulos.

Δ Rectángulo

Δ Oblicuángulo



$\alpha + \beta = 90°$

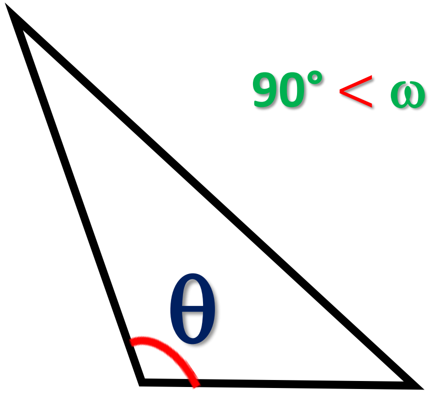


$0° < \omega < 90°$

$0° < \delta < 90°$

$0° < \phi < 90°$

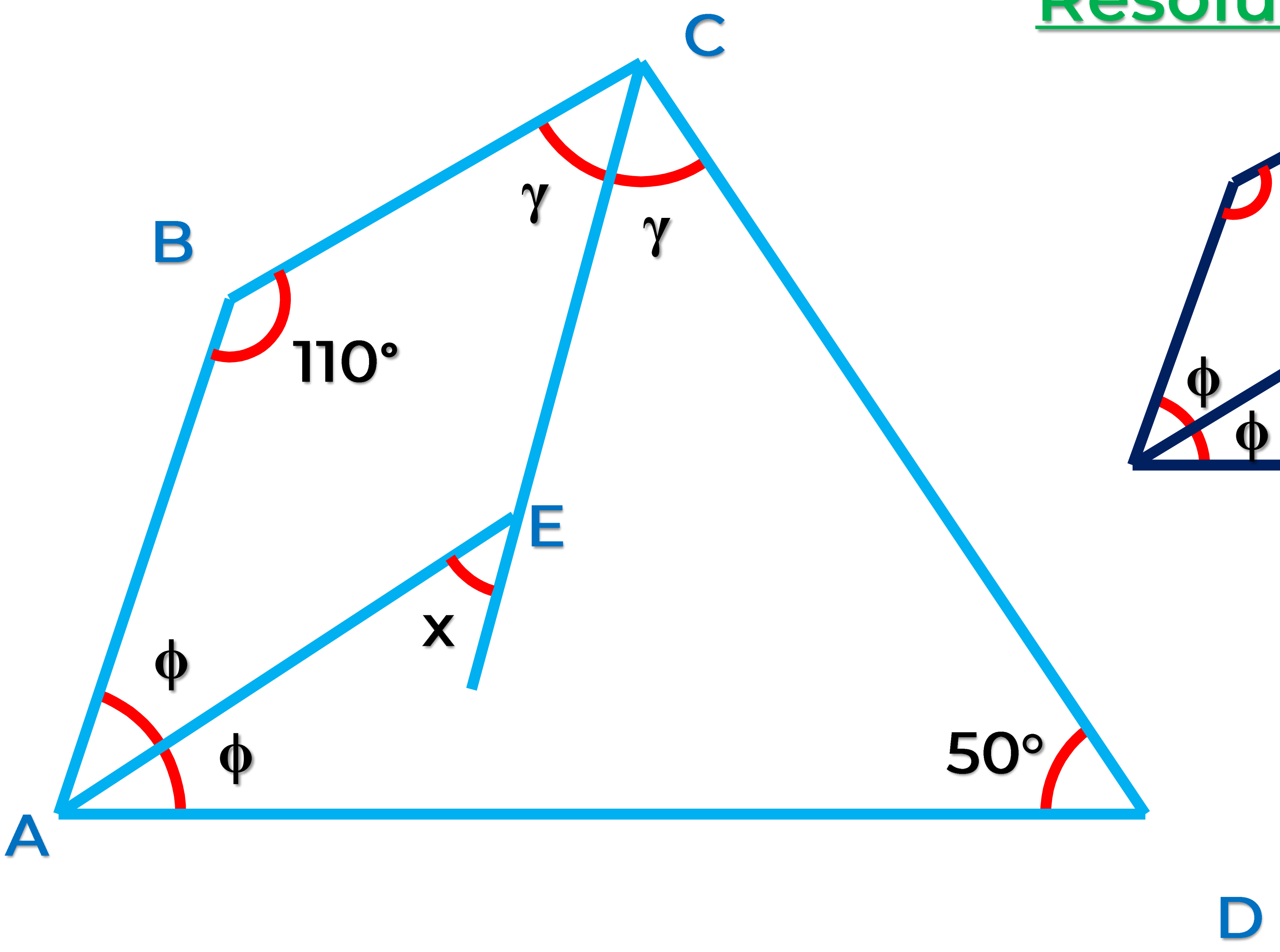
Δ Acutángulo



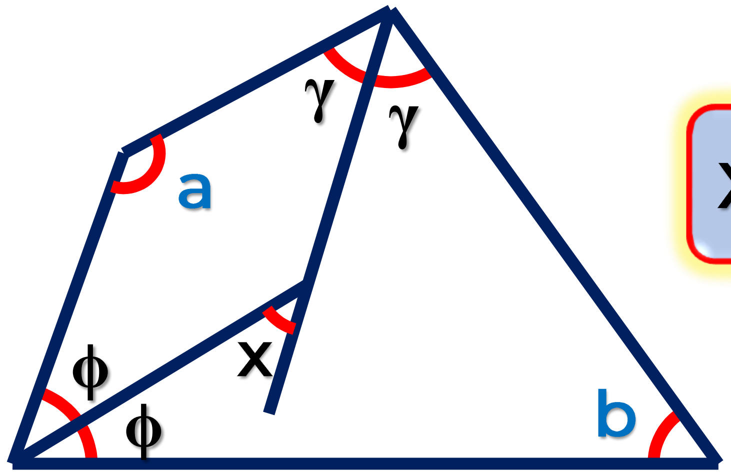
$90° < \omega < 180°$

Δ Obtusángul
