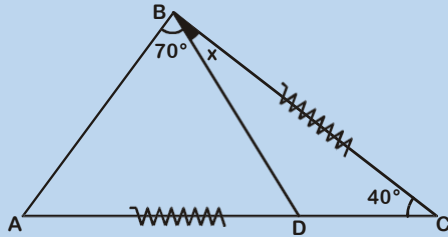


Congruencia de triángulos



¿Cómo resolverías el siguiente problema?

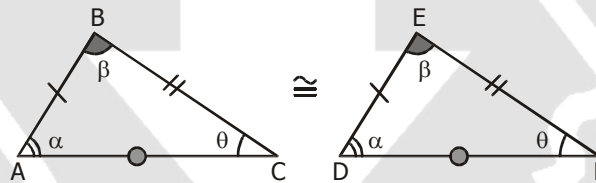
Hallar "x", si: $AD = BC$



Para resolver este tipo de problemas la Geometría nos permite usar los trazos triángulos congruentes que es el capítulo a estudiar.

El que no conoce la matemática muere sin conocer la verdad científica. SCHELBACH.

Definición



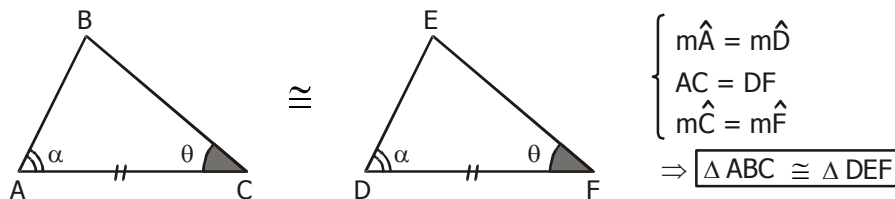
Notación:

$$\triangle ABC \cong \triangle DEF$$

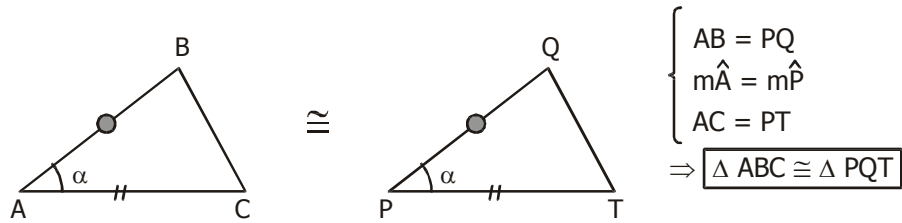
Se lee: "El triángulo ABC es congruente al triángulo DEF".

Casos de congruencia de triángulos

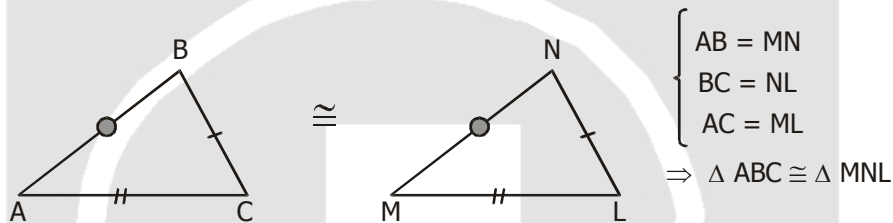
- **Primer caso (A.L.A.)** _____



- Segundo caso (L.A.L.)

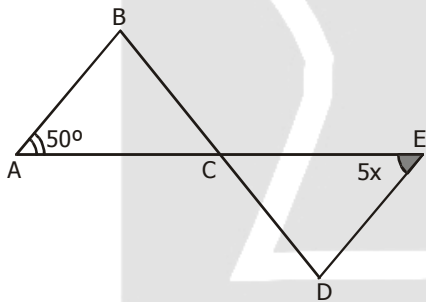


- Tercer caso (L.L.L.)

