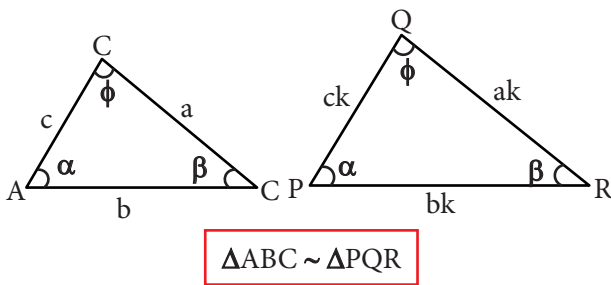




PROBLEMAS DE SEMEJANZA DE TRIÁNGULOS

Dos triángulos son semejantes si tienen sus tres ángulos interiores congruentes (ángulos de igual medida) y las longitudes de sus lados homólogos son directamente proporcionales. Los lados homólogos son aquellos que se oponen a los ángulos congruentes.



Notación

Nota 1

$$\begin{aligned} m\angle ABC &= m\angle PQR \\ m\angle BCA &= m\angle QRP \\ m\angle CAB &= m\angle RPQ \end{aligned}$$

Nota 2

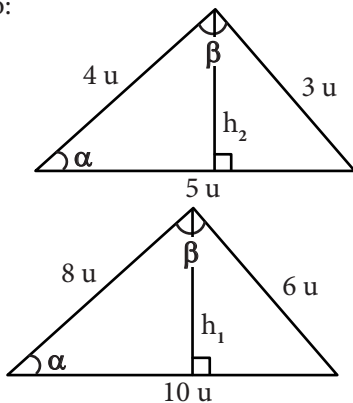
$$\frac{AB}{PQ} = \frac{BC}{QR} = \frac{CA}{RP} = k$$

k = constante de proporcionalidad

1. Razón de semejanza (r)

Es aquel número real y positivo que se obtiene al dividir dos longitudes homólogas de dos triángulos semejantes.

Ejemplo:

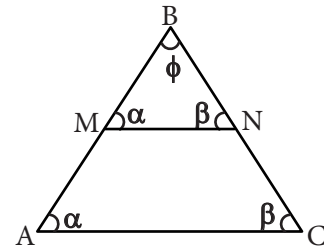


$$\text{Razón} = \frac{6}{3} = \frac{8}{4} = \frac{10}{5} = \dots = \frac{h_1}{h_2} = 2$$

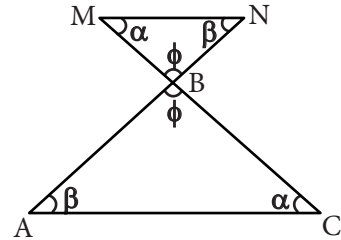
❖ Situaciones frecuentes en que se presentan triángulos semejantes.

Ejemplos:

1. Si $\overline{MN} \parallel \overline{AC} \Rightarrow \Delta ABC \sim \Delta MBN$

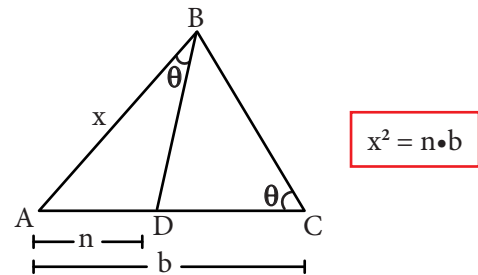


2. Si $\overline{MN} \parallel \overline{AC} \Rightarrow \Delta ABC \sim \Delta MBN$

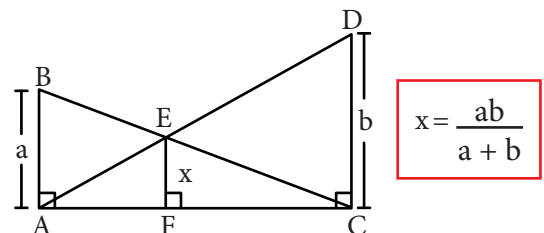


2. Propiedades

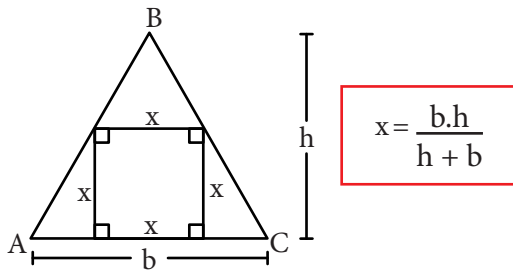
❖ En la figura:



❖ En la figura:



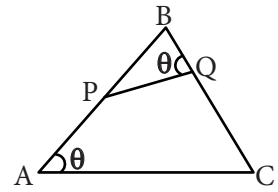
❖ Cuadrado inscrito en un triángulo:



Advertencia pre

En el cuadrilátero inscriptible APQC se cumple:

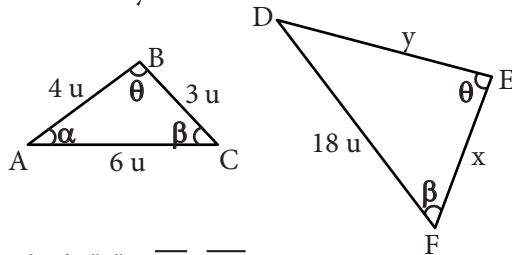
$$\triangle ABC \sim \triangle PBQ$$



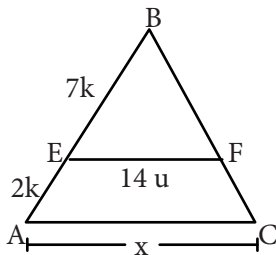
Trabajando en clase

Integral

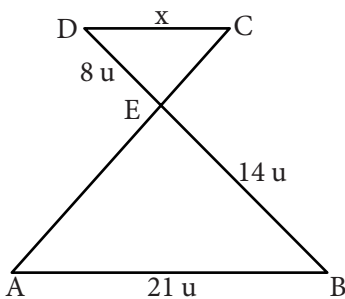
1. Calcula $x + y$.



2. Calcula "x" si $\overline{EF} \parallel \overline{AC}$.

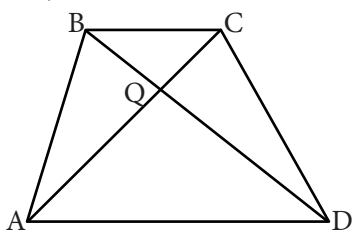


3. Calcula "x" si $\overline{DC} \parallel \overline{AB}$.

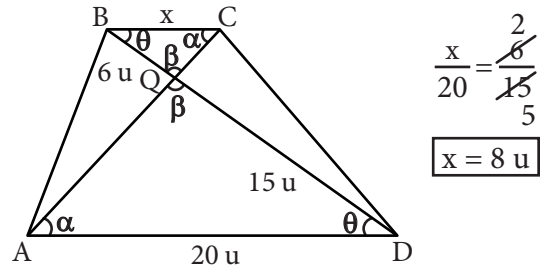


PUCP

4. Calcula BC si ABCD es un trapecio, $BQ = 6$ u, $QD = 15$ u y $AD = 20$ u; además, $\overline{BC} \parallel \overline{AD}$.



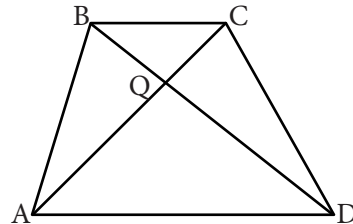
Resolución:



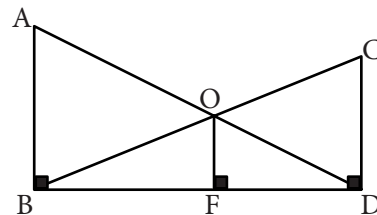
$$\frac{x}{20} = \frac{6}{15}$$

$$x = 8 \text{ u}$$

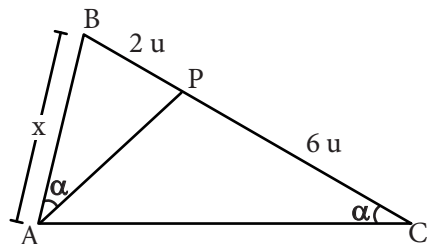
5. Calcula AD si ABCD es un trapecio $\overline{BC} \parallel \overline{AD}$, $BC = 5$ u y $QD = 3BQ$.



