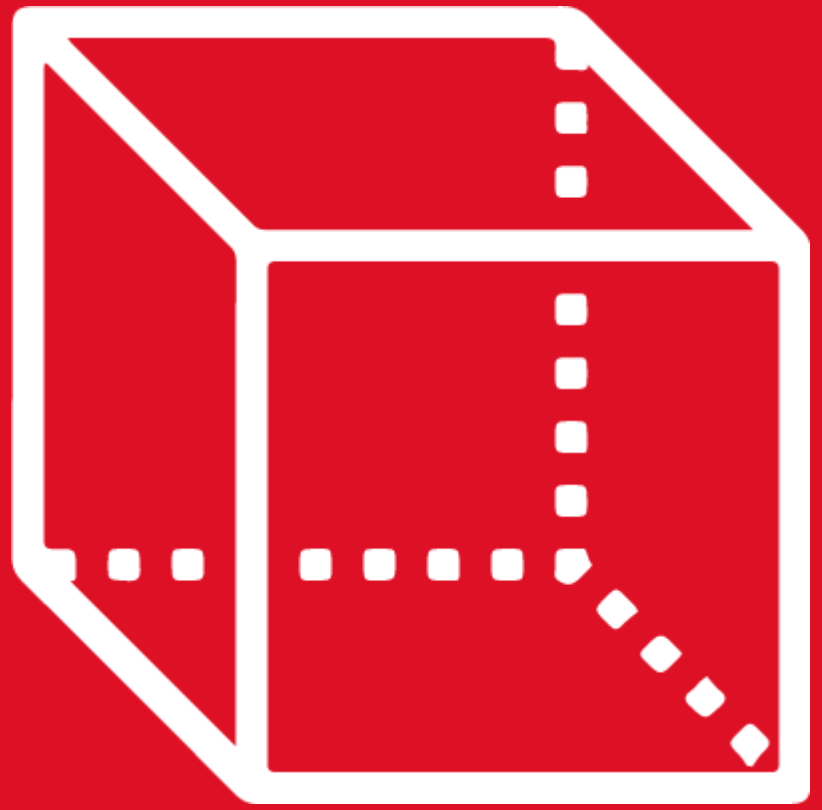
GEOMETRÍA

Capítulo 20

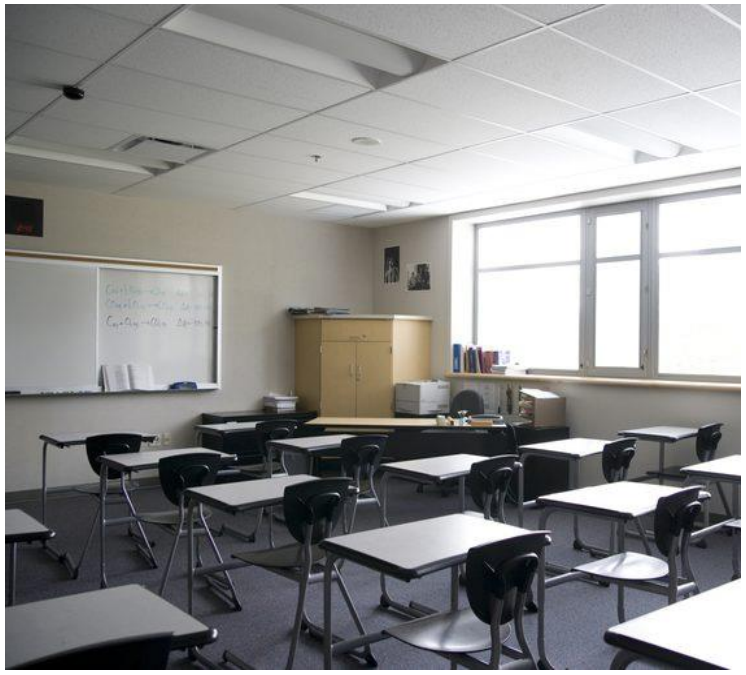


3th
SECONDARY

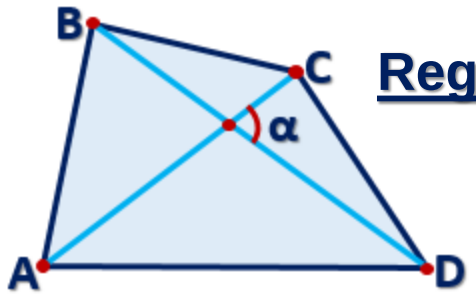
ÁREA DE REGIONES CUADRANGULARES

SACO OLIVEROS

HELICO | MOTIVATION



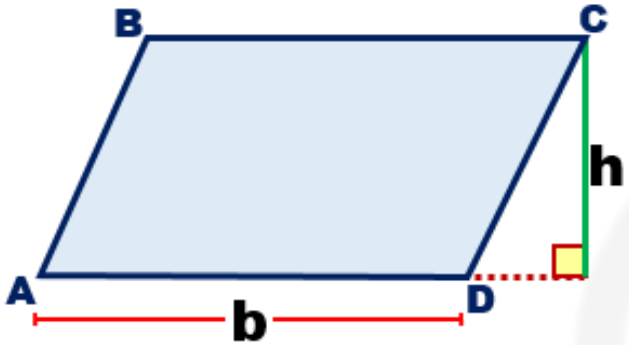
ÁREAS DE REGIONES CUADRANGULARES



Región cuadrangular convexa

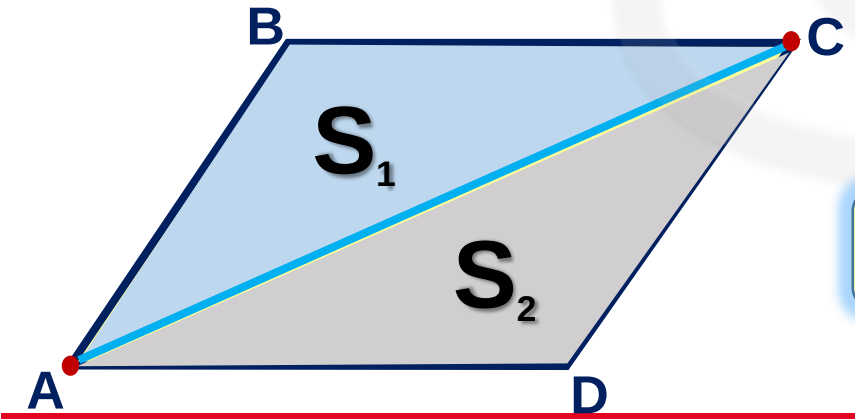
$$S_{ABCD} = \frac{(AC)(BD)}{2}.\text{Sen}\alpha$$