o

1. En la figura, halle el valor de x.



Resolución

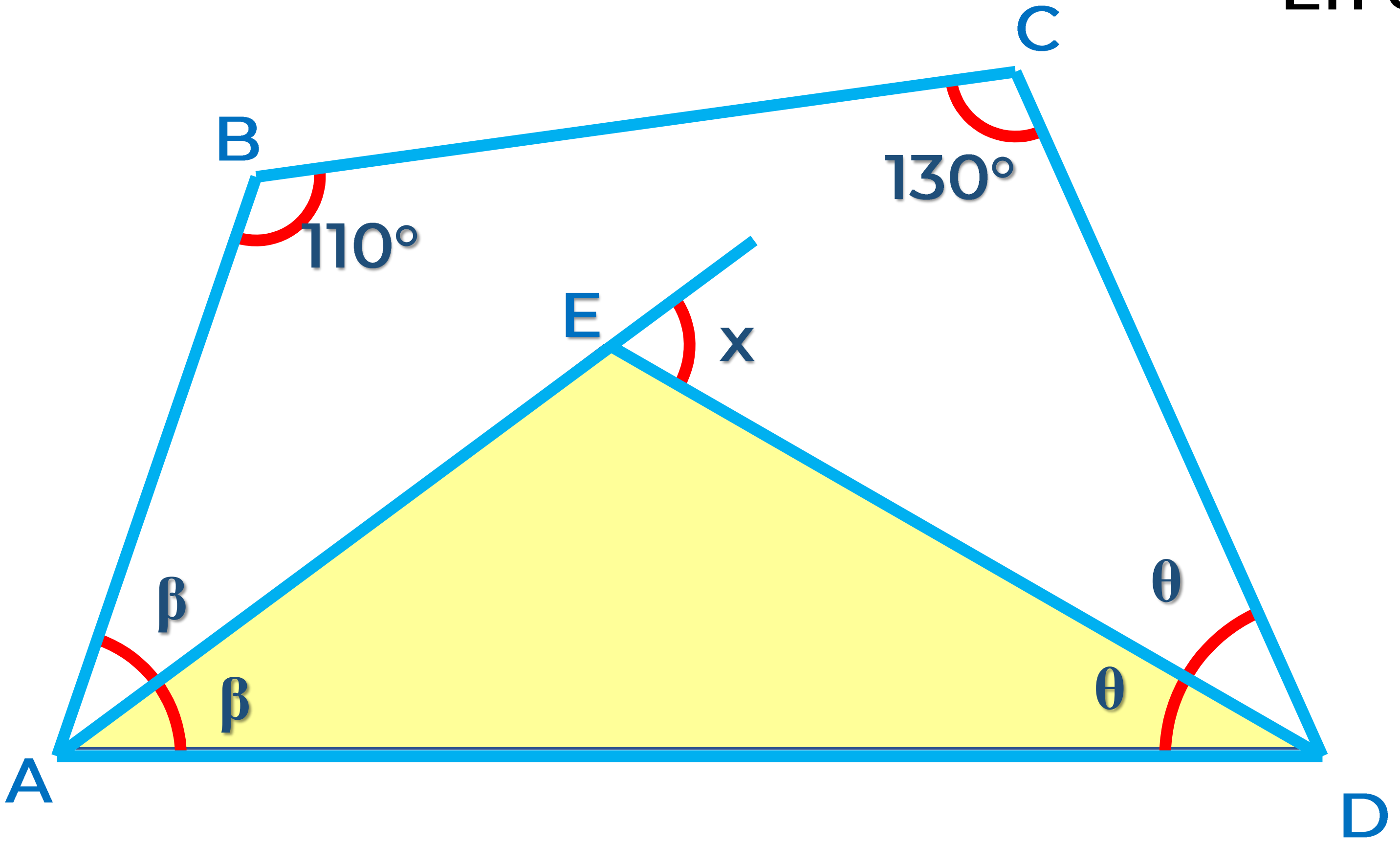


$$x = \frac{a - b}{2}$$

$$x = \frac{110° - 50°}{2}$$

$$\boxed{x = 30°}$$

2. En la figura, halle el valor de x.



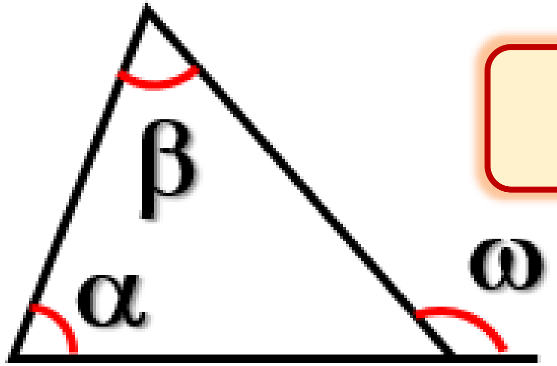
Resolución

- En el cuadrilátero ABCD:

