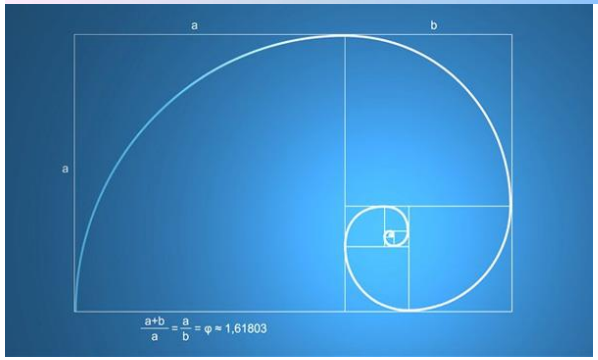
GEOMETRÍA

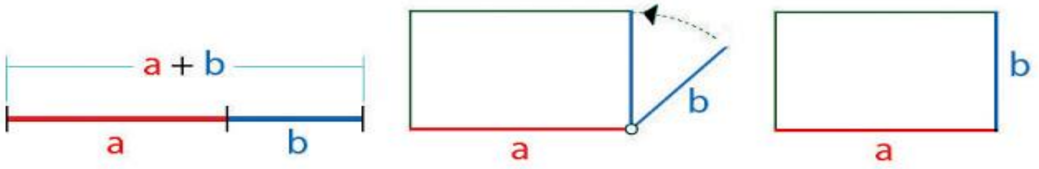
Capítulo 9

4st
SECONDARY

SEGMENTOS PROPORCIONALES

SACO OLIVEROS



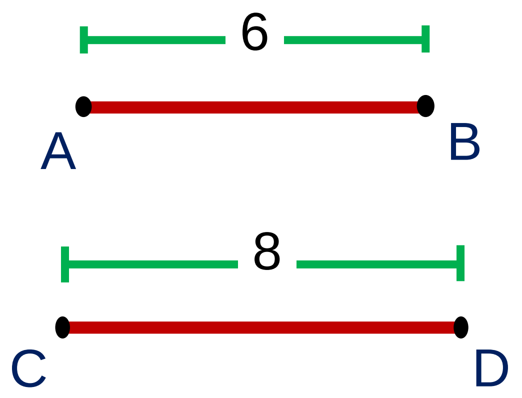


$$\frac{a}{b} = \frac{a+b}{a} = \varphi \text{ (Phi)} = \mathbf{1.61803399...}$$

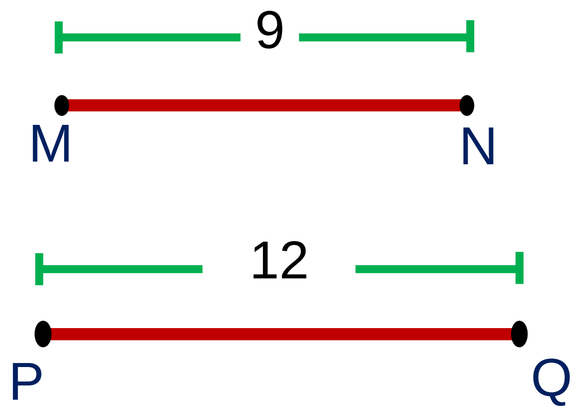
SEGMENTOS PROPORCIONALES

Segmentos proporcionales

Si la razón geométrica de 2 segmentos es igual a la de otros dos, dichos pares de segmentos son proporcionales.



$$\frac{AB}{CD} = \frac{\cancel{6}}{\cancel{8}} = \boxed{\frac{3}{4}}$$

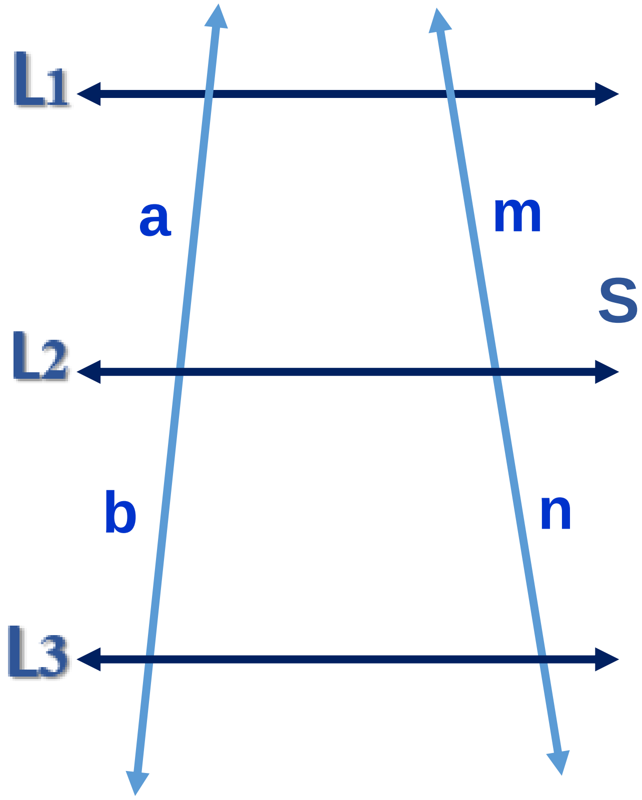


$$\frac{MN}{PQ} = \frac{\cancel{9}}{\cancel{12}} = \boxed{\frac{3}{4}}$$

$$\boxed{\frac{AB}{CD} = \frac{MN}{PQ}}$$

➡ Son proporcionales

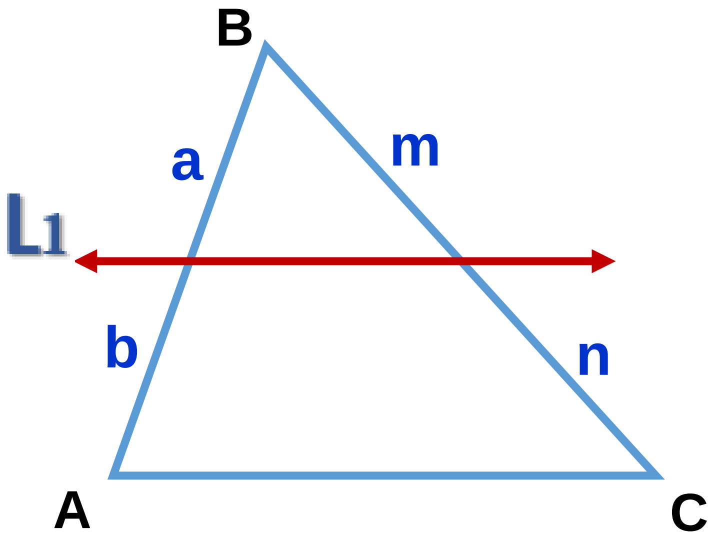
Teorema de Tales



Si: $\overleftrightarrow{L_1} \parallel \overleftrightarrow{L_2} \parallel \overleftrightarrow{L_3}$