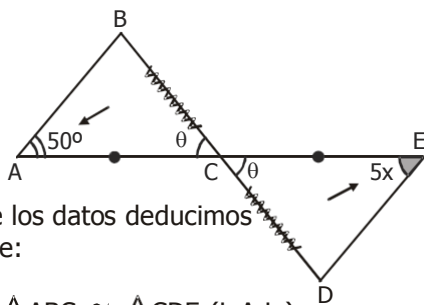


⇒ Problemas resueltos

1. En la figura: $BC = CD$ y $AC = CE$.
Calcular " $2x$ "



Solución:

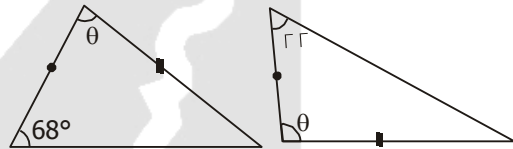


- De los datos deducimos que:

$\triangle ABC \cong \triangle CDE$ (L.A.L.)
 $\Rightarrow 5x = 50^\circ \rightarrow x = 10^\circ$

Rpta.: 20°

2. Calcular " α " en la figura.



Solución:

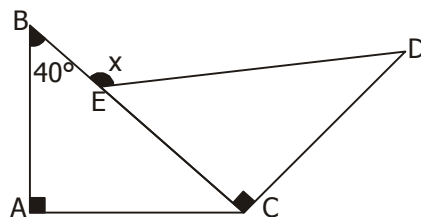
Con los datos indicados, deducimos que los triángulos son congruentes por el caso: L.A.L.

∴ A lados iguales se oponen ángulos iguales.

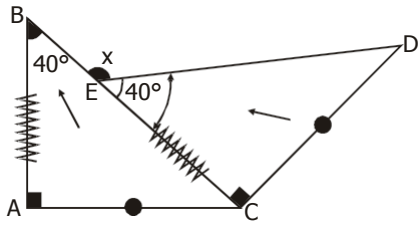
$\rightarrow 68^\circ = 4\alpha$
 $17^\circ = \alpha$

Rpta.: 17°

3. Si: $AB = EC$ y $AC = CD$, calcular " x ".



Solución:



Con los datos: $\triangle BAC \cong \triangle ECD$ (L.A.L.)

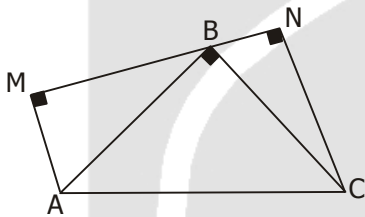
$\Rightarrow m \angle CED = 40^\circ$

Del gráfico: $x + 40^\circ = 180^\circ$

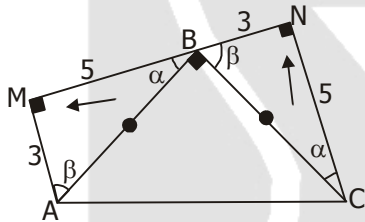
$\therefore x = 140^\circ$

Rpta.: 140°

4. Si: $AB = BC$, $AM = 3$ y $CN = 5$, calcular "MN".



Solución:

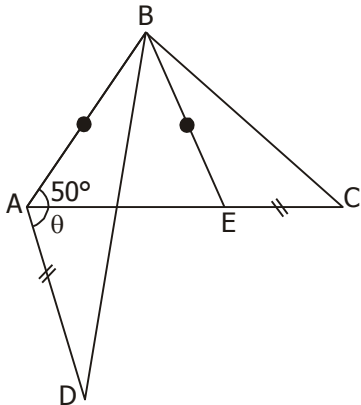


Con los datos: $\triangle AMB \cong \triangle CNB$ (A.L.A.)

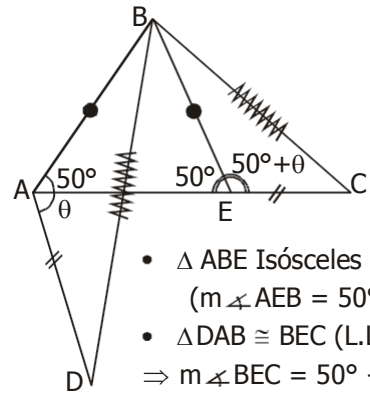
$$\begin{cases} AM = BN = 3 \\ NC = MB = 5 \end{cases}$$

$\therefore MN = 5 + 3 = 8$

5. Calcular " θ ", si: $BC = BD$.



Solución:



• $\triangle ABE$ Isósceles

($m \angle AEB = 50^\circ$)

• $\triangle DAB \cong \triangle BEC$ (L.L.L.)