$$2\theta + 2\beta + 110° + 130° = 360°$$

$$2\theta + 2\beta = 120°$$

$$\theta + \beta = 60°$$

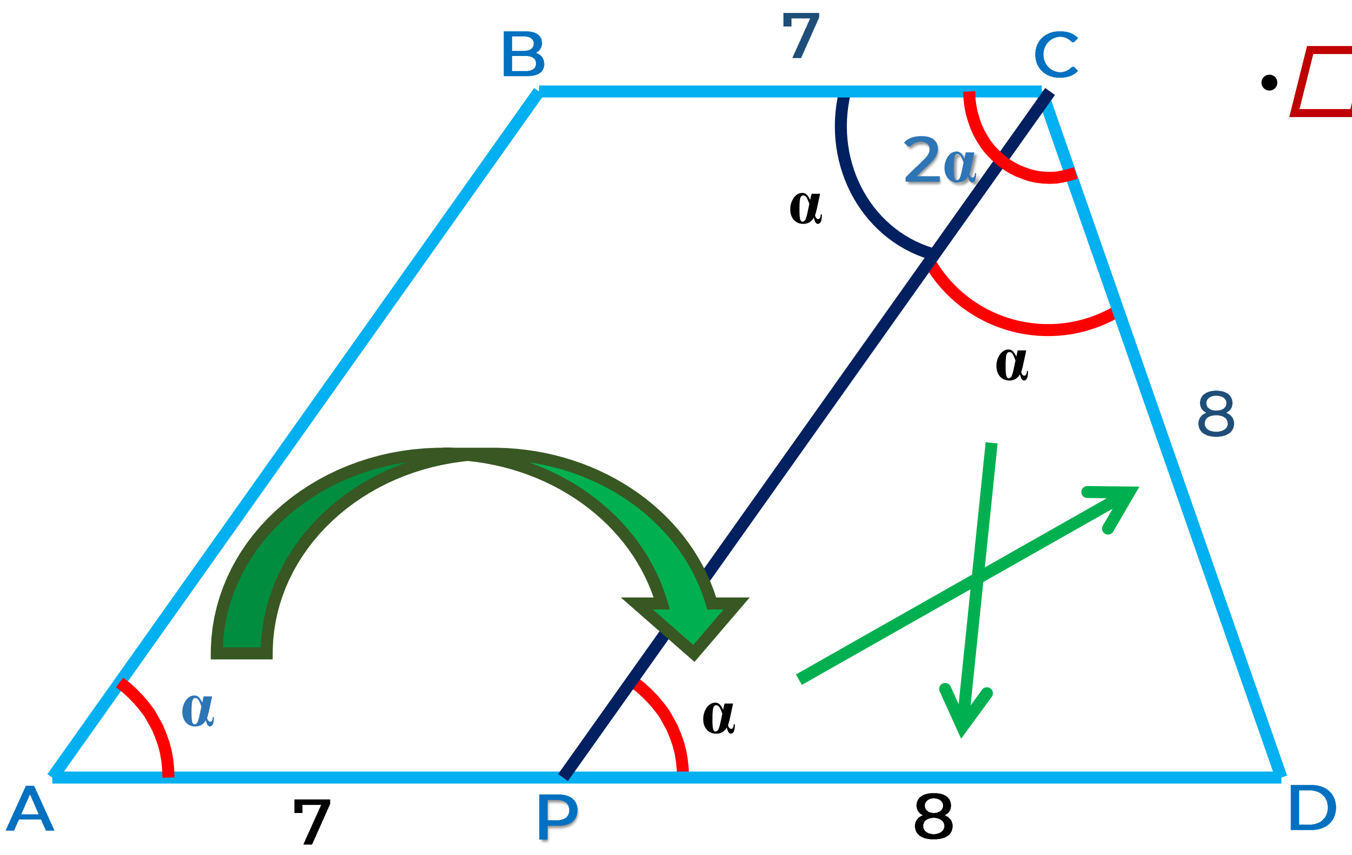


$$\boxed{\omega = \alpha + \beta}$$

$$x = \underbrace{\theta + \beta}_{60°}$$

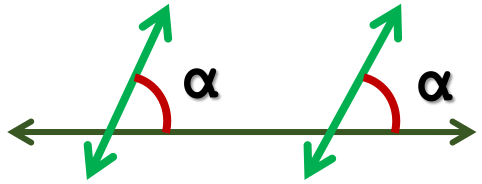
$$\boxed{x = 60°}$$

3. En un trapecio ABCD donde $\overline{BC}//\overline{AD}$, BC=7, CD=8 y m∡BCD=2(m∡BAD). Halle la longitud de la base mayor $\overline{AD}$.



Resolución

- Trazamos $\overline{CP}//\overline{BA}$
- ▱ ABCP (PARALELOGRAMO)



