# PRODUIT SCALAIRE
# SÉRIE 1

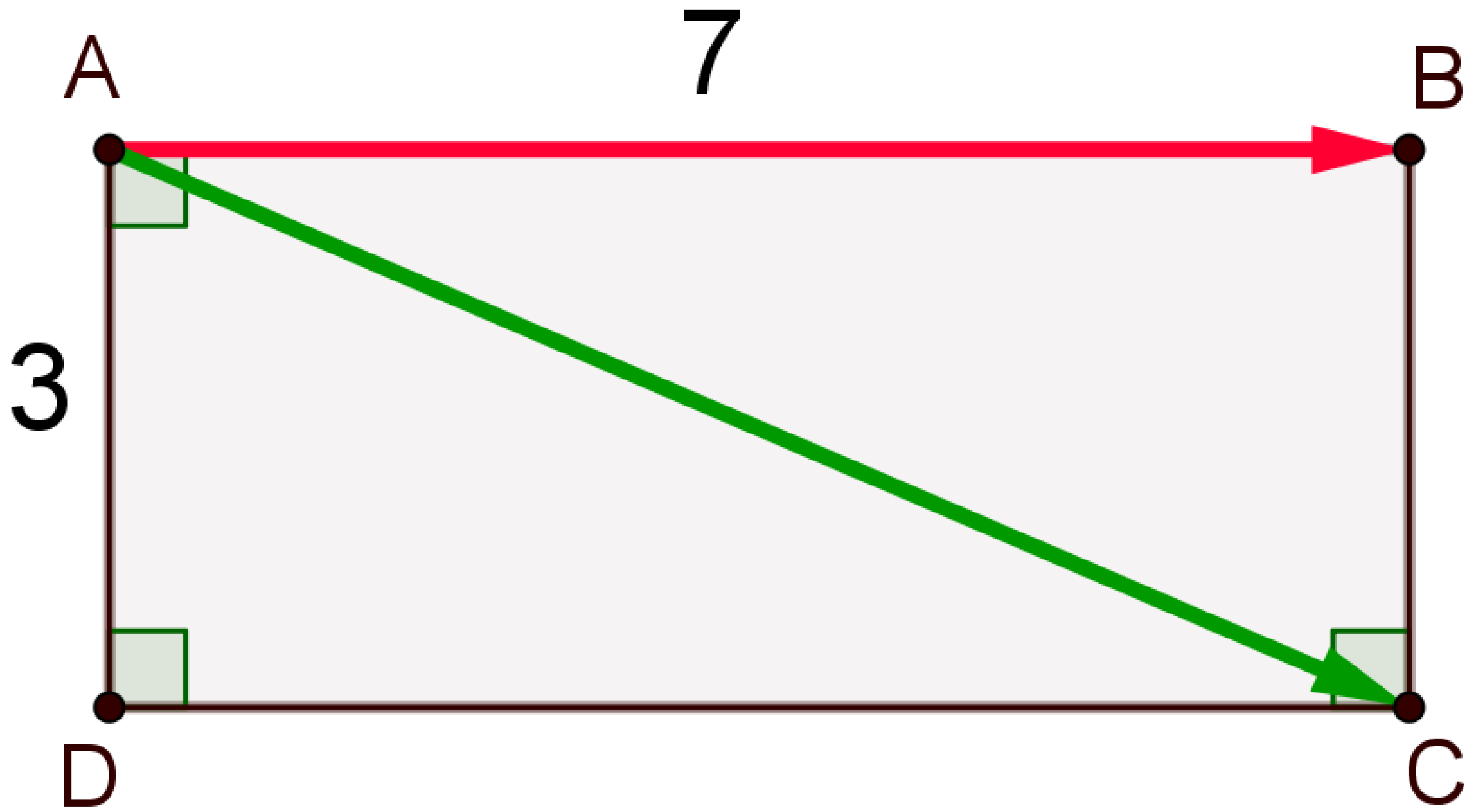
Activités mentales et automatismes en classe de première