Región Paralelográmica

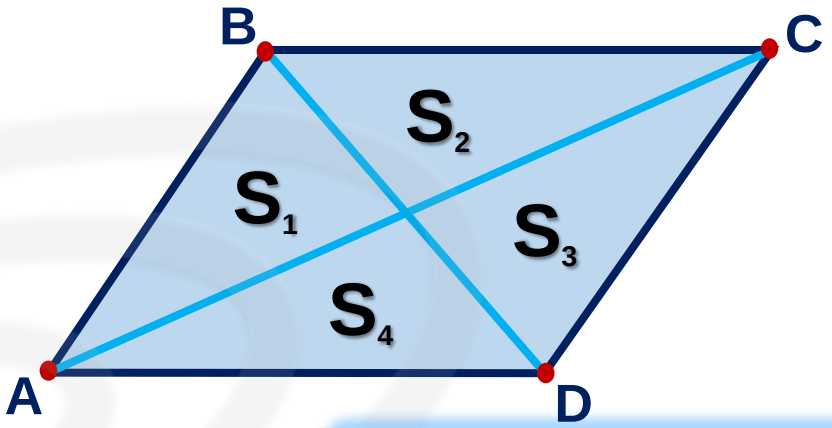


ABCD : Región paralelográmica

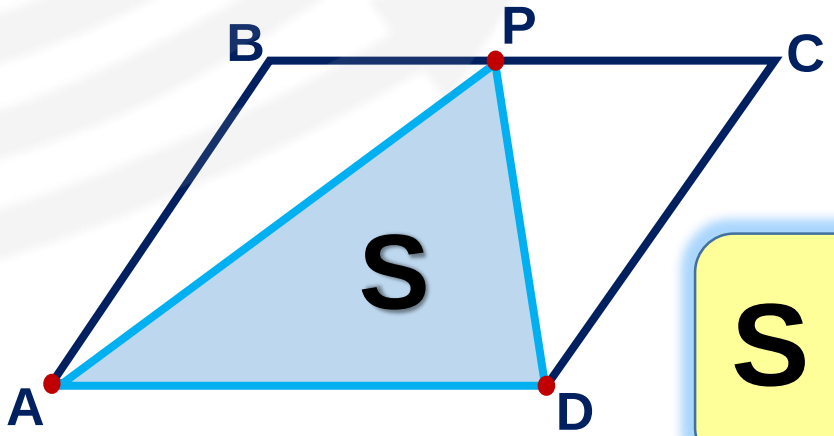
$$S_{ABCD} = b.h$$



$$S_1 = S_2$$

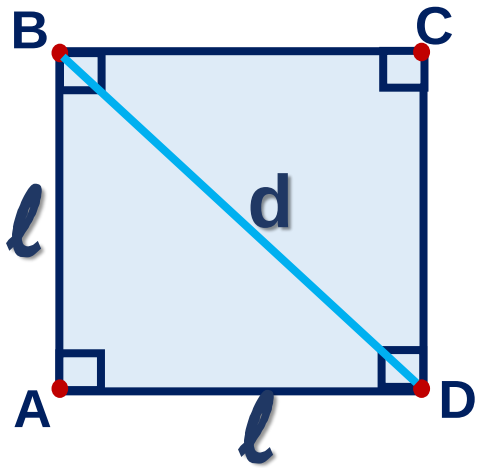


$$S_1 = S_2 = S_3 = S_4$$



$$S = \frac{S_{ABCD}}{2}$$

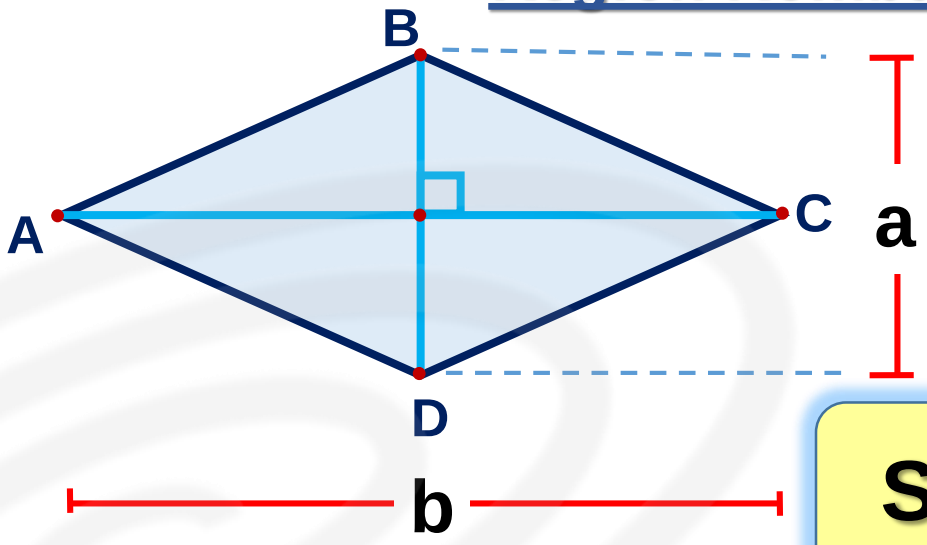
Región Cuadrada



$$S_{ABCD} = \ell^2$$

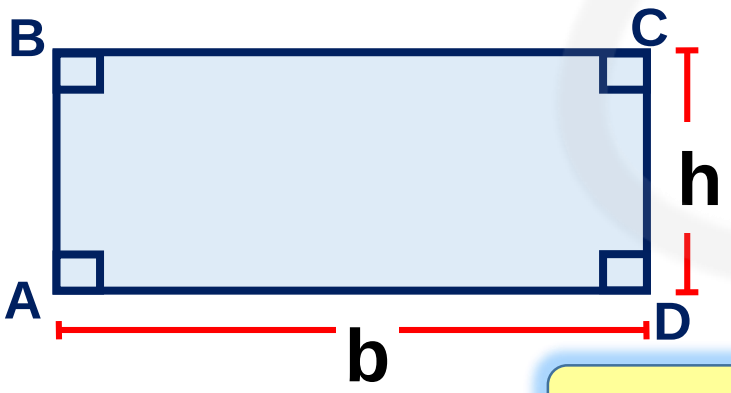