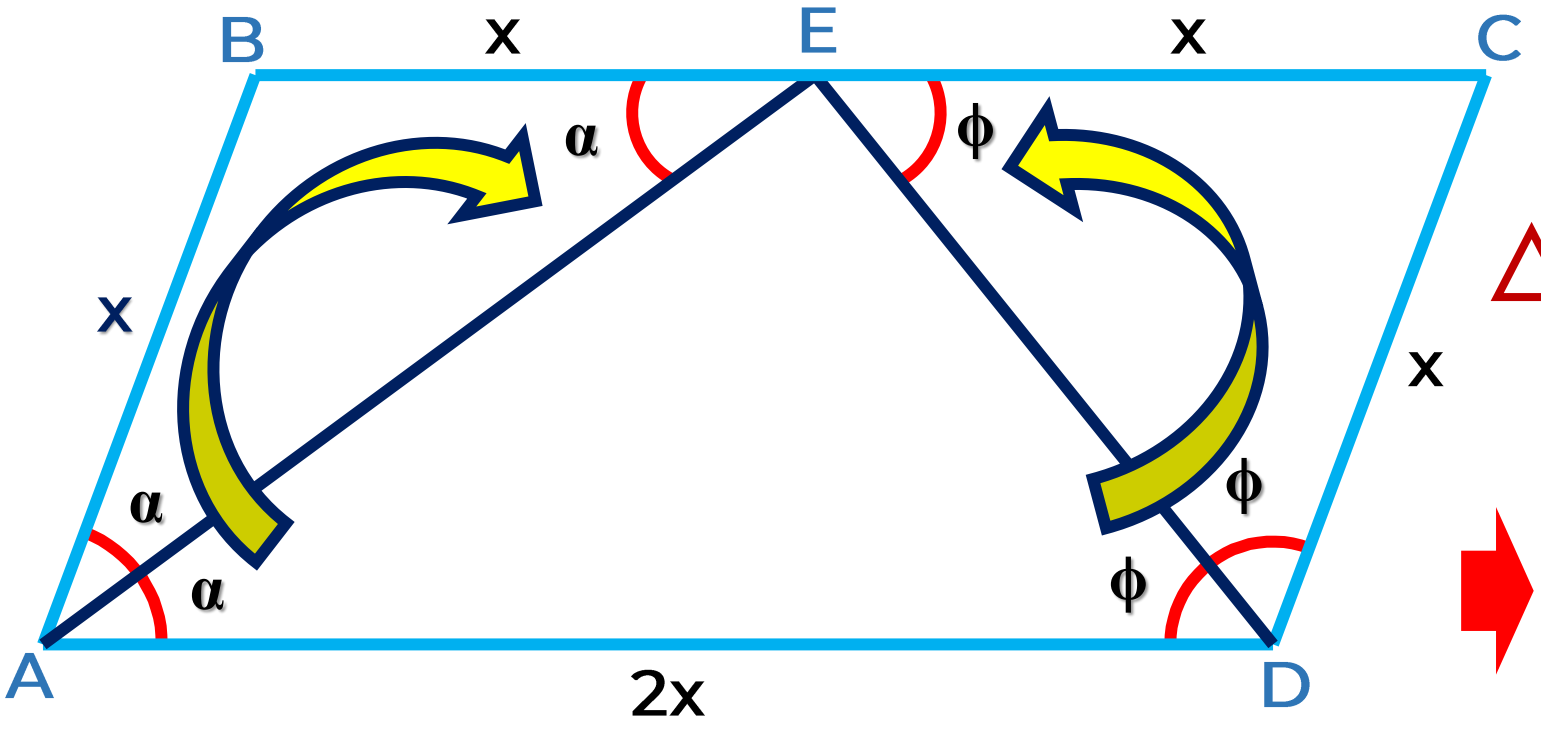
- △ CDP: ISÓSCELES

AD = 7 + 8

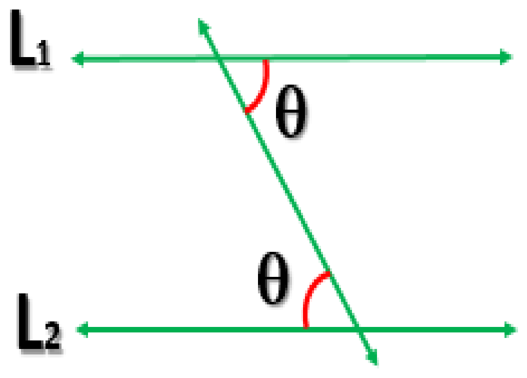
AD = 15

4. En la figura, halle el valor de *x* si ABCD es un romboide de perímetro 30.

Resolución



Ángulos alternos internos



$\triangle$ ABE y $\triangle$ ECD (Isósceles)