IREM de Clermont-Ferrand

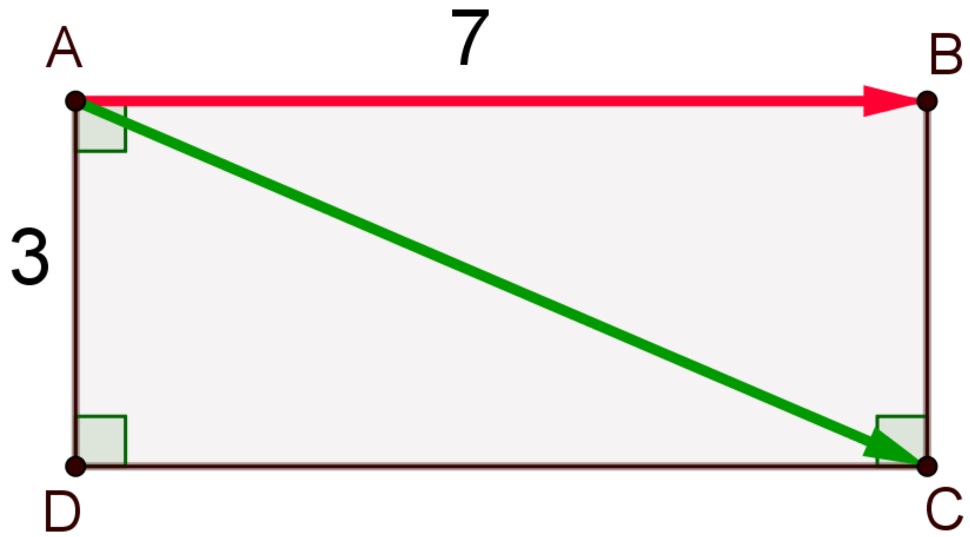
Pour chaque figure,

calculer $\overrightarrow{AB}.\overrightarrow{AC}$ en choisissant l'expression du produit scalaire qui vous semble la mieux adaptée.

# N°0



# N°0

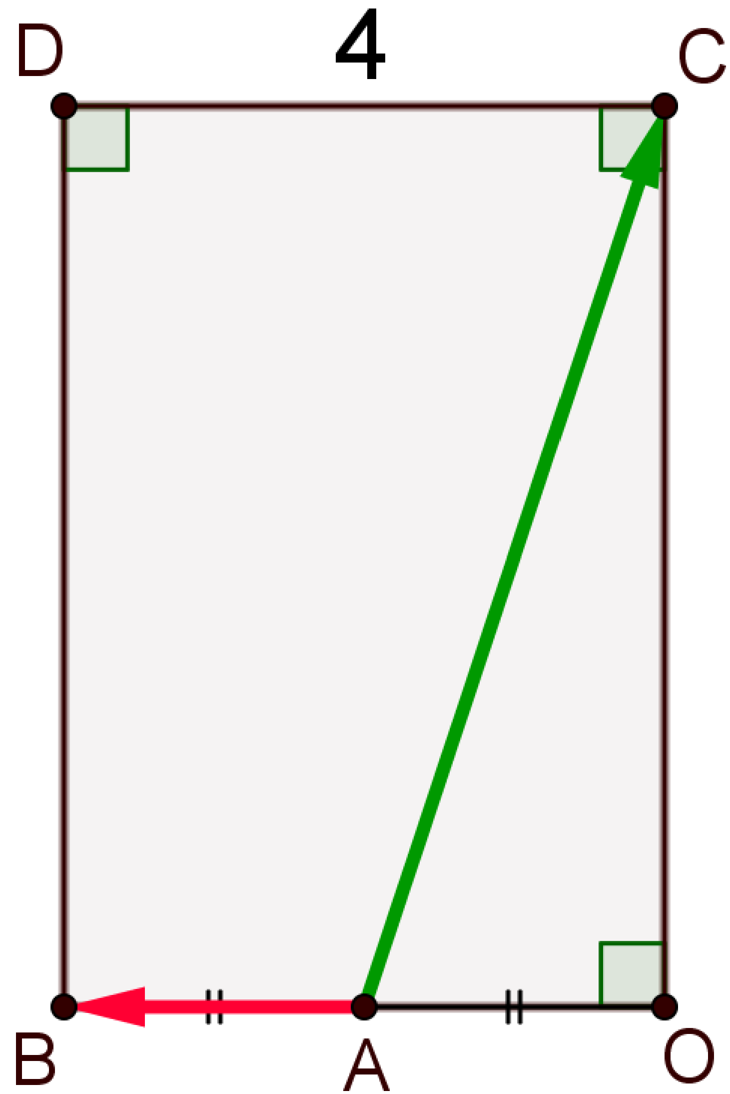



ABCD est un rectangle.