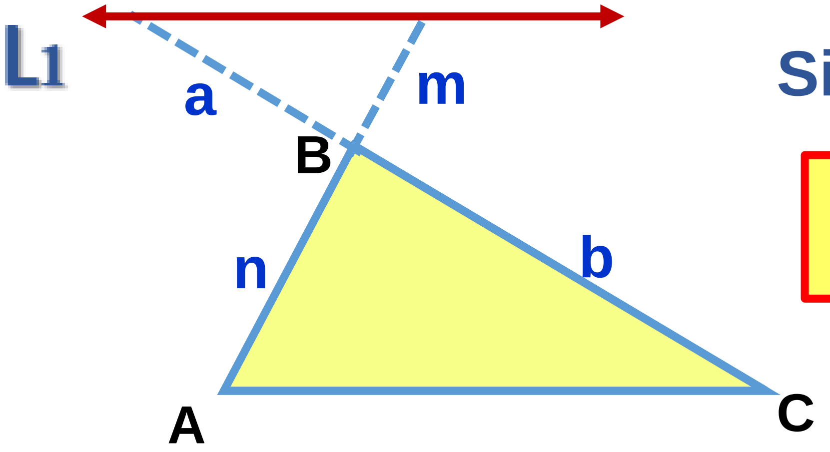
$$\boxed{\frac{a}{b} = \frac{m}{n}}$$

Corolario de Tales



Si: $\overleftrightarrow{L_1} \parallel \overline{AC}$

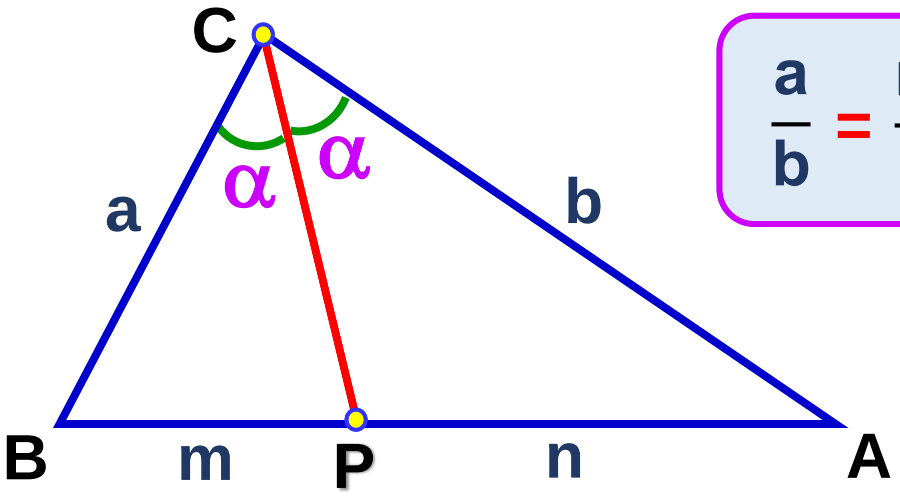
$$\boxed{\frac{a}{b} = \frac{m}{n}}$$



Si: $\overleftrightarrow{L_1} \parallel \overline{AC}$

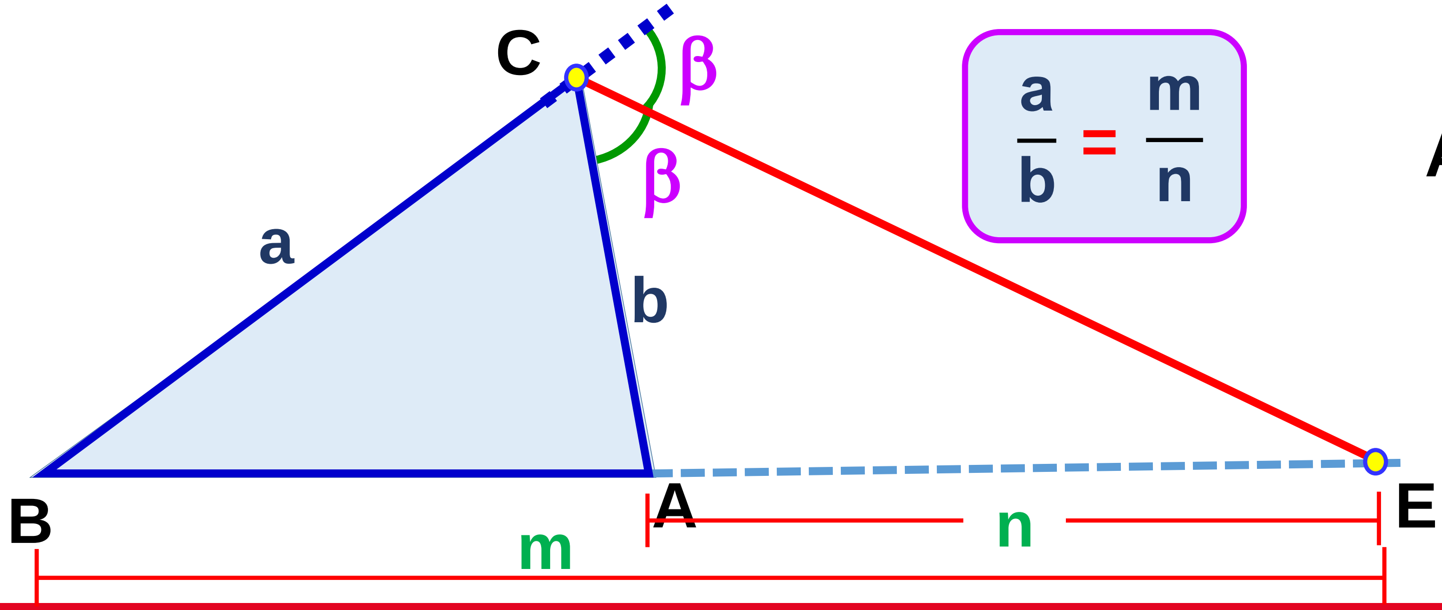
$$\boxed{\frac{a}{b} = \frac{m}{n}}$$