dato: $2p_{\square} = 30$

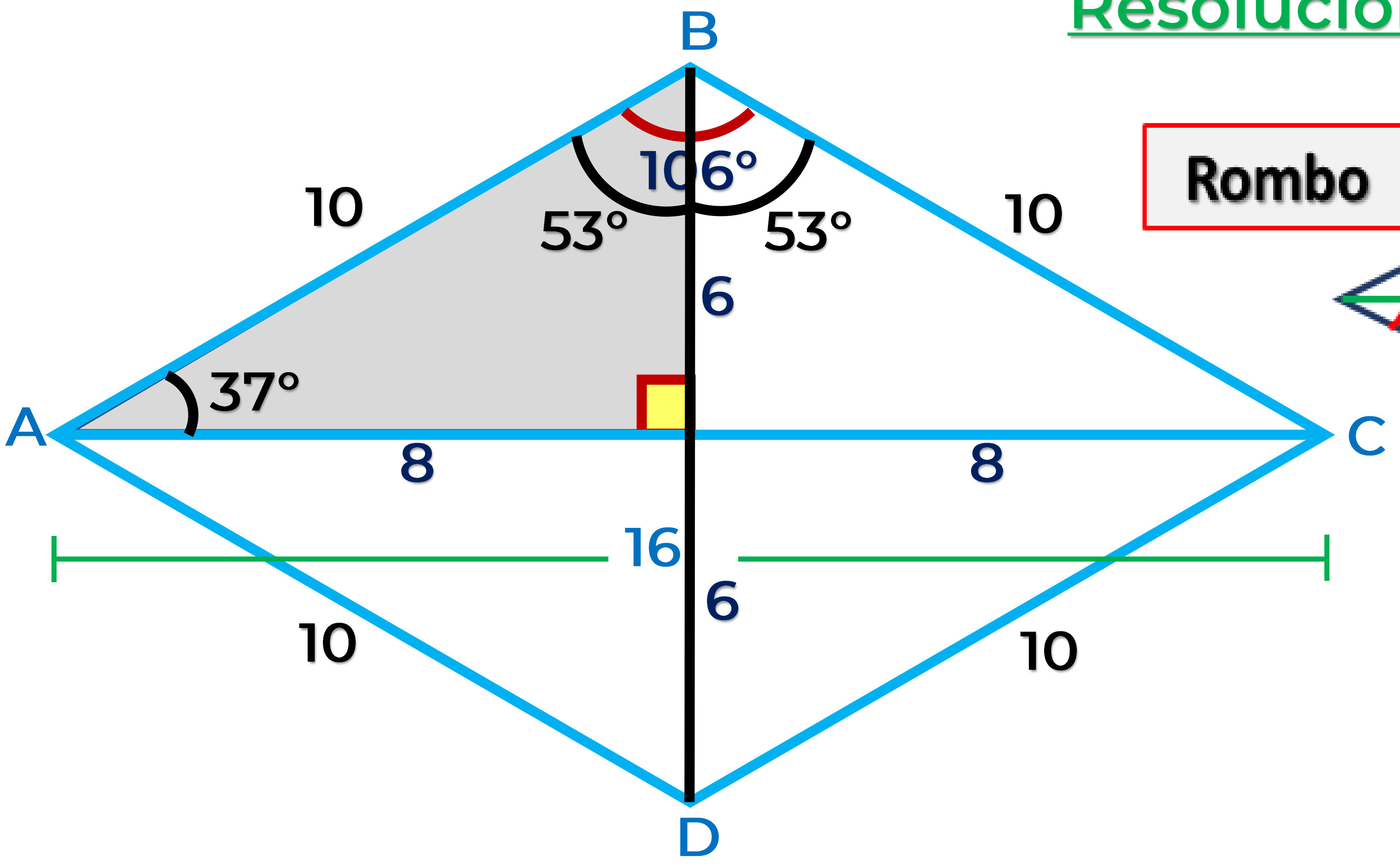
$$\underbrace{x + 2x + x + 2x}_{} = 30$$

