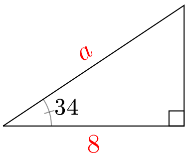
Funciones trigonométricas (solución)

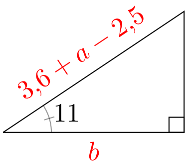
Solución

Vamos a resolver cada uno de los triángulos para obtener la medida final deseada, empezando desde el que está más abajo hasta llegar al triángulo deseado.

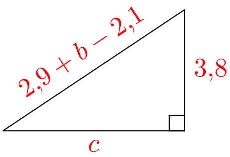
Nota: Los triángulos de la resolución no están hechos a medida, la idea es solo representar los datos de la resolución.



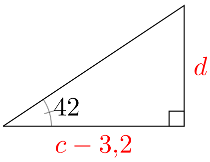
$$\cos(34) = \frac{8}{a} \Rightarrow a = \frac{8}{\cos(34)}$$



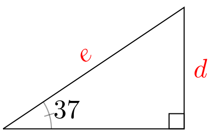
$$\cos(11) = \frac{b}{3{,}6 + a - 2{,}5} \Rightarrow b = (1{,}1 + a)\cos(11) \Rightarrow \boxed{b = \left(1{,}1 + \frac{8}{\cos(34)}\right)\cos(11)}$$



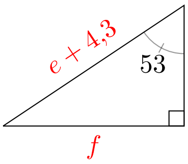
$$(2{,}9 + b - 2{,}1)^2 = 3{,}8^2 + c^2 \Rightarrow \boxed{c = \sqrt{(b + 0{,}8)^2 - 3{,}8^2}}$$



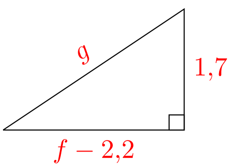
$$\tan(42) = \frac{d}{c - 3{,}2} \Rightarrow d = (c - 3{,}2) \cdot \tan(42)$$



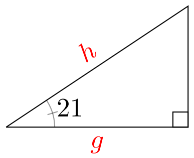
$$\sin(37) = \frac{d}{e} \Rightarrow e = \frac{d}{\sin(37)} = \frac{(c - 3{,}2) \cdot \tan(42)}{\sin(37)}$$



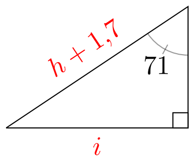
$$\sin(53) = \frac{f}{e + 4{,}3} \Rightarrow f = \sin(53)(e + 4{,}3) \Rightarrow \boxed{f = \sin(53)\left(\frac{(c - 3{,}2)\tan(42)}{\sin(37)} + 4{,}3\right)}$$



$$g^2 = 1{,}7^2 + (f - 2{,}2)^2 \Rightarrow g = \sqrt{1{,}7^2 + (f - 2{,}2)^2}$$



$$\cos(21) = \frac{g}{h} \Rightarrow h = \frac{g}{\cos(21)} \Rightarrow h = \frac{\sqrt{1{,}7^2 + (f - 2{,}2)^2}}{\cos(21)}$$



$$\sin(71) = \frac{i}{h + 1{,}7} \Rightarrow \boxed{i = \sin(71)\left(\frac{\sqrt{1{,}7^2 + (f - 2{,}2)^2}}{\cos(21)} + 1{,}7\right)}$$

Finalmente, si ahora ponemos todos los cálculos juntos, tenemos que la medida del lado que buscábamos es

$$\sin(71)\cdot\left(\frac{\sqrt{\left(\sin(53)\cdot\left(4{,}3 + \left[\left(\sqrt{\left[\left(\frac{8}{\cos(34)} - 2{,}5 + 3{,}6\right)\cos(11) - 2{,}1 + 2{,}9\right]^2 - 3{,}8^2} - 3{,}2\right)\frac{\tan(42)}{\sin(37)}\right]\right) - 2{,}2\right)^2 + 1{,}7^2}}{\cos(21)} + 1{,}7\right).$$

Si lo calculamos, obtenemos un valor aproximado de 12.073.