Teorema de la bisectriz Interior



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

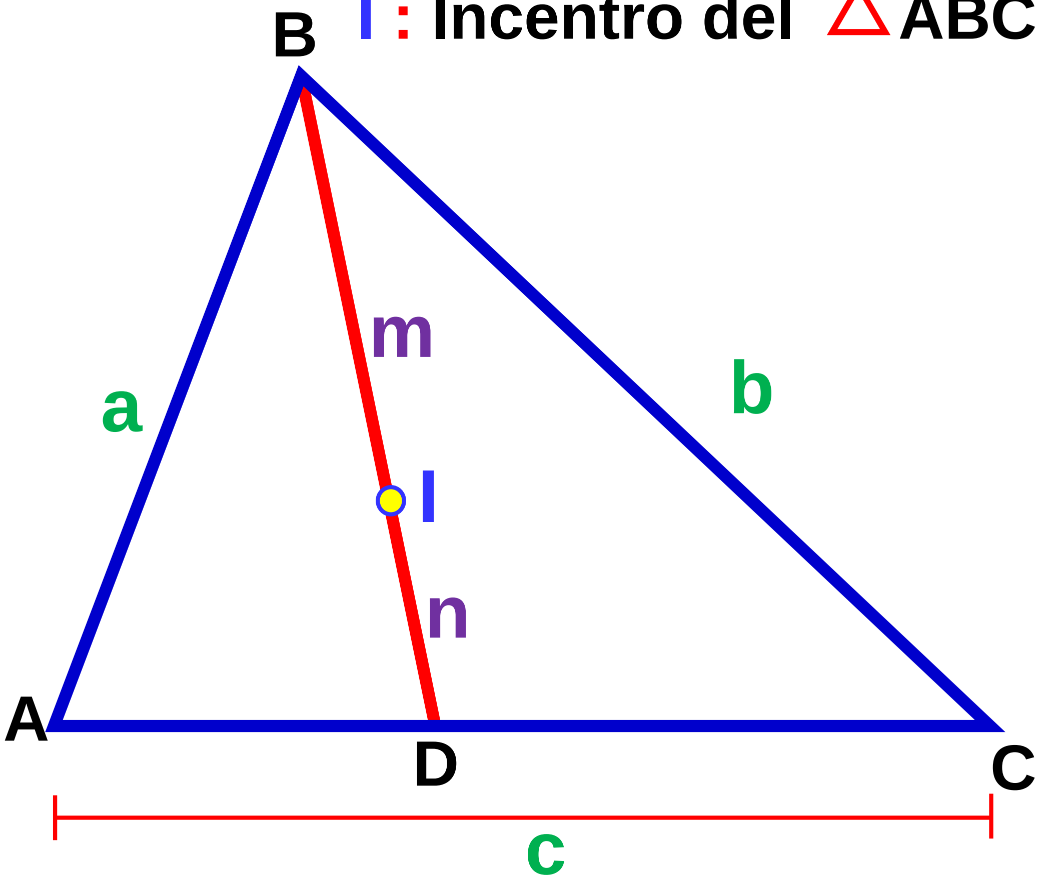
Teorema de la bisectriz Exterior



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

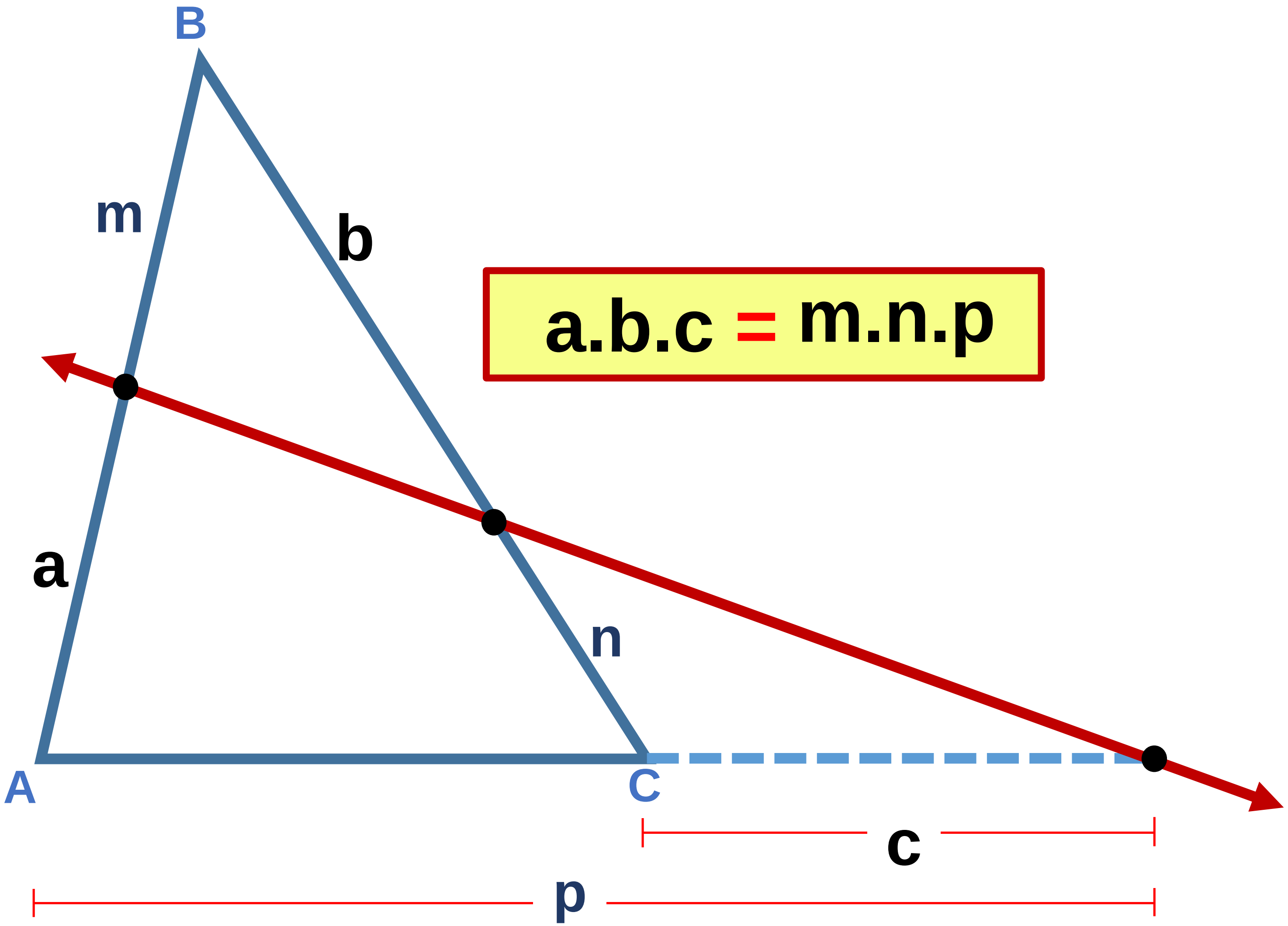
Teorema del incentro

I : Incentro del △ABC



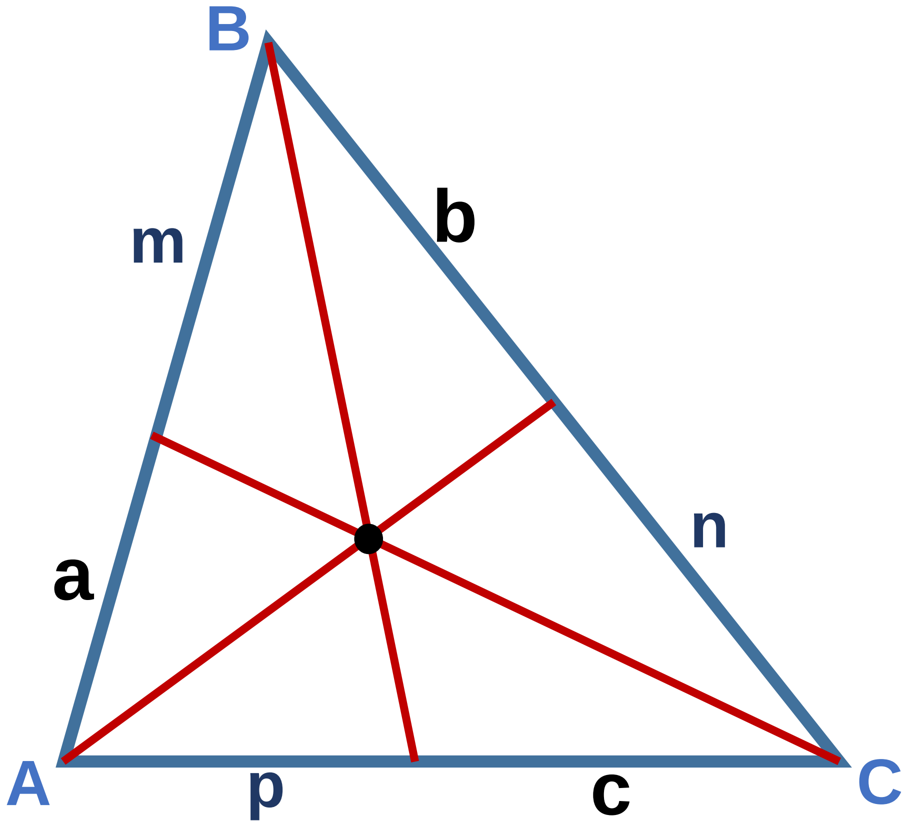