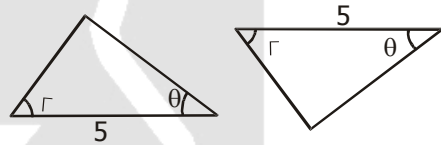
$\Rightarrow m \angle BEC = 50^\circ + \theta$

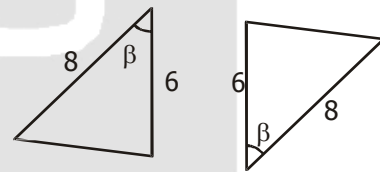
$\therefore 50^\circ + (50^\circ + \theta) = 180^\circ$

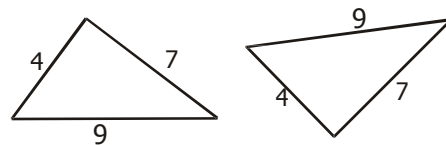
$\theta = 80^\circ$

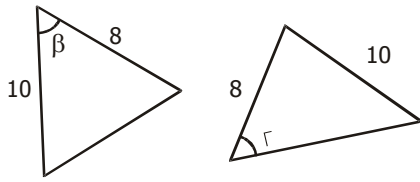
Problemas para la clase

1. En cada caso, decir si los siguientes pares de triángulos son congruentes o no. Si lo son decir por cual de los tres casos.

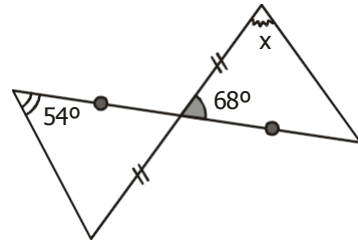




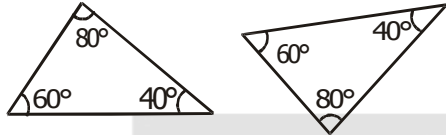




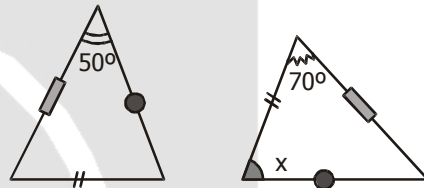
5. Calcular "x"



- a) 54° b) 56° c) 58°
 d) 62° e) 64°



6. Calcular "x"



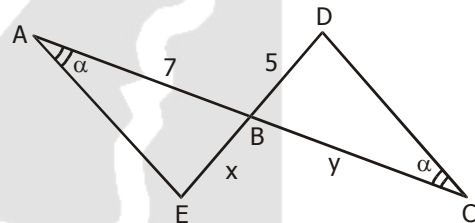
- a) 70° b) 50° c) 60°
 d) 40° e) 80°

2. Calcular "x + y"



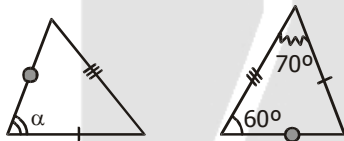
- a) 14 b) 12 c) 13
 d) 15 e) 11

7. Si: $AE = DC$, calcular "x + y".



- a) 8 b) 9 c) 10
 d) 12 e) 11

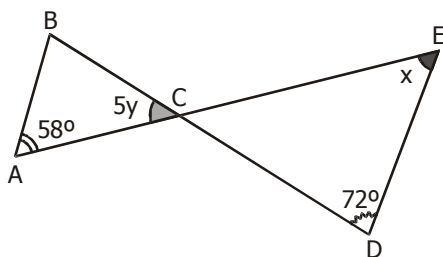
3. Calcular " α "