$$S_{ABCD} = \frac{d^2}{2}$$

Región Rombal



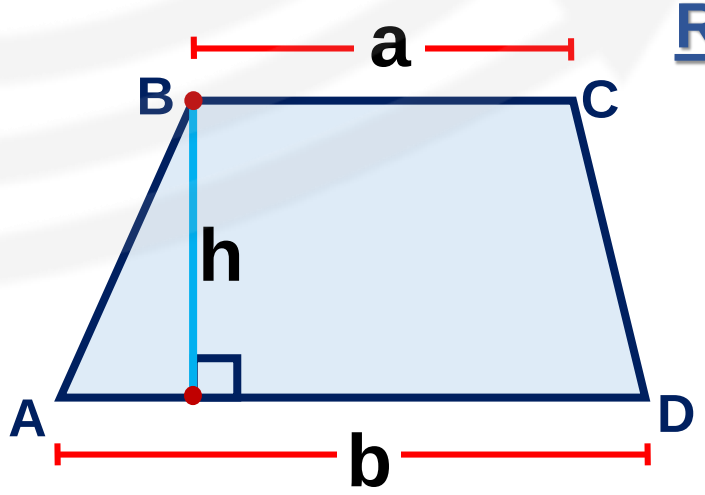
$$S_{ABCD} = \frac{b.a}{2}$$

Región Rectangular



$$S_{ABCD} = b.h$$

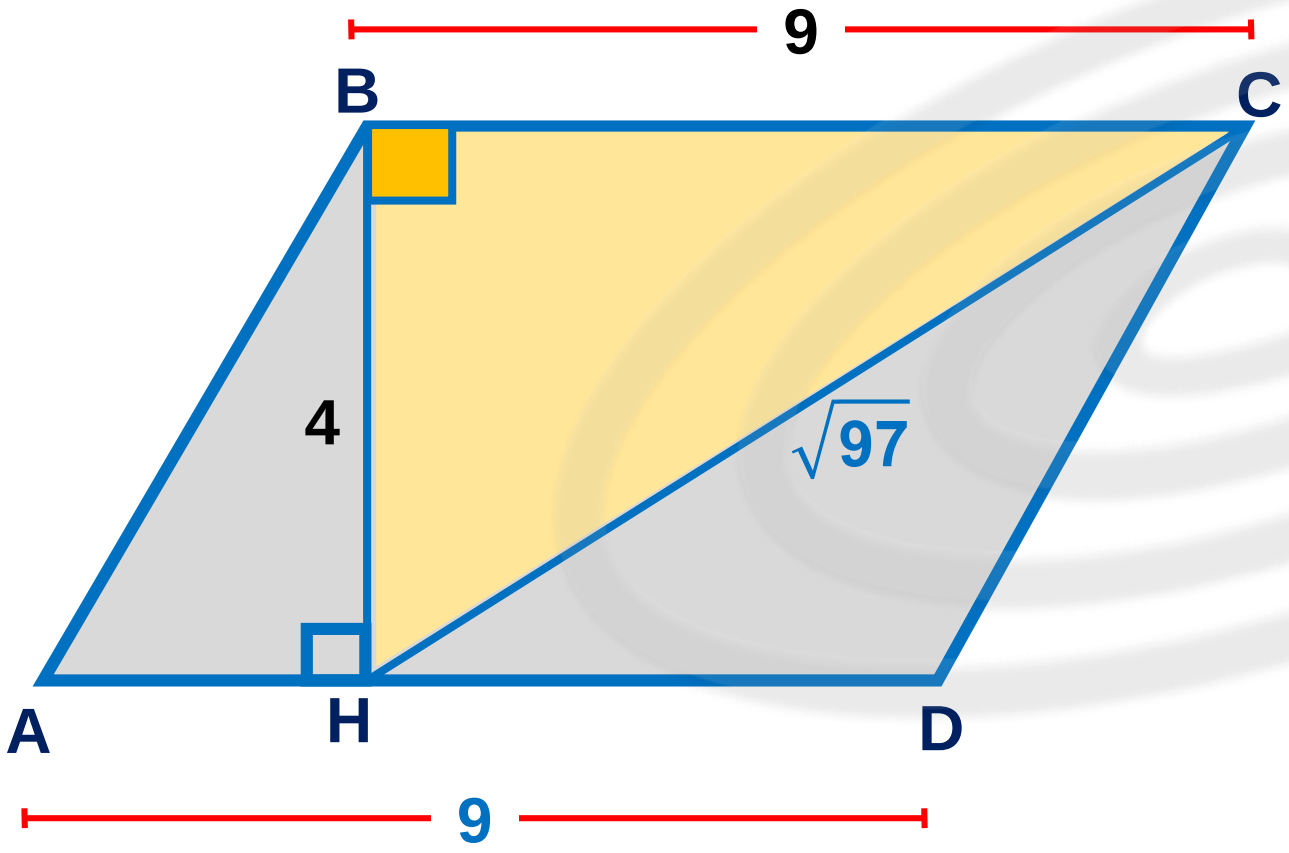
Región Trapecial



$$\overline{BC} \parallel \overline{AD}$$

$$S_{ABCD} = \frac{(b+a)h}{2}$$

1. Calcule el área de la región romboidal ABCD, si AD = 9 y HC = $\sqrt{97}$.



Resolución:

- Piden: S_{ABCD}
- ABCD: Romboide

  $AD = BC = 9$
- $\triangle$CBH: T. Pitágoras

  $\sqrt{97}^2 = 9^2 + (BH)^2$

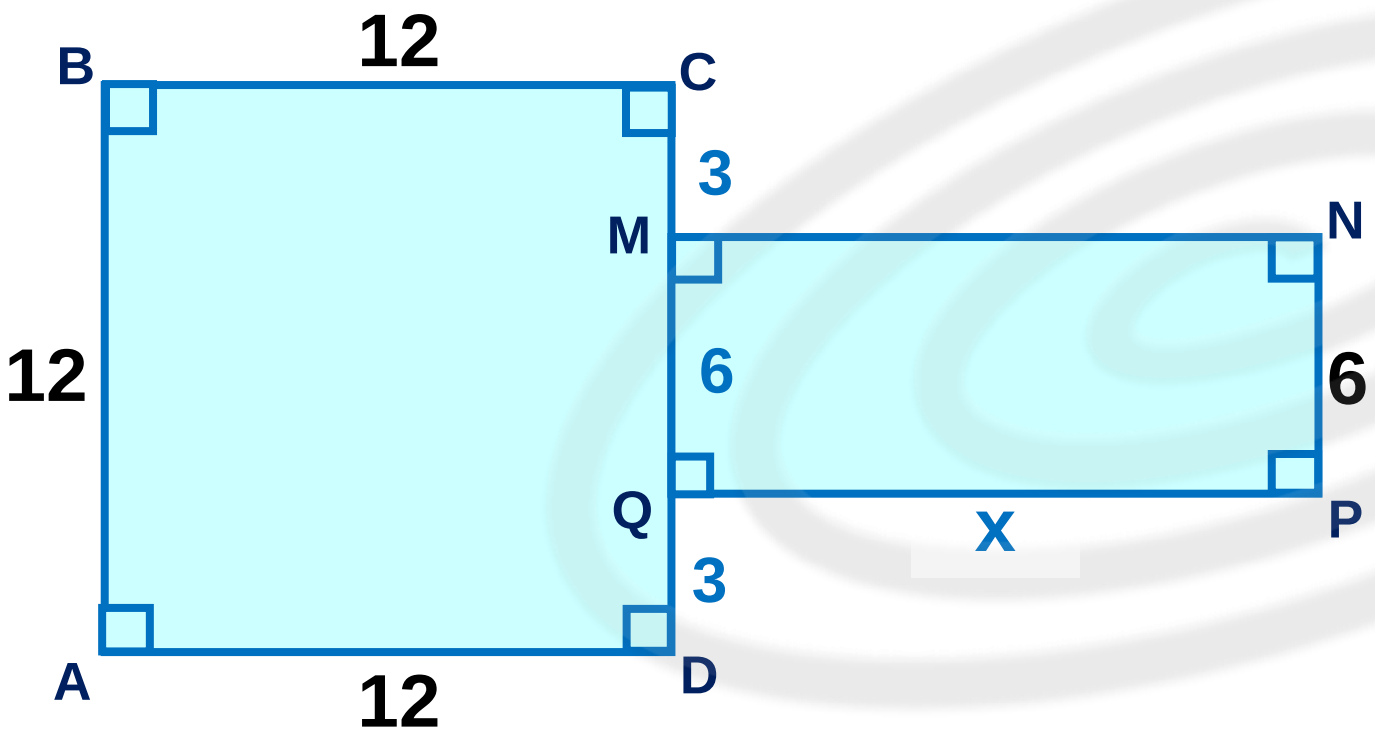
  $4 = BH$
- Aplicando el teorema:

  $S_{ABCD} = (AD)(BH)$

  $S_{ABCD} = (9)(4)$

$$S_{ABCD} = 36\ u^2$$

2. Se muestra un cuadrado y un rectángulo de regiones equivalentes. Halle el valor de x.



Resolución:

- Piden: x
- Por dato:

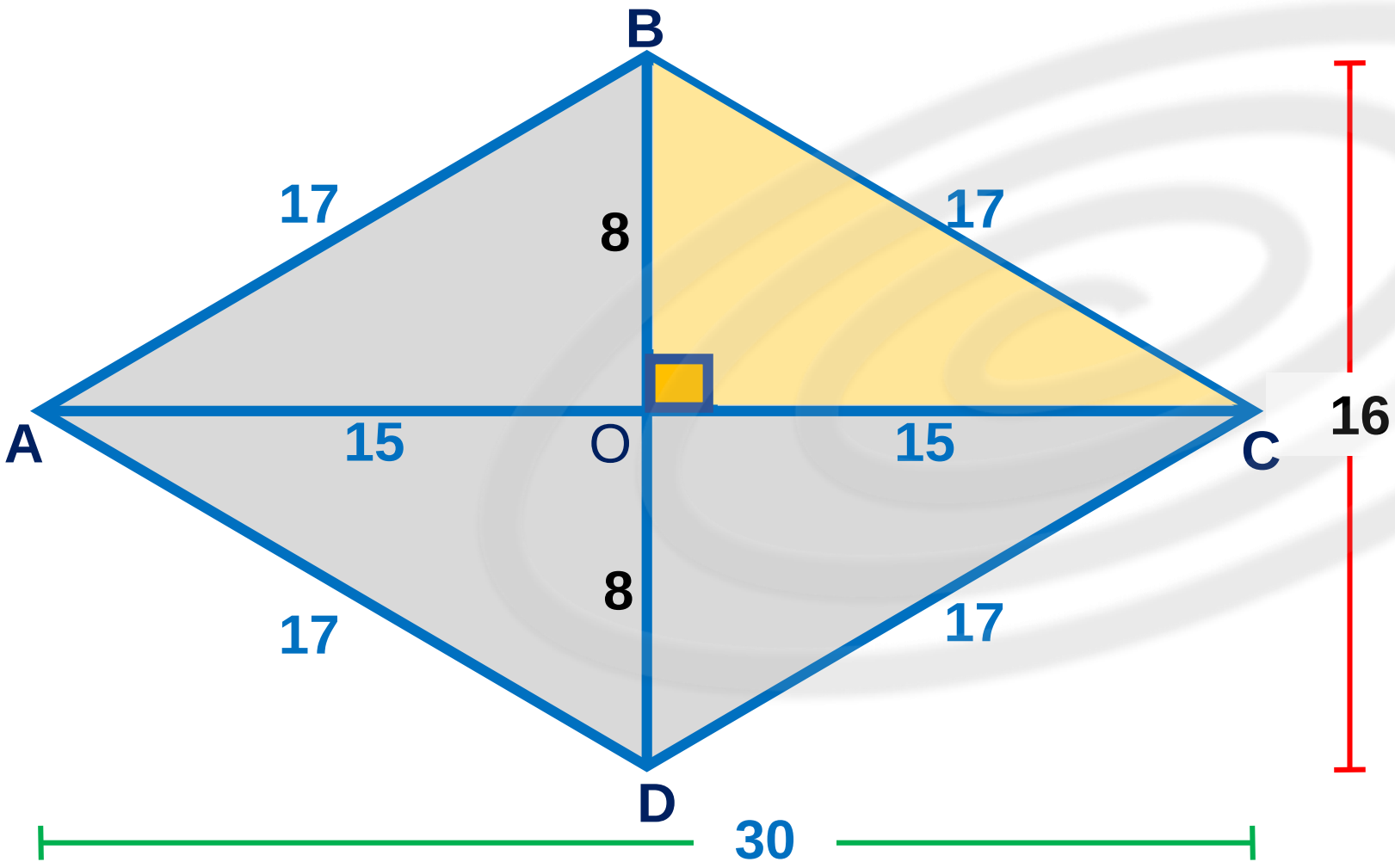
$$S_{ABCD} = S_{MNPQ}$$

$$12^2 = (6)(x)$$

$$144 = (6)(x)$$

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

3. Calcule el área de una región rombal, si un lado mide 17 u y la diagonal mayor mide 30 u.



Resolución:

- Piden: S_{ABCD}
- Se traza $\overline{BD}$.
- $\triangle$BOC: T. Pitágoras

$$17^2 = (BO)^2 + 15^2$$

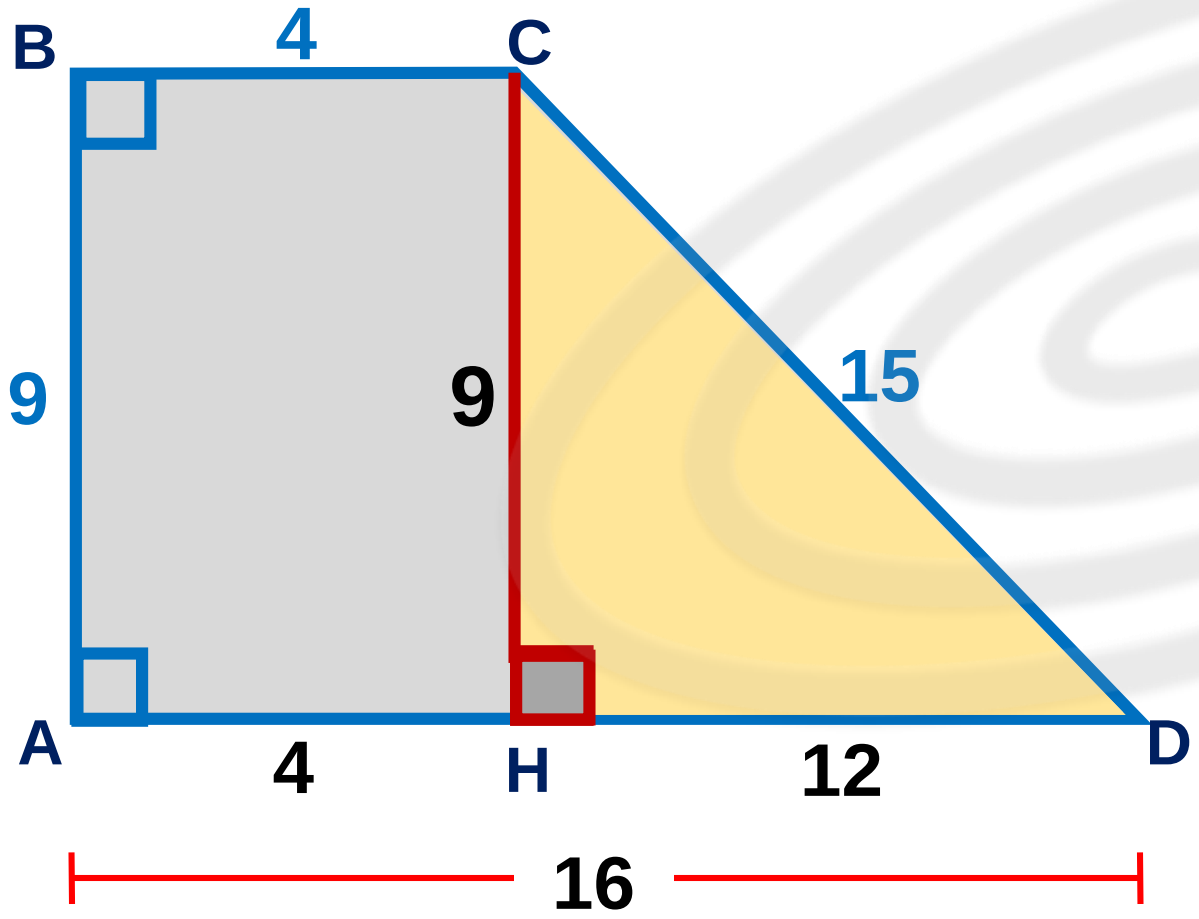
$$8 = BO$$

- Aplicando el teorema:

$$S_{ABCD} = \frac{(30)(\cancel{16}^{\,8})}{\cancel{2}_{\,1}}$$

$$S_{ABCD} = 240\ u^2$$

4. Calcule el área de la región trapecial sombreada.



Resolución:

- Piden: S_{ABCD}

$$S_{ABCD} = \frac{(AD + BC)}{2} \cdot (AB) \quad \text{... (1)}$$

- Se traza la altura $\overline{CH}$.
- ABCH : Rectángulo
- CHD: T. Pitágoras

$$15^2 = (HD)^2 + 9^2$$

$$144 = (HD)^2$$

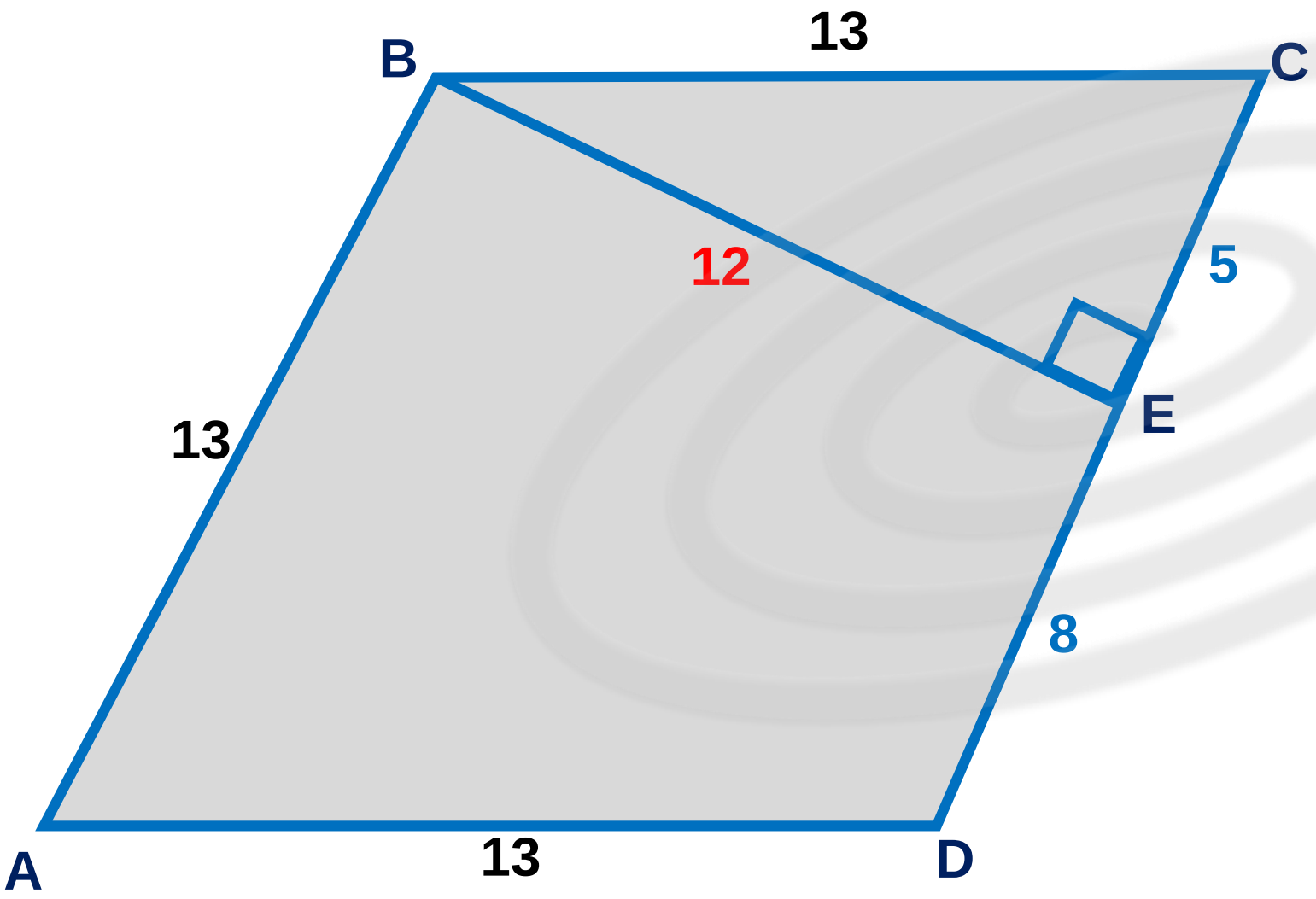
$$HD = 12 \quad \text{... (2)}$$

- Reemplazando 2 en 1.

$$S_{ABCD} = \frac{(16 + 4)}{2} \cdot (9)$$

$$S_{ABCD} = 90\ u^2$$

5. Calcule el área de una región rombal ABCD.



Resolución:

- Piden: S_{ABCD}
- ABCD : Rombo

  AD = CD = BC = AB = 13
- CEB : T. de Pitágoras

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

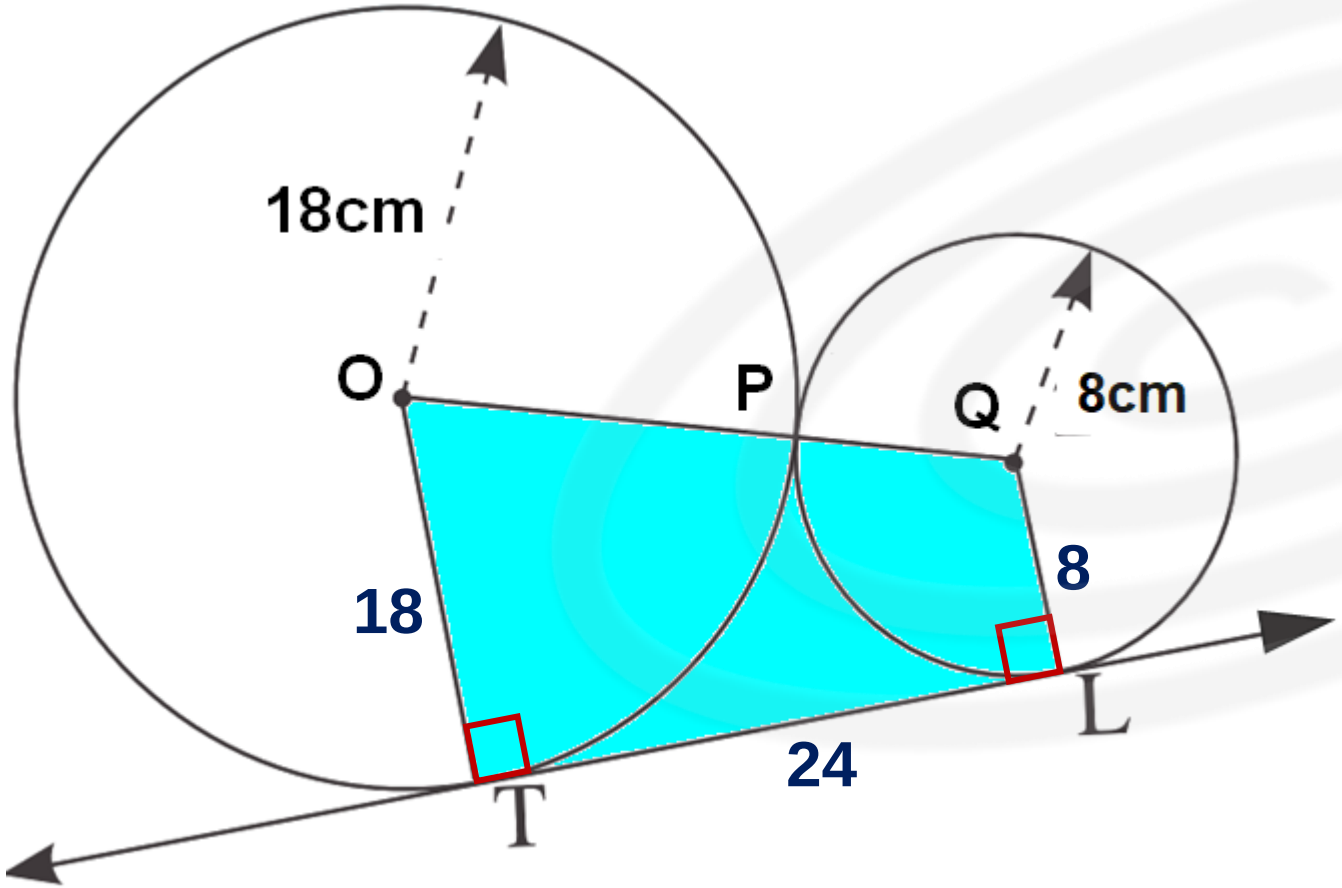
  BE = 12
- Aplicando el teorema.