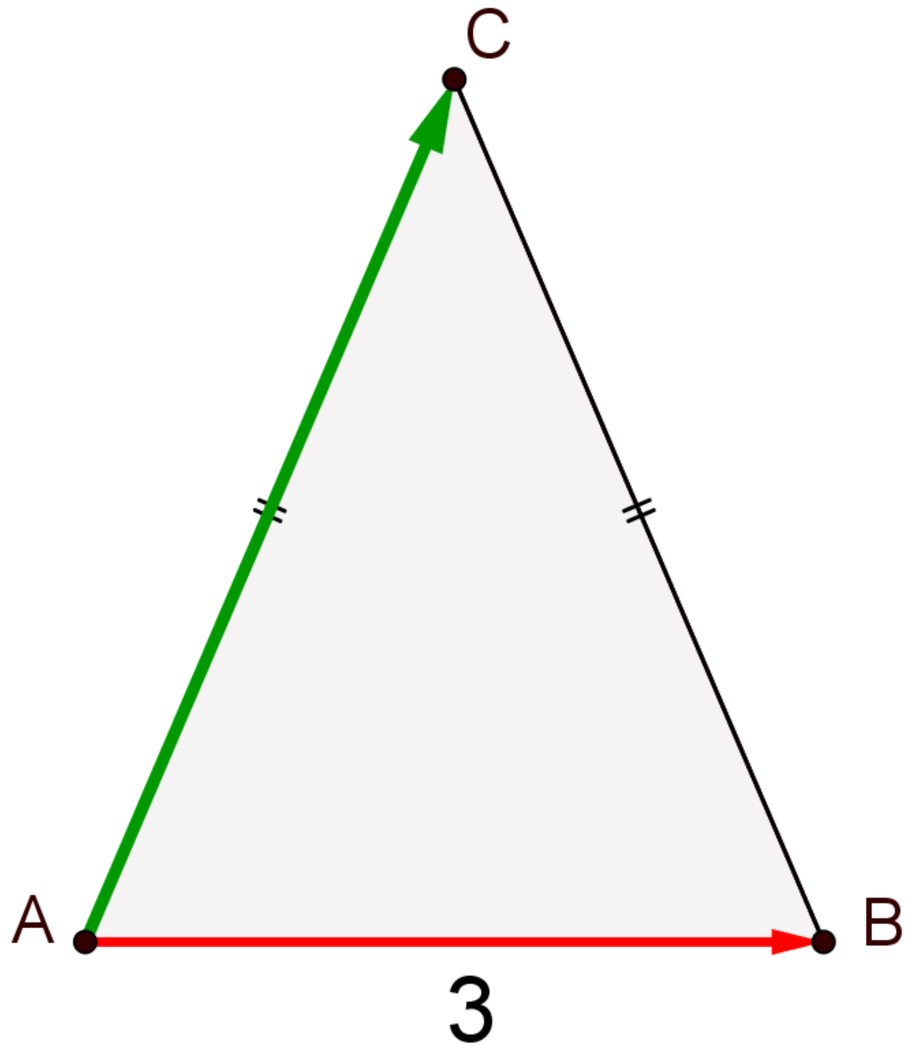
B est le projeté orthogonal de C sur (AB).

$$\overrightarrow{AB} \cdot \overrightarrow{AC} = \overrightarrow{AB} \cdot \overrightarrow{AB} = AB^2 = \mathbf{49}$$