$$\frac{m}{n} = \frac{a+b}{c}$$

Teorema de Menelao



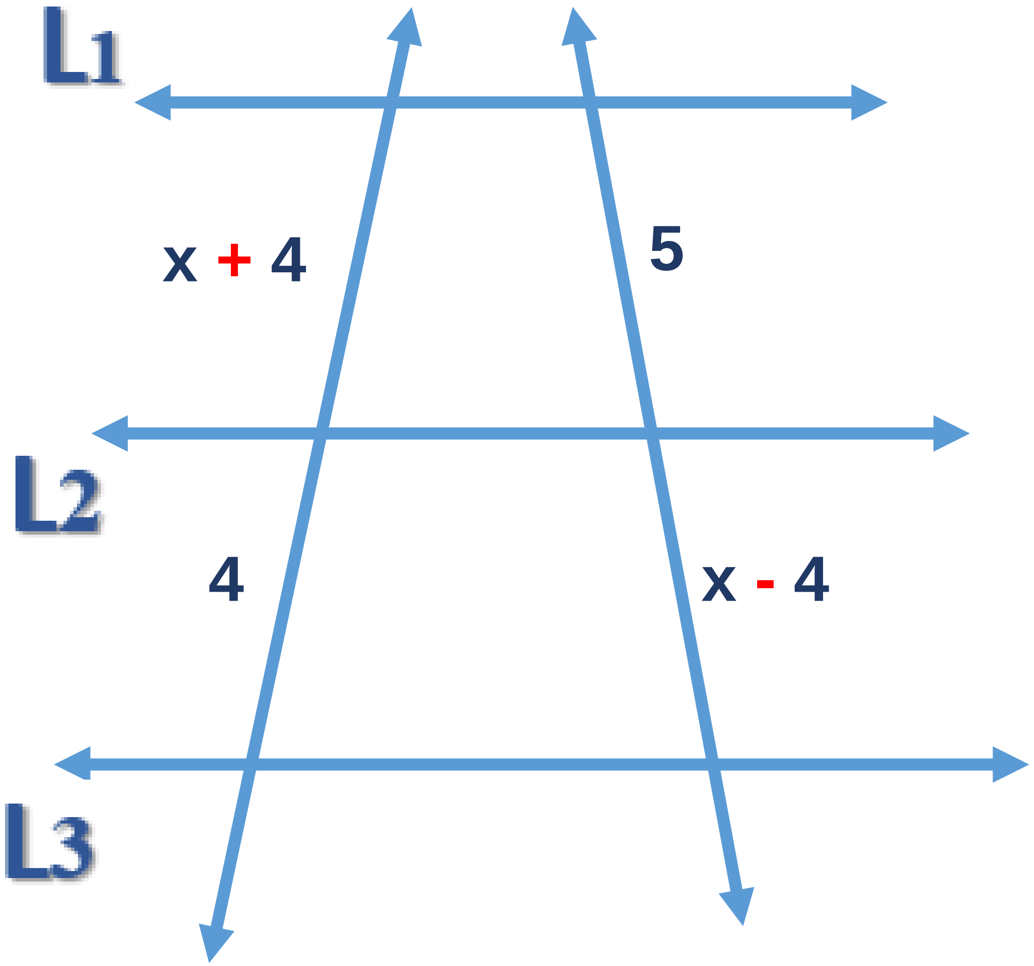
$$a.b.c = m.n.p$$

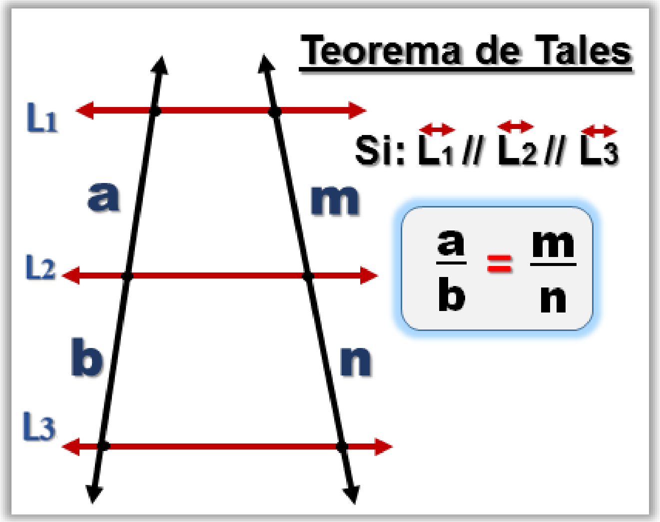
Teorema de Ceva



$$a.b.c = m.n.p$$

1. En la figura , $\overleftrightarrow{L_1} \,//\, \overleftrightarrow{L_2} \,//\, \overleftrightarrow{L_3}$. Halle el valor de *x*.





Resolución

- **Piden x**

Por el teorema de thales:

$$\frac{x+4}{4} = \frac{5}{x-4}$$

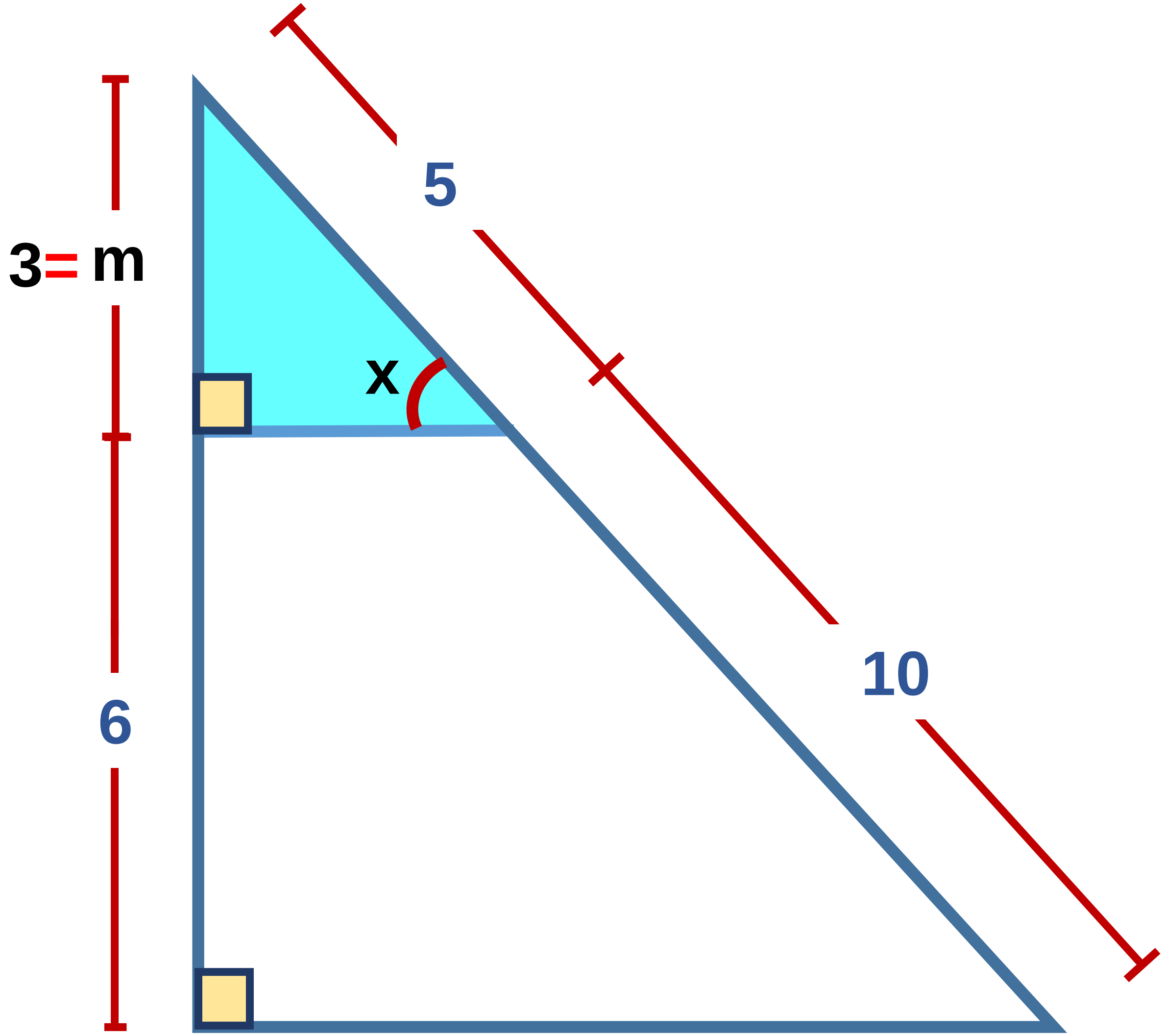
$$(x+4)(x-4) = 20$$

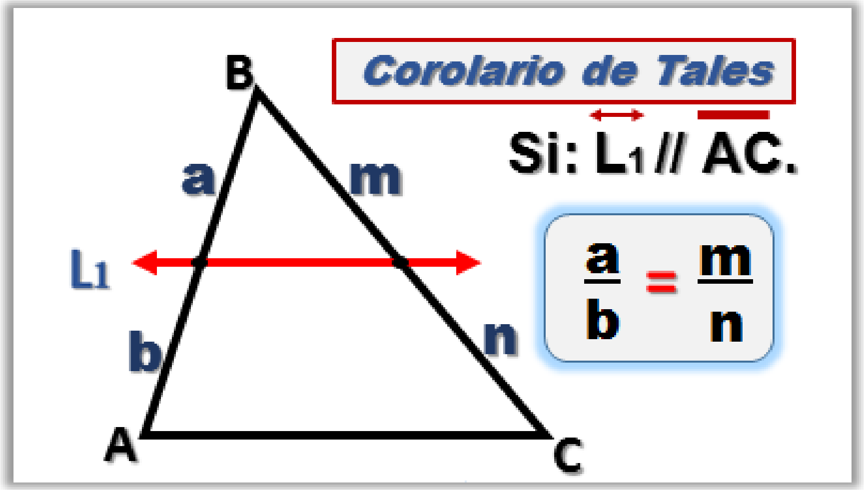
$$x^2 - 4^2 = 20$$

$$x^2 = 36$$

$$\boxed{x = 6}$$

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





Resolución

- Piden x

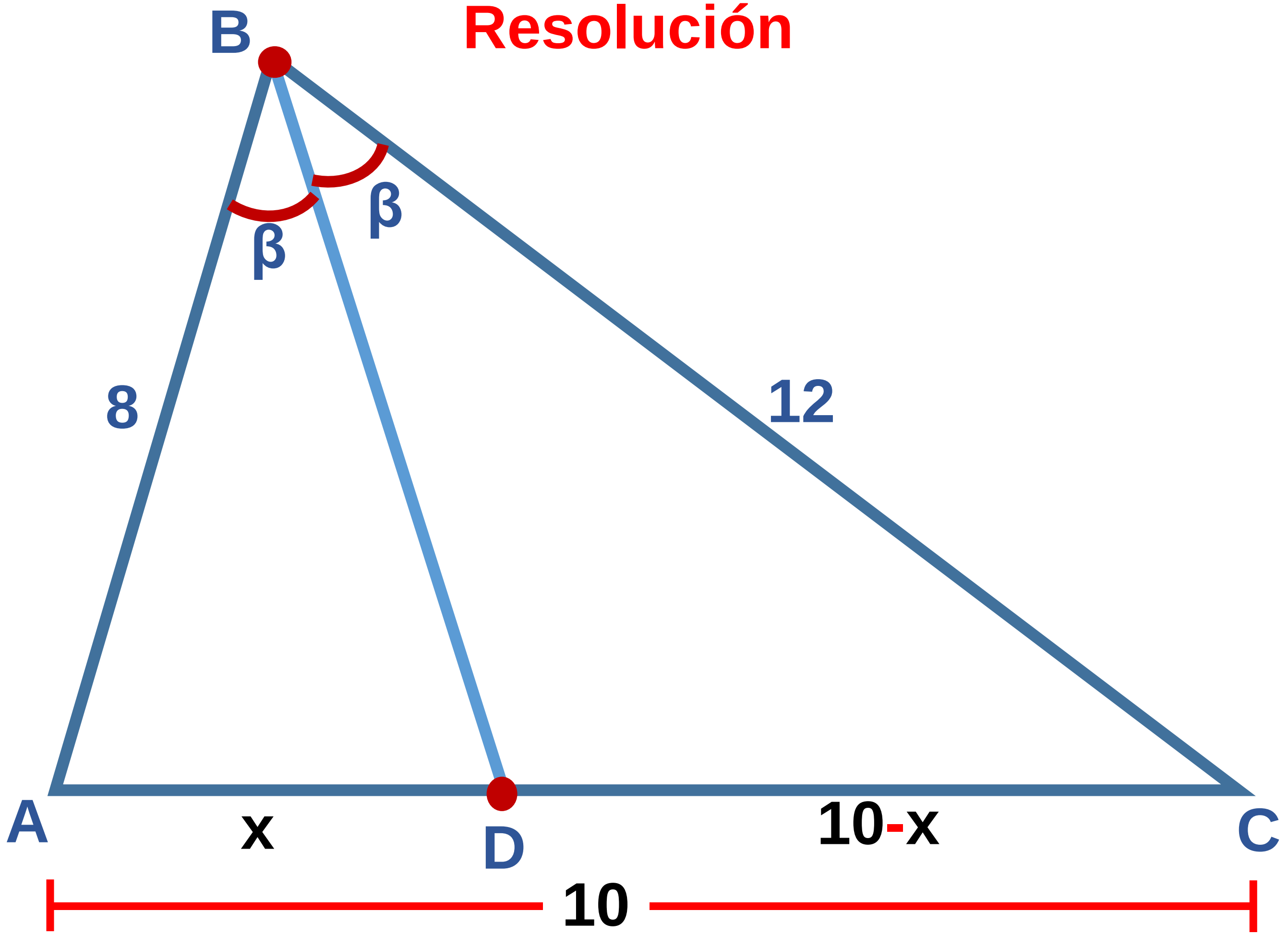
$$\frac{m}{6} = \frac{5}{10} \longrightarrow m = 3$$