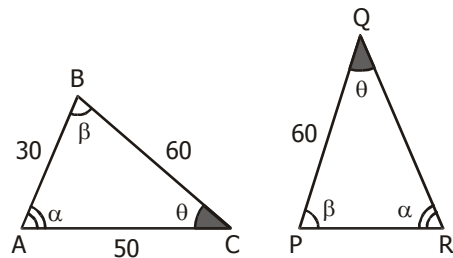
- a) 45° b) 70° c) 40°
 d) 50° e) 60°

8. Calcular "QR"

4. En la figura, si: $BC = CD$ y $AC = CE$, calcular "x + y".

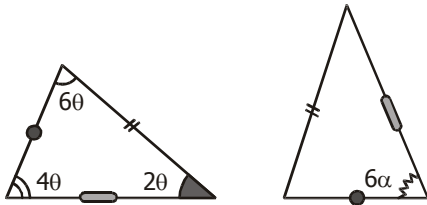


- a) 41° b) 35° c) 32°
 d) 26° e) 68°



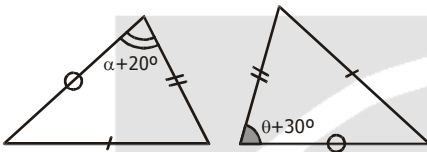
- a) 50 b) 60 c) 30
 d) 80 e) 90

9. Calcular " α "



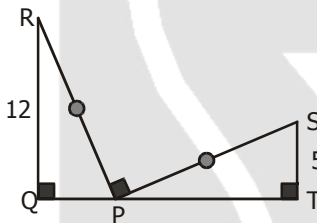
- a) 5° b) 10° c) 12°
 d) 15° e) 20°

10. Calcular " $\alpha - \theta$ "



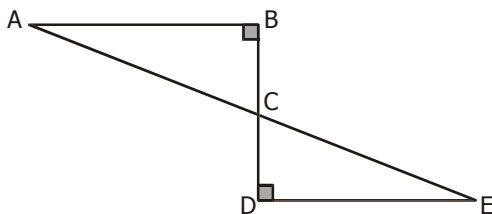
- a) 10° b) 20° c) 30°
 d) 40° e) 50°

11. Calcular "QT"



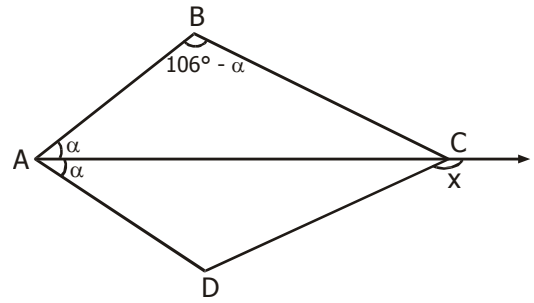
- a) 15 b) 16 c) 17
 d) 18 e) 20

12. Si: $AB = DE$; $AC = 2x + 11$ y $CE = 20 - x$
 Calcular " x "



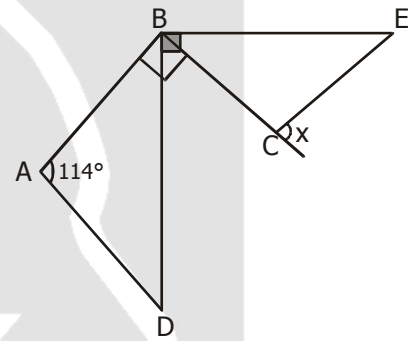
- a) 3 b) 5 c) 6
 d) 2 e) 4

13. Si: $AB = AD$, calcular " x ".



- a) 112° b) 74° c) 96°
 d) 136° e) 106°

14. Si: $AB = BC$ y $BD = BE$, calcular " x ".



- a) 56° b) 76° c) 66°
 d) 57° e) 44°

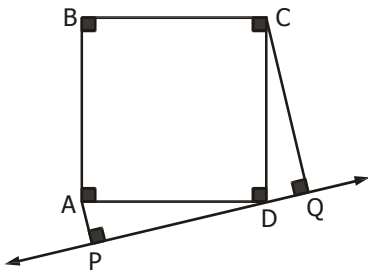
15. Dado el triángulo ABC equilátero, se trazan las cevianas AE y CF que se interceptan en "P". Si $AF = EB$
 Hallar $m\angle APF$.