$$6x = 30$$

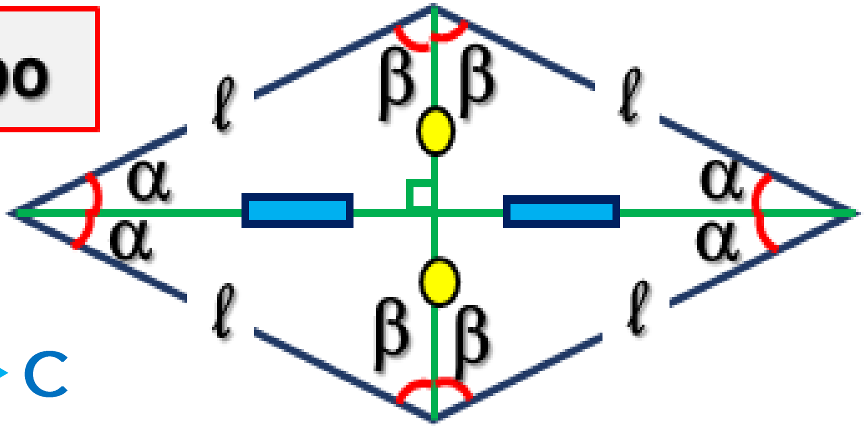
$$\boxed{x = 5}$$

5. En un rombo ABCD, se sabe que m∡ABC = 106° y AC = 16. Halle BD.

Resolución



Rombo

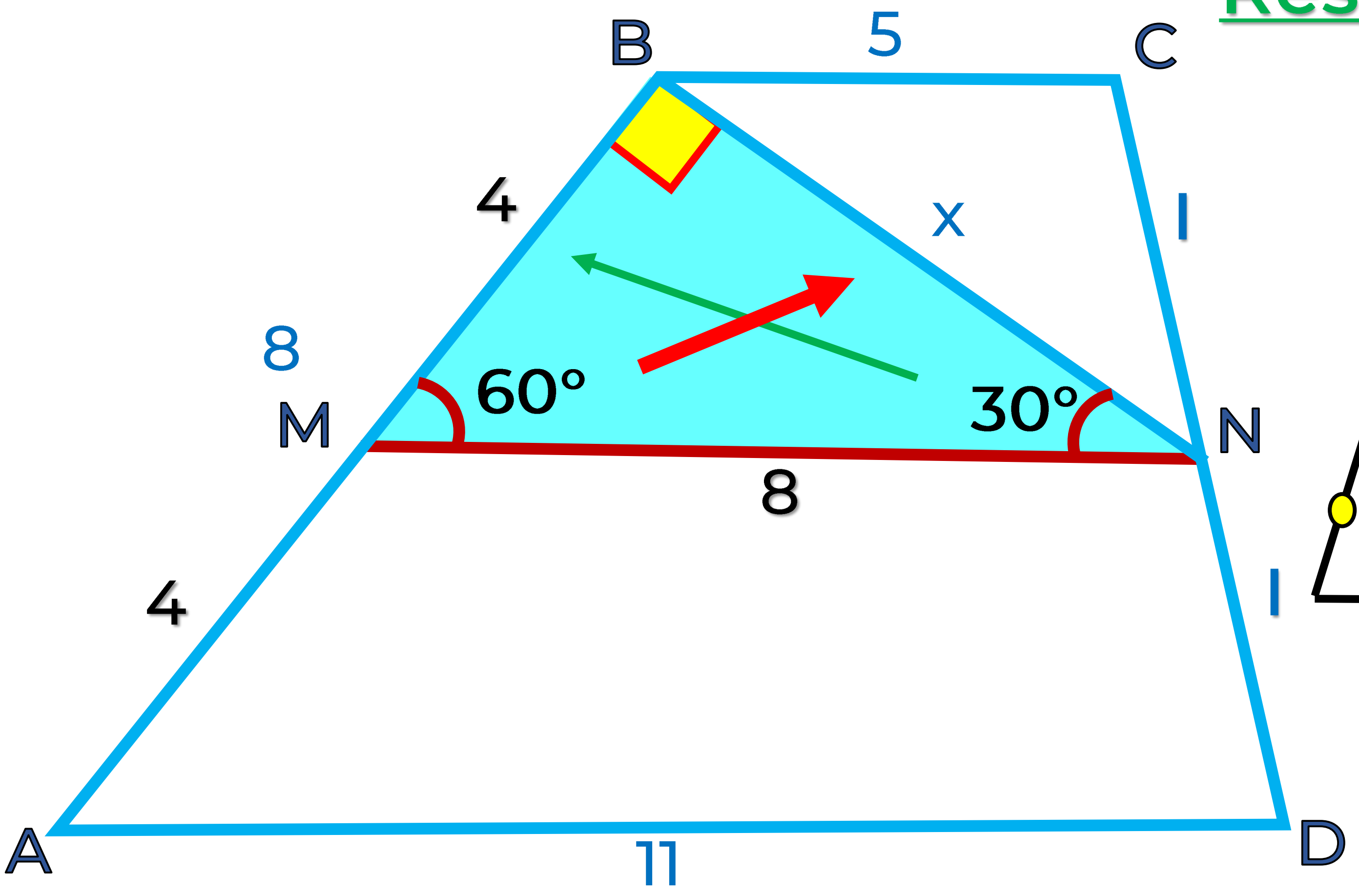


BD = 2(6)

BD = 12

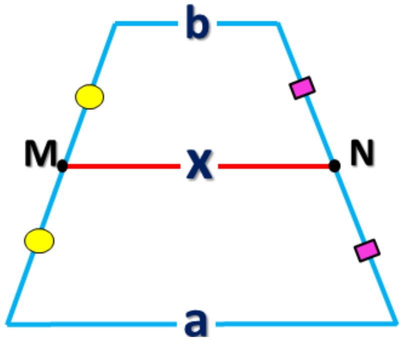
6. En un trapecio ABCD, donde $\overline{BC} // \overline{AD}$, BC = 5, AD = 11 y AB = 8. Luego en $\overline{CD}$ se ubica el punto medio N, tal que, la m∡ABN = 90°. Halle BN.