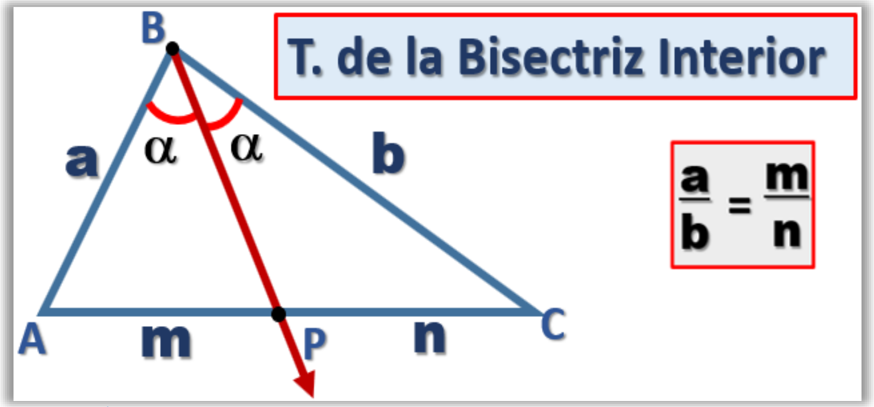
- Es ◺ notable de 37° y 53°

$$\boxed{x = 37°}$$

3. En un triángulo ABC, AB = 8m, BC = 12m y AC = 10m. Luego se traza la bisectriz interior $\overline{BD}$. Calcule AD.

Resolución





- Piden AD = x

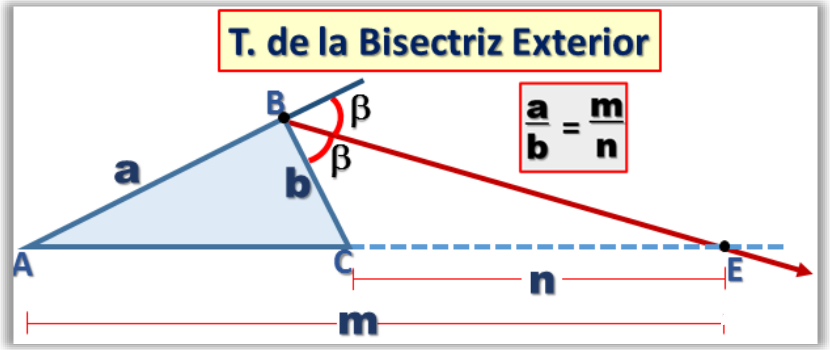
$$\frac{\cancel{8}^{\,2}}{\cancel{12}_{\,3}} = \frac{x}{10 - x}$$

$$20 - 2x = 3x$$

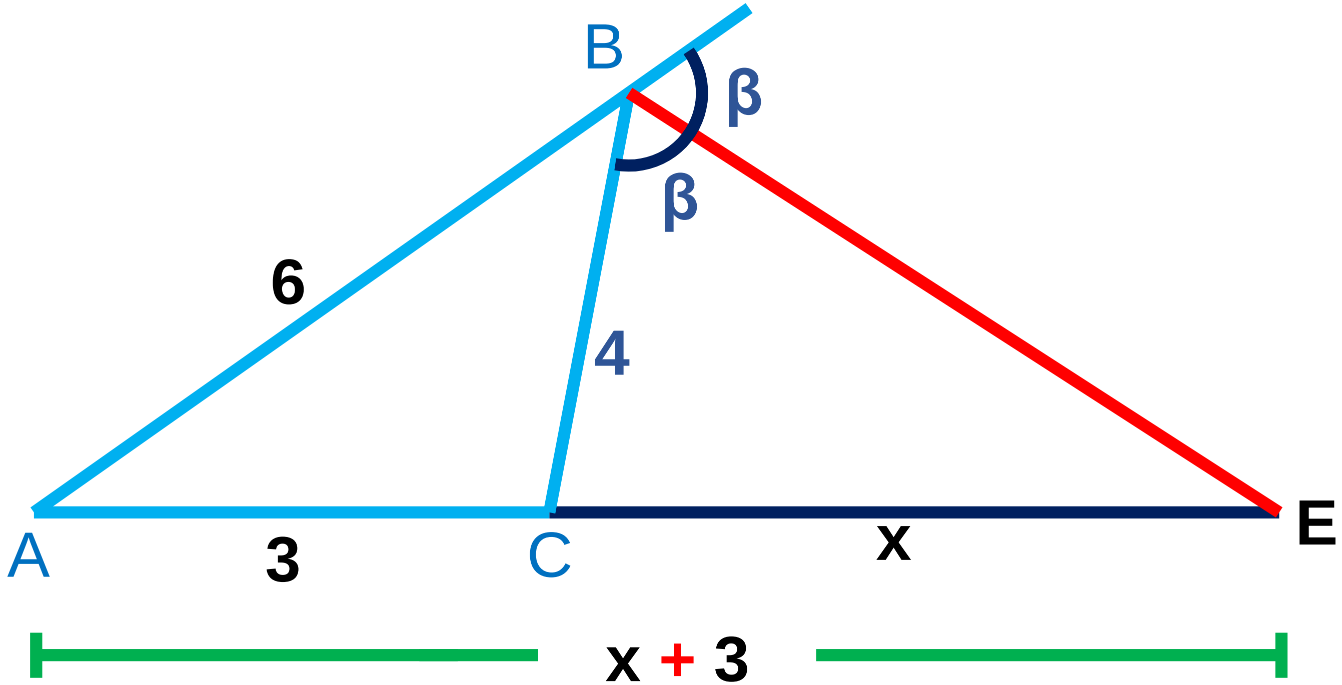
$$20 = 5x$$

$$\boxed{x = 4m}$$

4. En un triángulo ABC, AB = 6m, BC = 4m y AC = 3m. Luego se traza la bisectriz exterior del ángulo exterior en B, la cual interseca a la prolongación de $\overline{AC}$ en E. Calcule CE.



