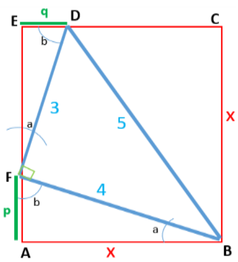
Determinar la longitud "x"



Los triángulos ABF y DEF son semejantes

Luego

$$\frac{EF}{DF}=\frac{AB}{FB}$$

$$\frac{x-p}{3}=\frac{x}{4}$$

$$4x-4p=3x$$

$$4x-3x=4p$$

$$x=4p \qquad (a)$$

El triángulo ABF es rectángulo

Luego

$$p^2+x^2=4^2$$

$$p^2+(4p)^2=16$$

$$p^2+(4p)^2=16$$

$$p^2+16p^2=16$$

$$17p^2=16$$

$$p^2=\frac{16}{17}$$

$$p=\frac{4}{\sqrt{17}} \qquad (b)$$

Reemplazando

$$x=4p \qquad (a)$$

en

$$p=\frac{4}{\sqrt{17}} \qquad (b)$$

$$x=4\cdot\frac{4}{\sqrt{17}}$$

La solución es

$$x=\frac{16}{\sqrt{17}}$$

$$x = \frac{16}{\sqrt{17}}$$

Comprobación

Por semejanza

$$q=p\cdot\frac{3}{4}$$

$$p=\frac{4}{\sqrt{17}}$$

$$q=\frac{4}{\sqrt{17}}\cdot\frac{3}{4}$$

$$q=\frac{3}{\sqrt{17}}$$

Para comprobar la solución, se debe demostrar, por ejemplo, que

$$q^2+(x-p)^2=3^2$$

$$q=\frac{3}{\sqrt{17}}$$

$$x=\frac{16}{\sqrt{17}}$$

$$p=\frac{4}{\sqrt{17}}$$

$$q^2+(x-p)^2=\left(\frac{3}{\sqrt{17}}\right)^2+\left(\frac{16}{\sqrt{17}}-\frac{4}{\sqrt{17}}\right)^2$$

$$q^2+(x-p)^2=\frac{9}{17}+\left(\frac{12}{\sqrt{17}}\right)^2$$

$$q^2+(x-p)^2=\frac{9}{17}+\frac{144}{17}$$

$$q^2+(x-p)^2=\frac{153}{17}=9=3^2 \quad \Rightarrow qed$$