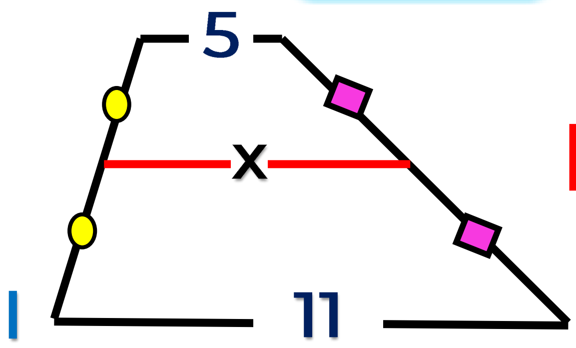
Resolución



$\overline{MN}$: Base media

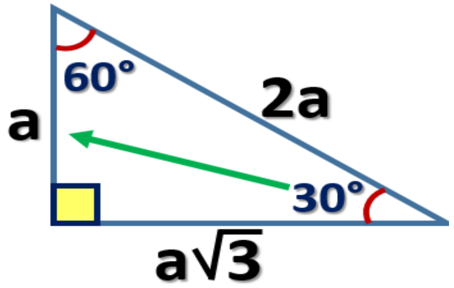
$$\boxed{x = \frac{a+b}{2}}$$





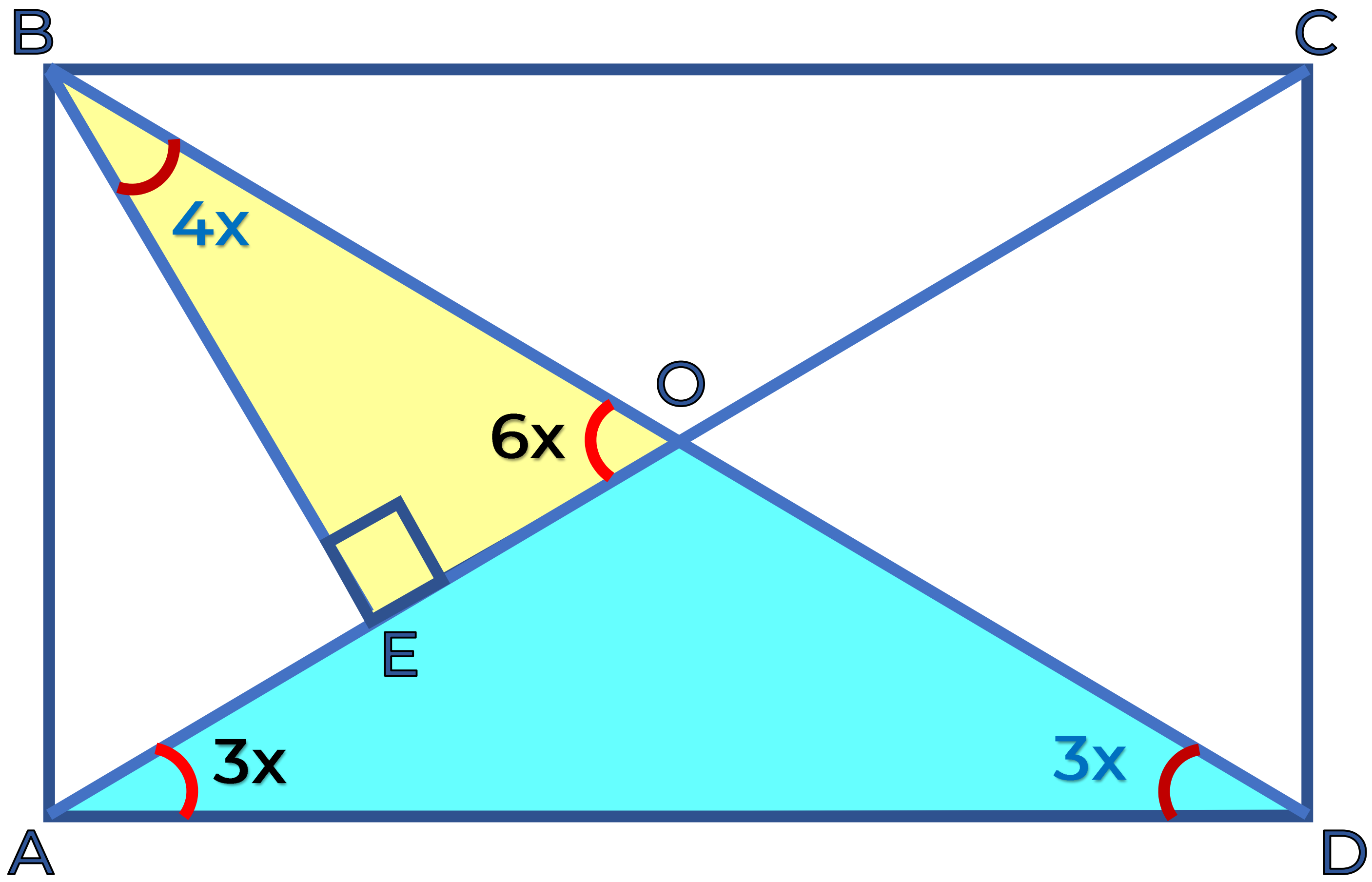
$$MN = \frac{5+11}{2}$$

$$MN = 8$$

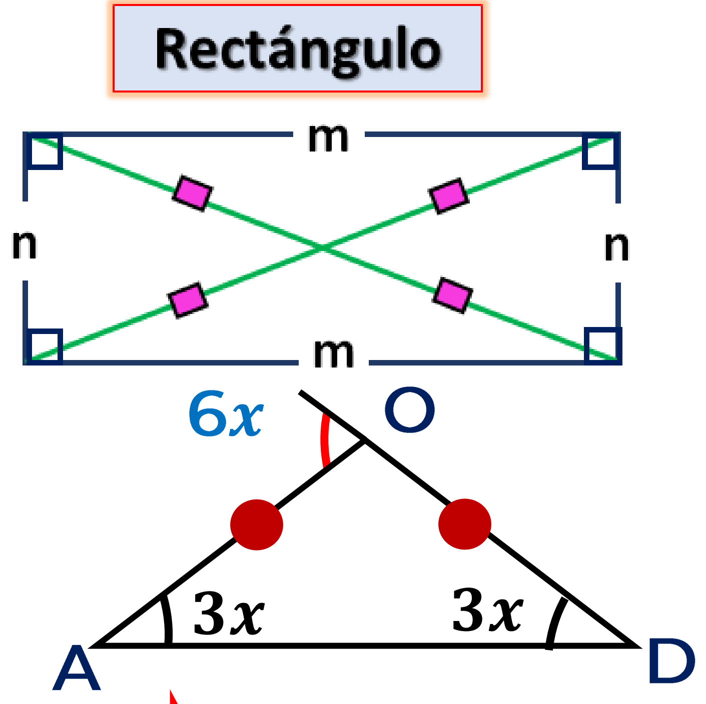


$$\boxed{x = 4\sqrt{3}}$$