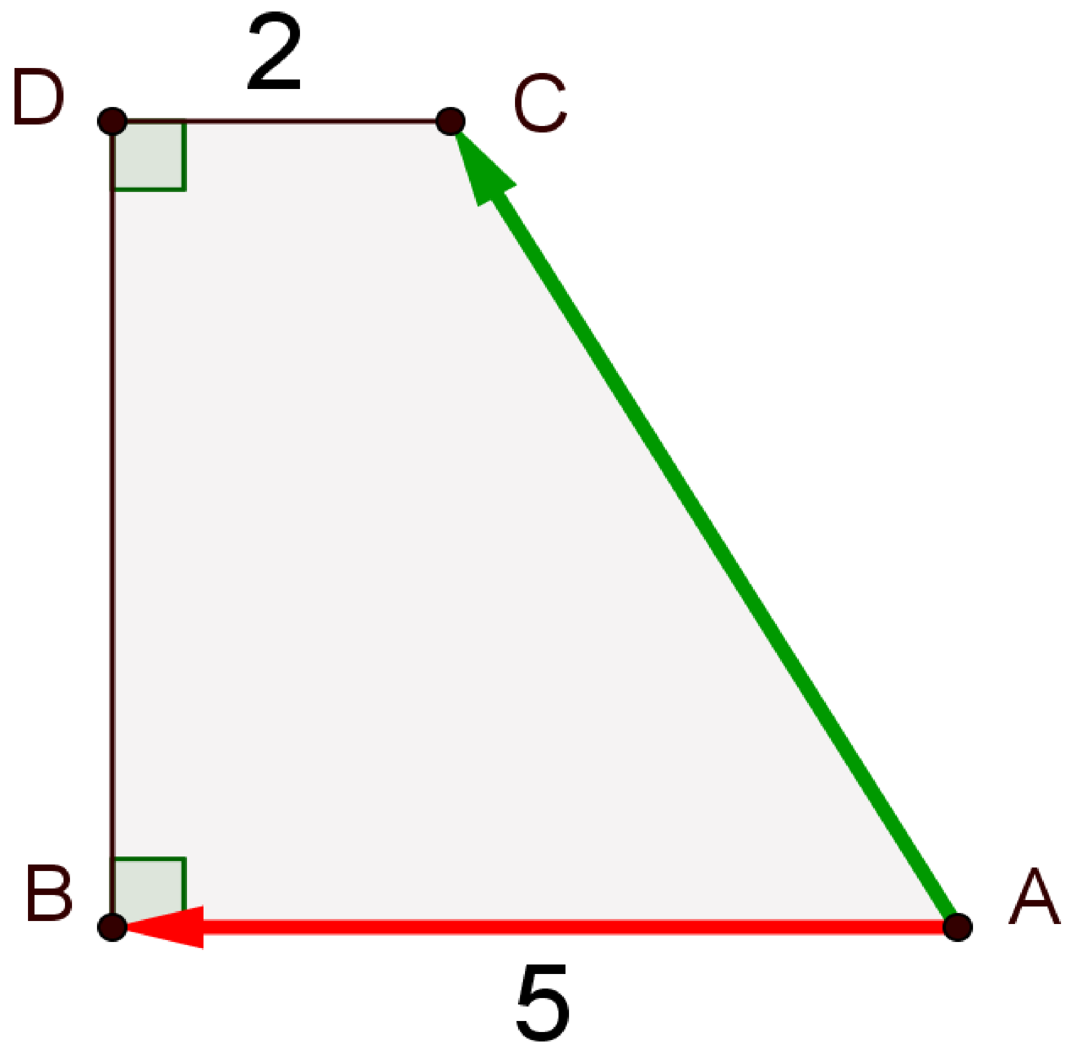
# N°1