Resolución



- **Piden x**

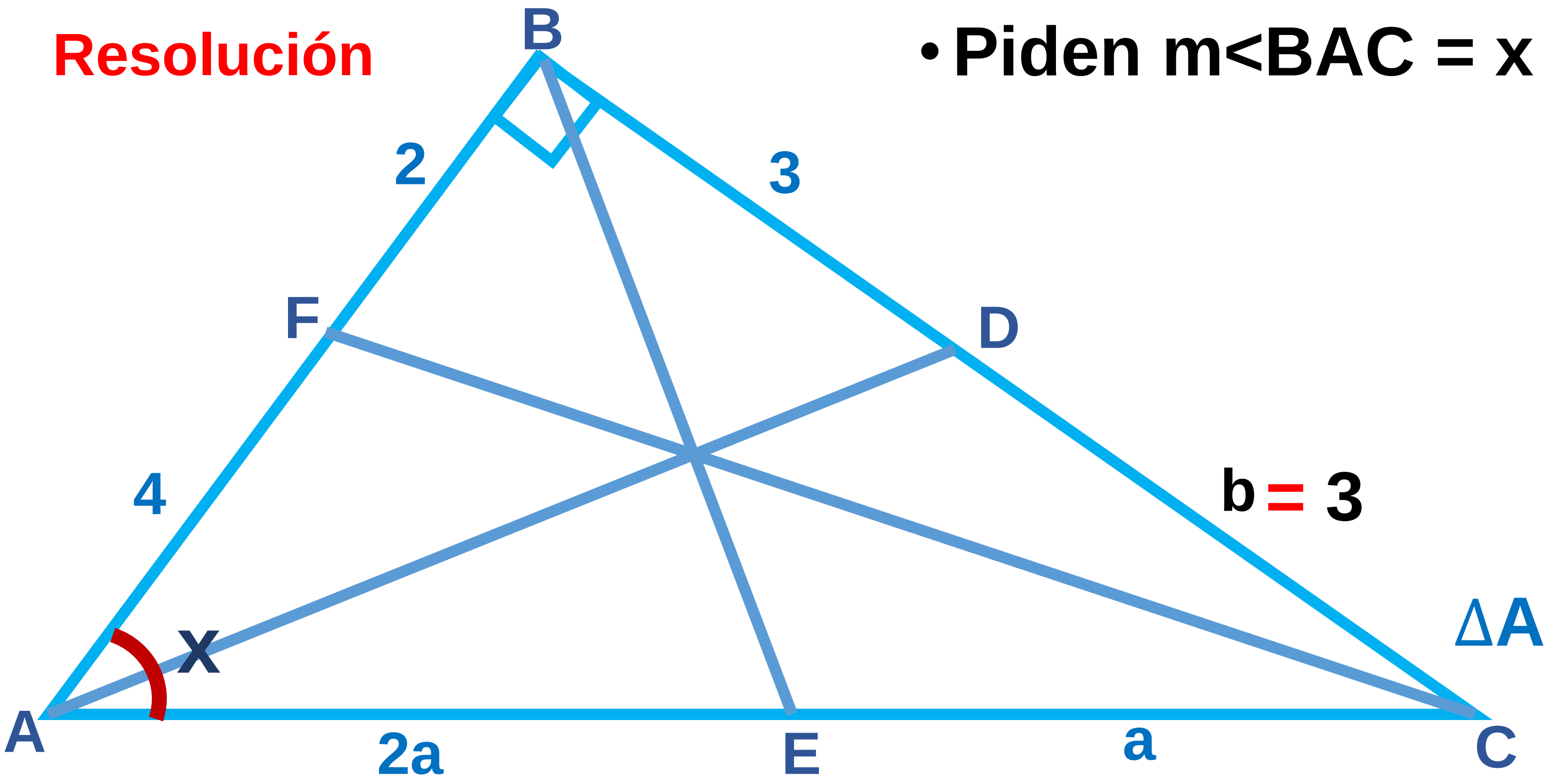
$$\frac{\overset{3}{\cancel{6}}}{\underset{2}{\cancel{4}}} = \frac{x + 3}{x}$$

$$3x = 2x + 6$$

$$\boxed{x = 6m}$$

5. En un triángulo rectángulo ABC, recto en B, se trazan las cevianas interiores $\overline{AD}$, $\overline{BE}$ y $\overline{CF}$, las cuales se intersecan en un punto. Si AF = 4, FB = 2, BD = 3 y AE = 2(EC), calcule m<BAC.