- a) 50° b) 45° c) 48°
 d) 60° e) 90°

16. Graficar el triángulo escaleno ABC y por "B", se levantan las perpendiculares \overline{BE} y \overline{BF} a \overline{AB} y \overline{BC} respectivamente tal que: $AB = BE$ y $BC = BF$. Calcular "AF", si $EC = 12$ cm.

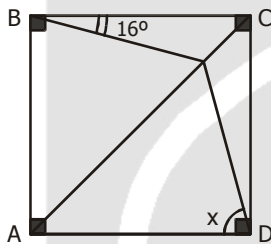
- a) 6 cm b) 10 c) 12
 d) 18 e) 24

17. Calcular "PQ", si: ABCD es un cuadrado y AP = 3; CQ = 7.



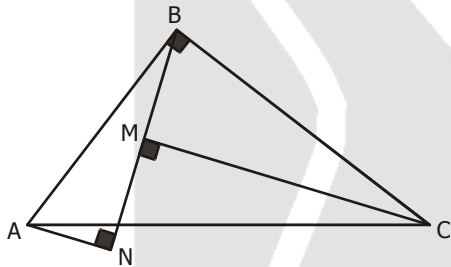
- a) 8 b) 10 c) 12
d) 6 e) 9

18. Si: ABCD es un cuadrado, calcular "x"



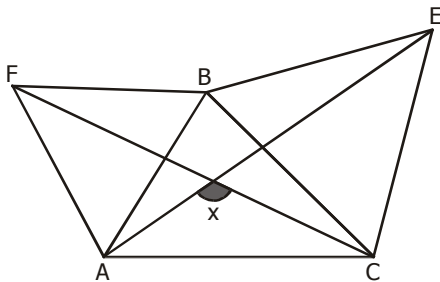
- a) 70° b) 72° c) 74°
d) 79° e) 80°

19. Si: AB = BC, calcular "AN", si: BM = 4.



- a) 4 b) $4\sqrt{2}$ c) 3
d) $3 \cdot 2$ e) 5

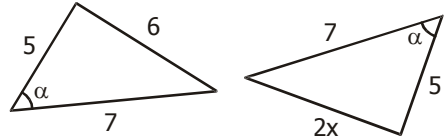
20. Calcular "x", si los triángulos AFB y BEC son equiláteros.



- a) 60° b) 90° c) 110°
d) 120° e) 150°

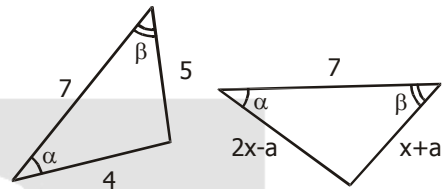
Autoevaluación

1. Calcular "x"



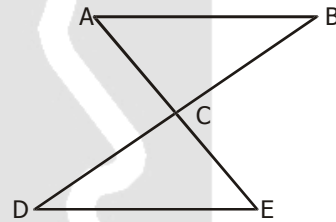
- a) 2 b) 3 c) 4
d) 5 e) 6

2. Calcular "x"



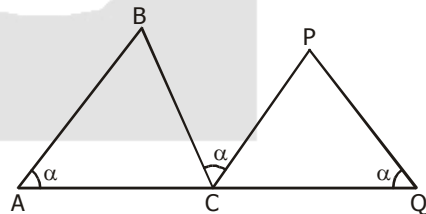
- a) 5 b) 4 c) 3
d) 2 e) 1

3. Si: $\overline{AB} \parallel \overline{DE}$; $AB = DE = 10$. Calcular "BC", además: $BD = 14$.



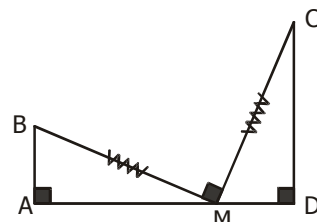
- a) 6 b) 7 c) 8
d) 9 e) 10

4. Calcular "AQ", si: $AB = CQ$ y $AB + PQ = 24$



- a) 12 b) 16 c) 18
d) 24 e) 28

5. Calcular "AB", si: $BM = MC$; $AD = 50$ y $CD = 35$.



- a) 35 b) 30 c) 25
d) 20 e) 15

Claves

1. b
2. c
3. b
4. d
5. e