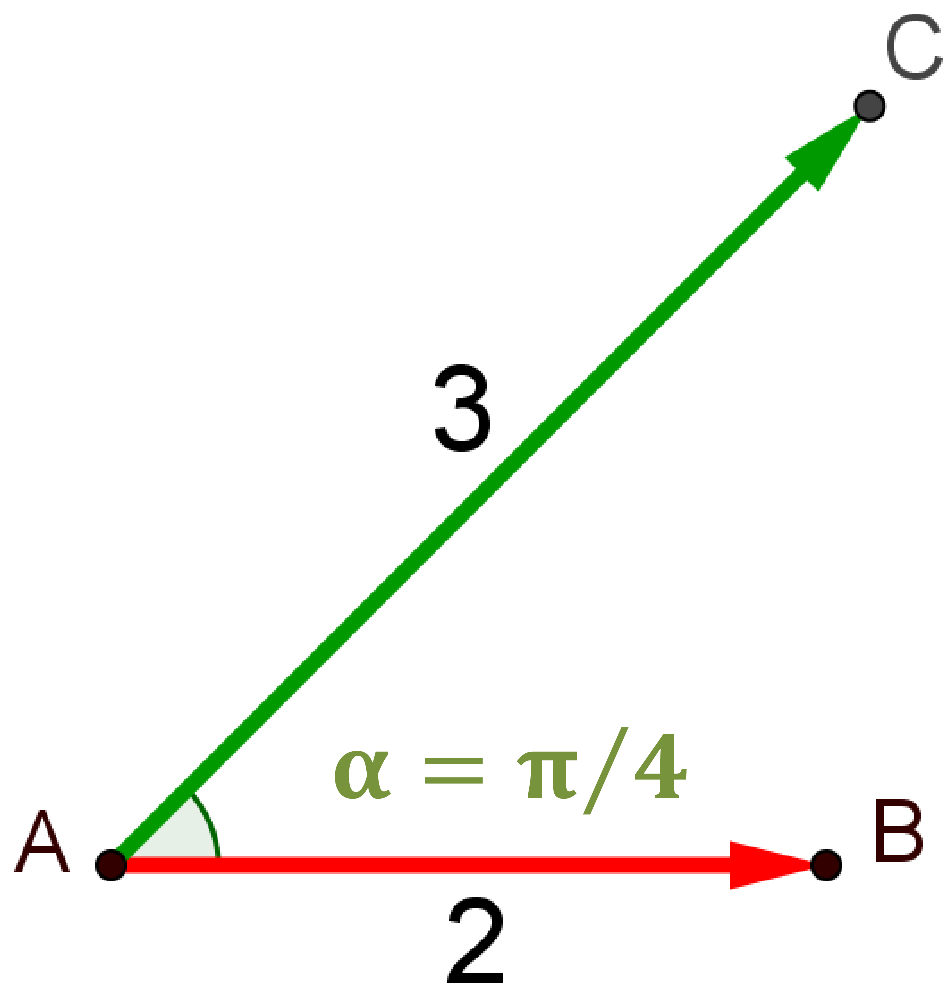
# N°2



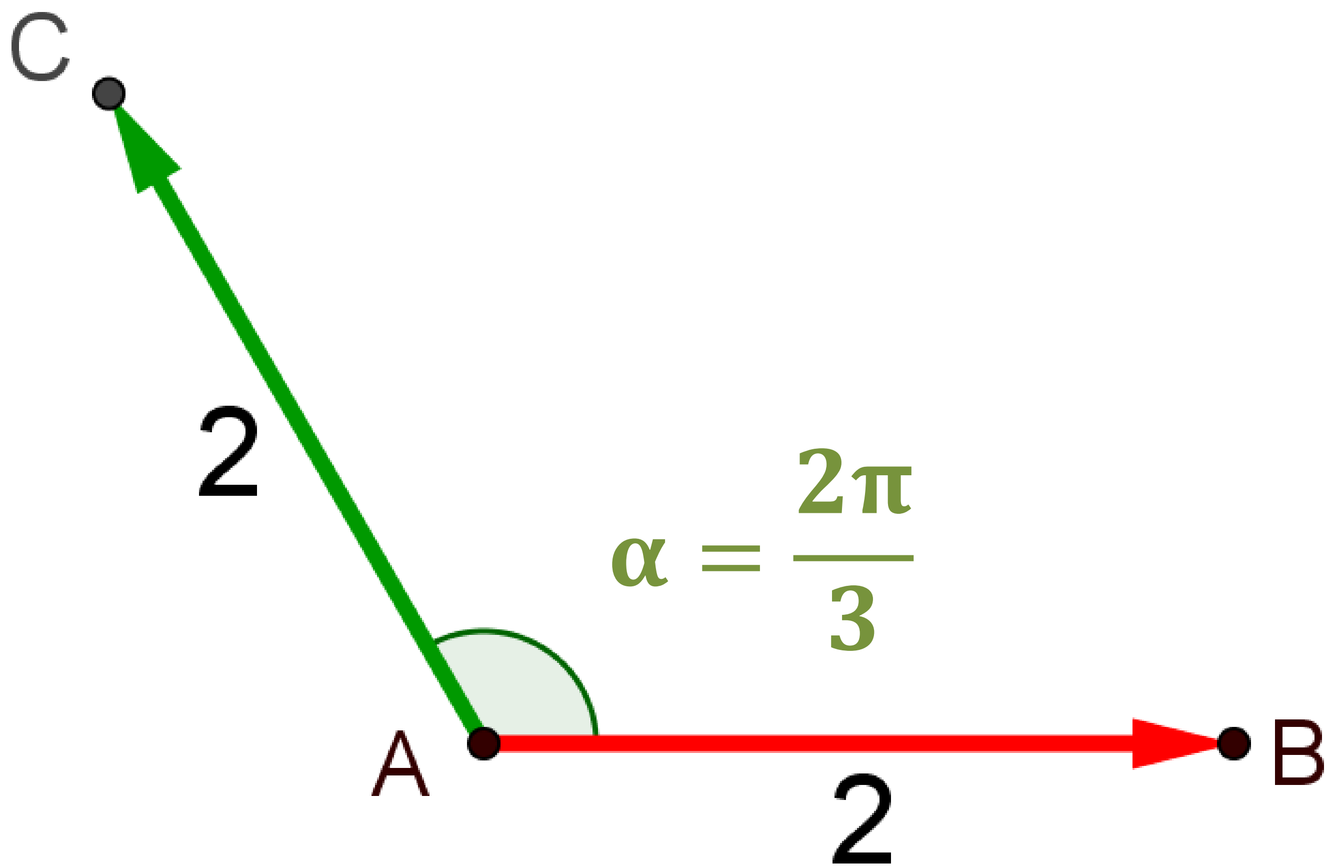