Resolución

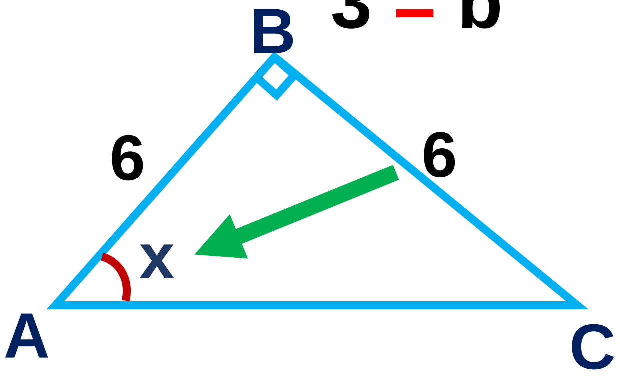


- **Piden m<BAC = x**

Teorema de Ceva

$(\cancel{4})(3)(\cancel{a}) = (\cancel{2})(b)(\cancel{2}\cancel{a})$

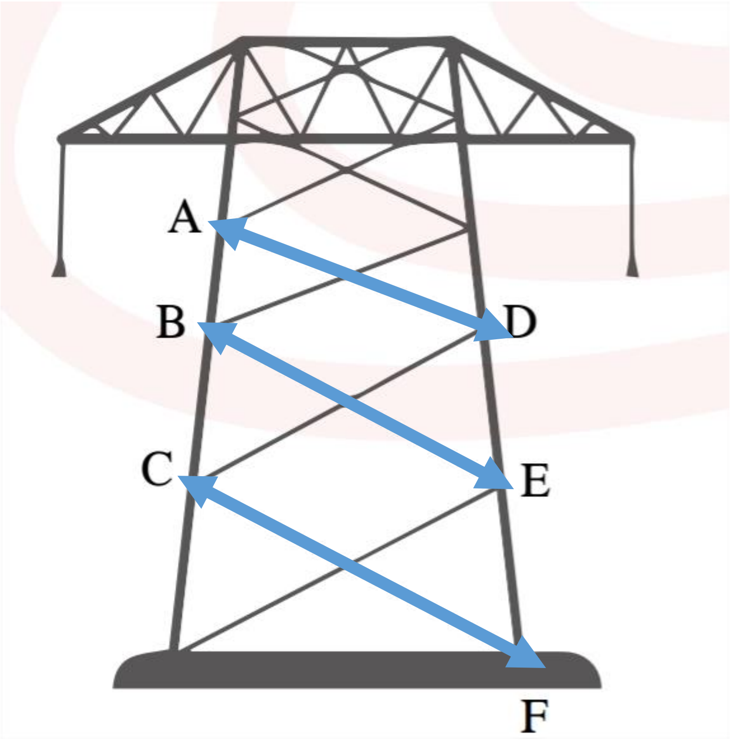
3 = b

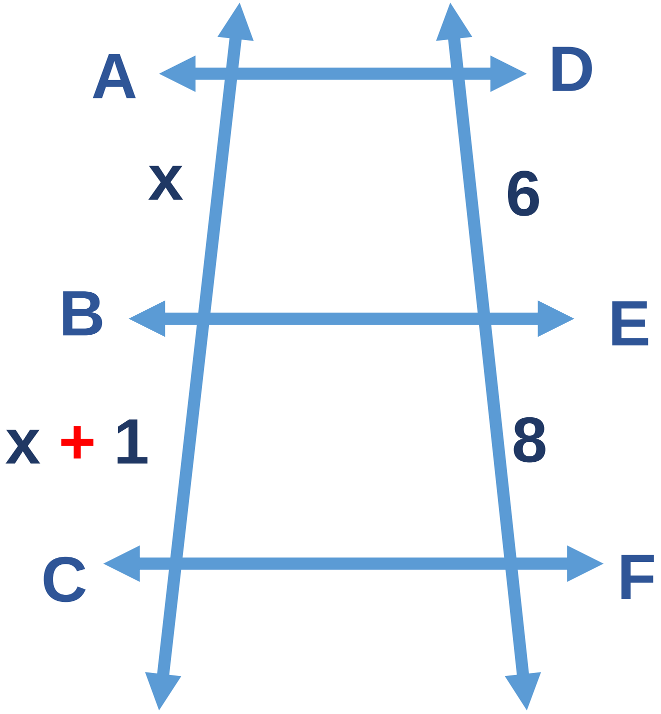


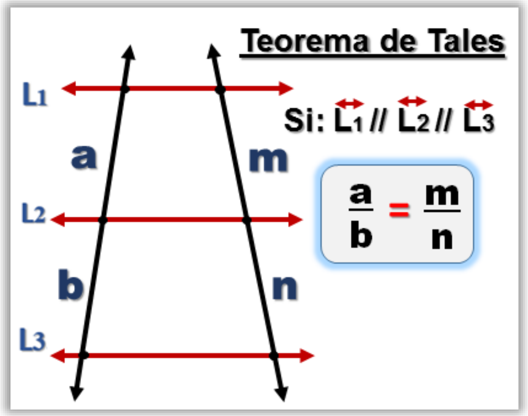
ΔABC: Isósceles

$\boxed{x = 45°}$

6. En la figura se observa una torre de alta tensión de manera que los borras metálicas $\overline{AD}$, $\overline{BE}$ y $\overline{CF}$ son paralelas, BC=AB + 1; DE = 6 y EF = 8. Calcule AB.







Resolución

- **Piden AB = x**

Por el teorema de thales:

$$\frac{x}{x+1} = \frac{\cancel{6}^{\,3}}{\cancel{8}_{\,4}}$$

$$4x = 3x + 3$$

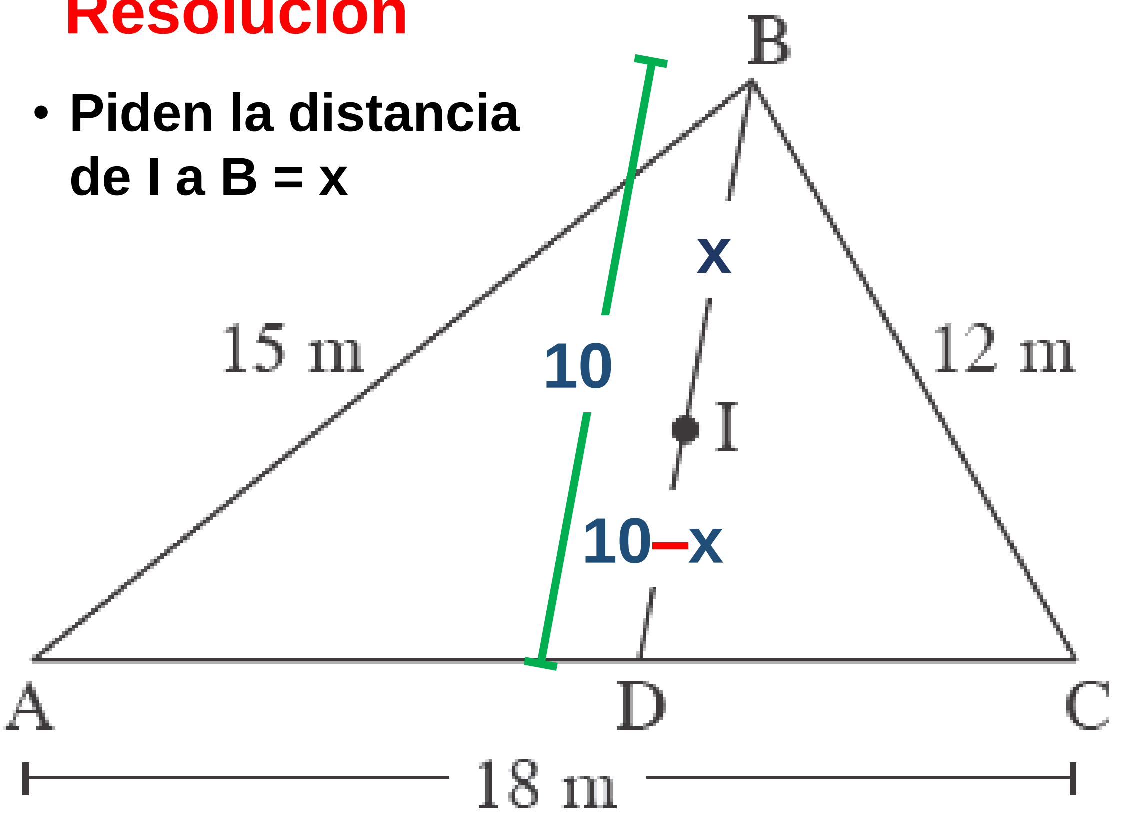
$$\boxed{x = 3}$$

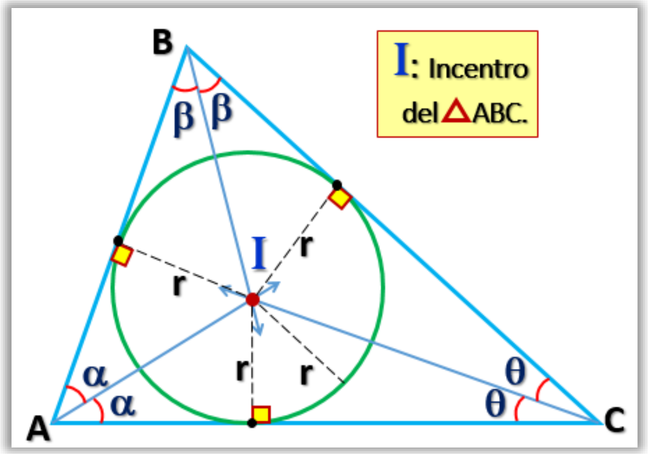
7. En la figura se muestra el piso de una piscina donde en el punto I se encuentra el punto de succión del agua, el cual equidista de las paredes de la piscina. Halle la distancia de I a B si BD = 10 m.

I es el incentro △ABC

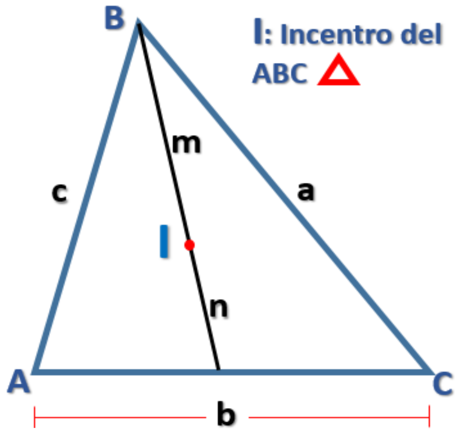
Resolución

- **Piden la distancia de I a B = x**





Teorema del Incentro



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

Por teorema del Incentro

$$\frac{x}{10-x} = \frac{15+12}{18}$$

$$\frac{x}{10-x} = \frac{\cancel{27}^{\,3}}{\cancel{18}_{\,2}}$$

$$2x = 30 - 3x$$

$$5x = 30$$

$$\boxed{x = 6 \text{ m}}$$