6. Calcula OF si $AB = 6$ cm y $CD = 4$ cm.

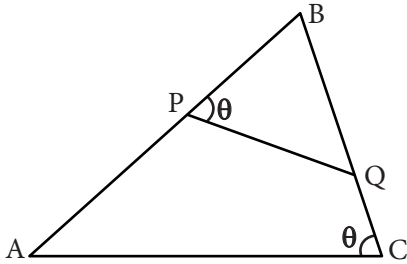


7. Calcula "x".



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8. Calcula AC si PQ = 8 u, BQ = 12 u y AB = 36 u.



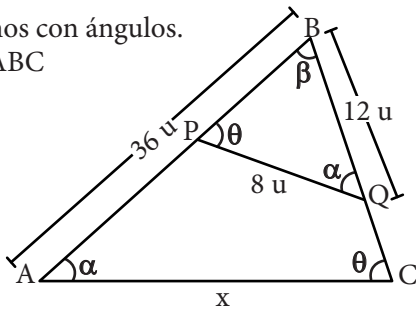
Resolución:

Completamos con ángulos.

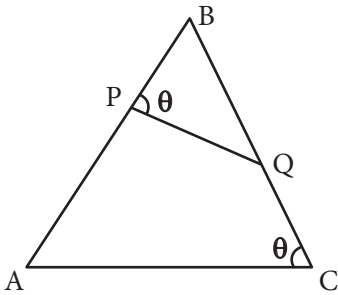
$$\Delta PBQ \sim \Delta ABC$$

$$\frac{x}{8} = \frac{36}{12}$$

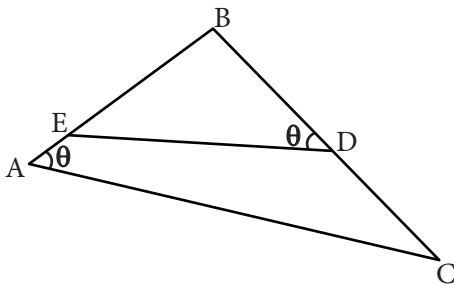
$$x = 24 \text{ u}$$



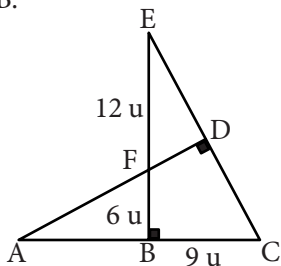
9. Calcula AC si PQ = 6 u, BQ = 8 u y AB = 24 u.



10. Calcula "AE", si EB = 8m, BD = 6m y BC = 12m.

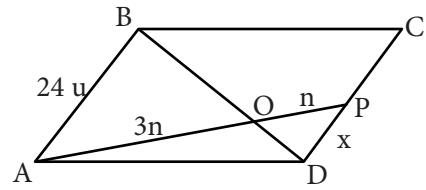


11. Calcula AB.



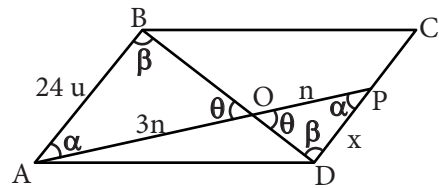
UNI

12. Calcula "x" si ABCD es un romboide.



Resolución:

Completamos con ángulos.



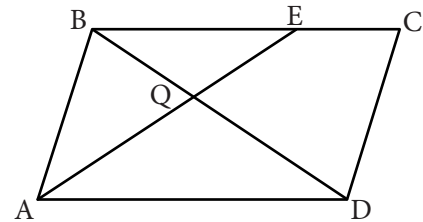
$$\Delta AOB \sim \Delta DOP:$$

$$\frac{x}{24} = \frac{n}{3n}$$

$$\Rightarrow x = 8 \text{ u}$$

13. Calcula EC si ABCD es un paralelogramo,

$$\frac{BQ}{QD} = \frac{2}{3} \text{ y } BE = 18 \text{ cm.}$$



14. Calcula BC si BC = CD, AD = 12 u y AE = 30 u.