  $S_{ABCD} = (DC)(BE)$

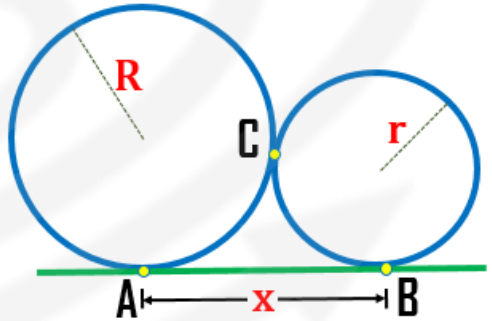
  $S_{ABCD} = (13)(12)$

$$S_{ABCD} = 156\ u^2$$

6. Determine el área de la región sombreada; si P, T y L son puntos de tangencia.



Resolución:

- Piden: S_{OQLT}
- Aplicando el teorema:
- OQLT : Trapecio
- 

$$x = 2\sqrt{Rr}$$

$$TL = 2\sqrt{18.8}$$

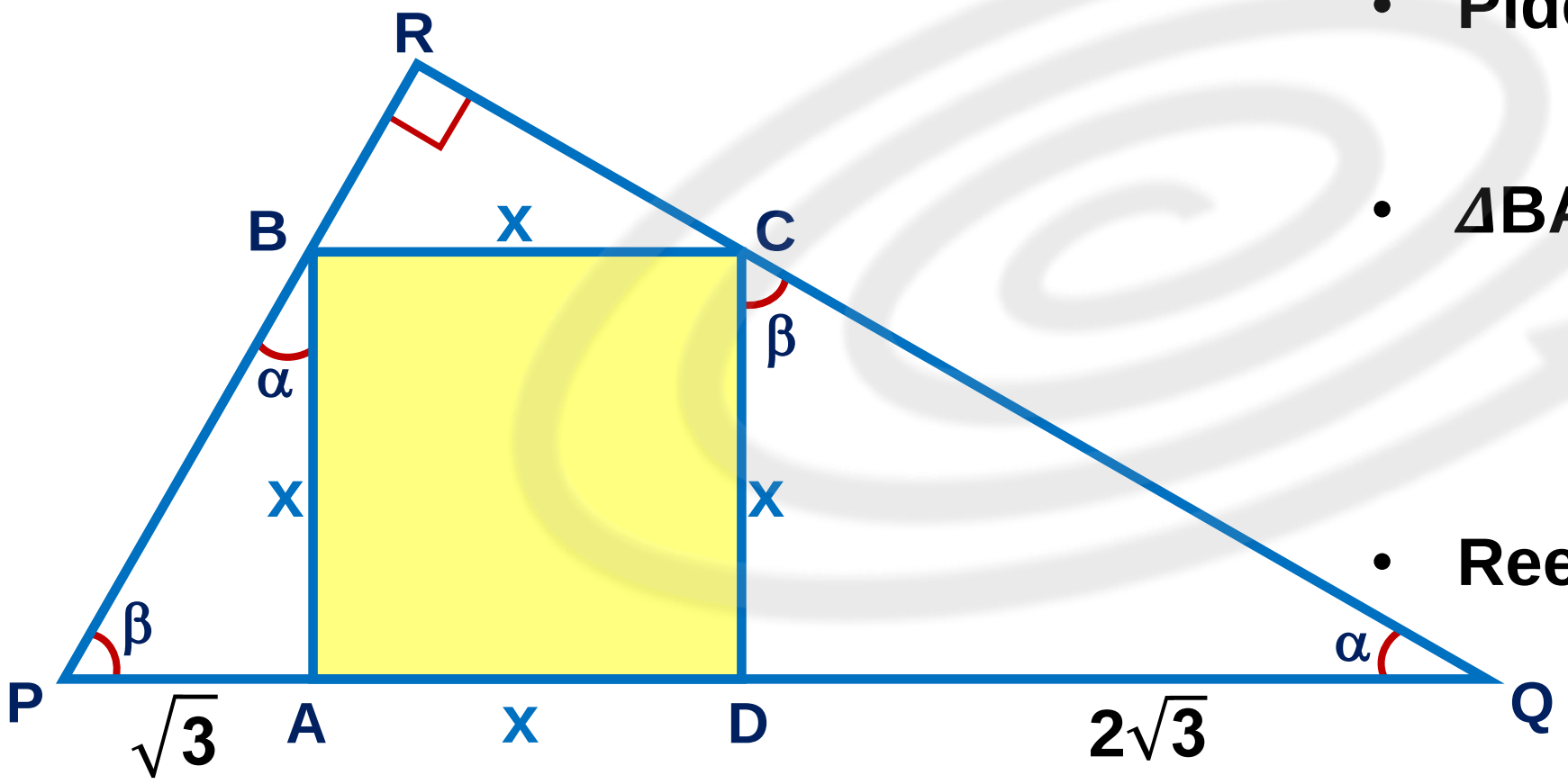
$$TL = 24$$

- Reemplazando al teorema:

$$S_{OQLT} = \frac{(18 + 8)}{2}.(24)$$

$$S_{OQLT} = 312\ cm^2$$

7. En la figura, PA = $\sqrt{3}$ u y DQ = $2\sqrt{3}$ u. Calcule el área de la región cuadrada ABCD.



Resolución:

- Piden: S_{ABCD}

$$S_{ABCD} = x^2 \quad \ldots(1)$$

- $\Delta BAP \sim \Delta QDC$

$$\frac{x}{2\sqrt{3}} = \frac{\sqrt{3}}{x}$$

$$x^2 = 6 \quad \ldots(2)$$

- Reemplazando 2 en 1.

$$S_{ABCD} = 6\ u^2$$