7. En la figura, ABCD es un rectángulo. Halle el valor de x.



Resolución



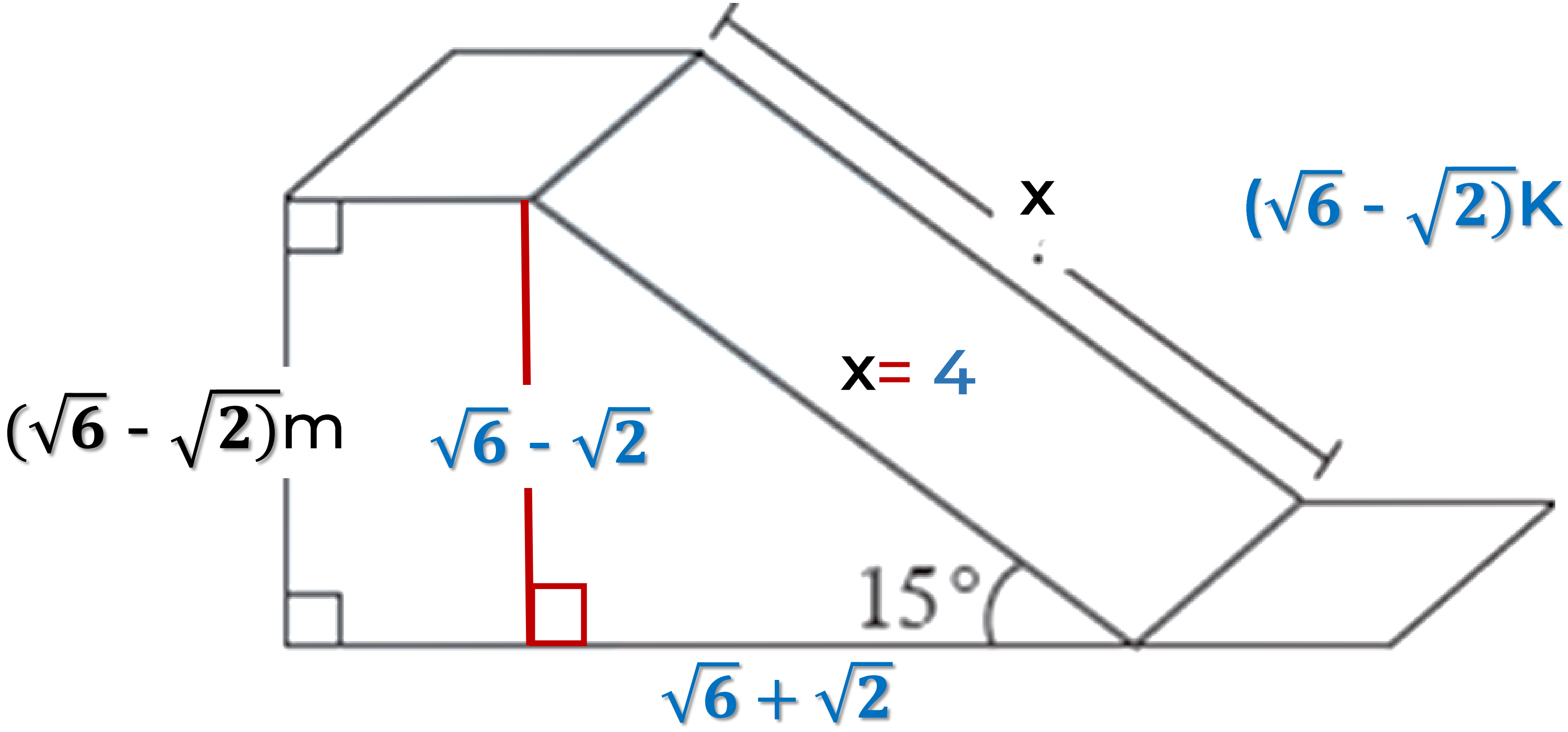
$\triangle$ EBO :

$4x + 6x = 90°$

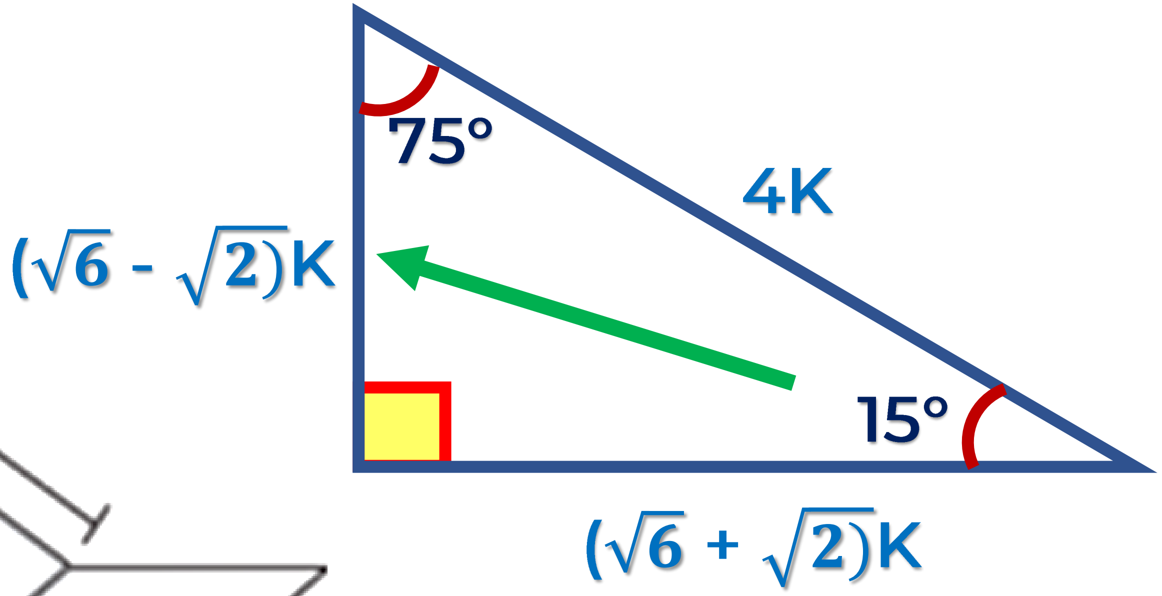
$10x = 90°$

$\boxed{x = 9°}$

8. En la figura se muestra una rampa. Halle la longitud de la parte inclinada.



Resolución



Por ◺ Notable de 15° y 75°

$\boxed{x = 4}$