# N°3



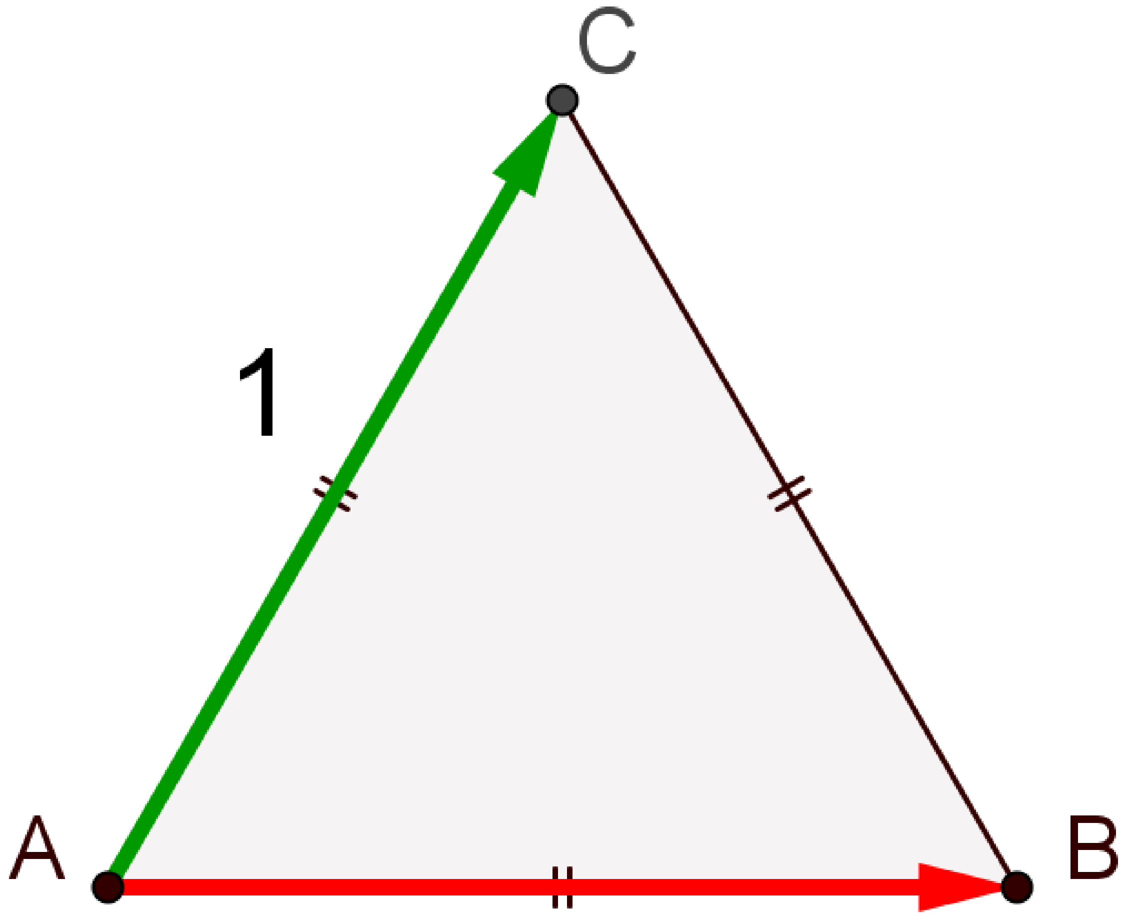
# N°4



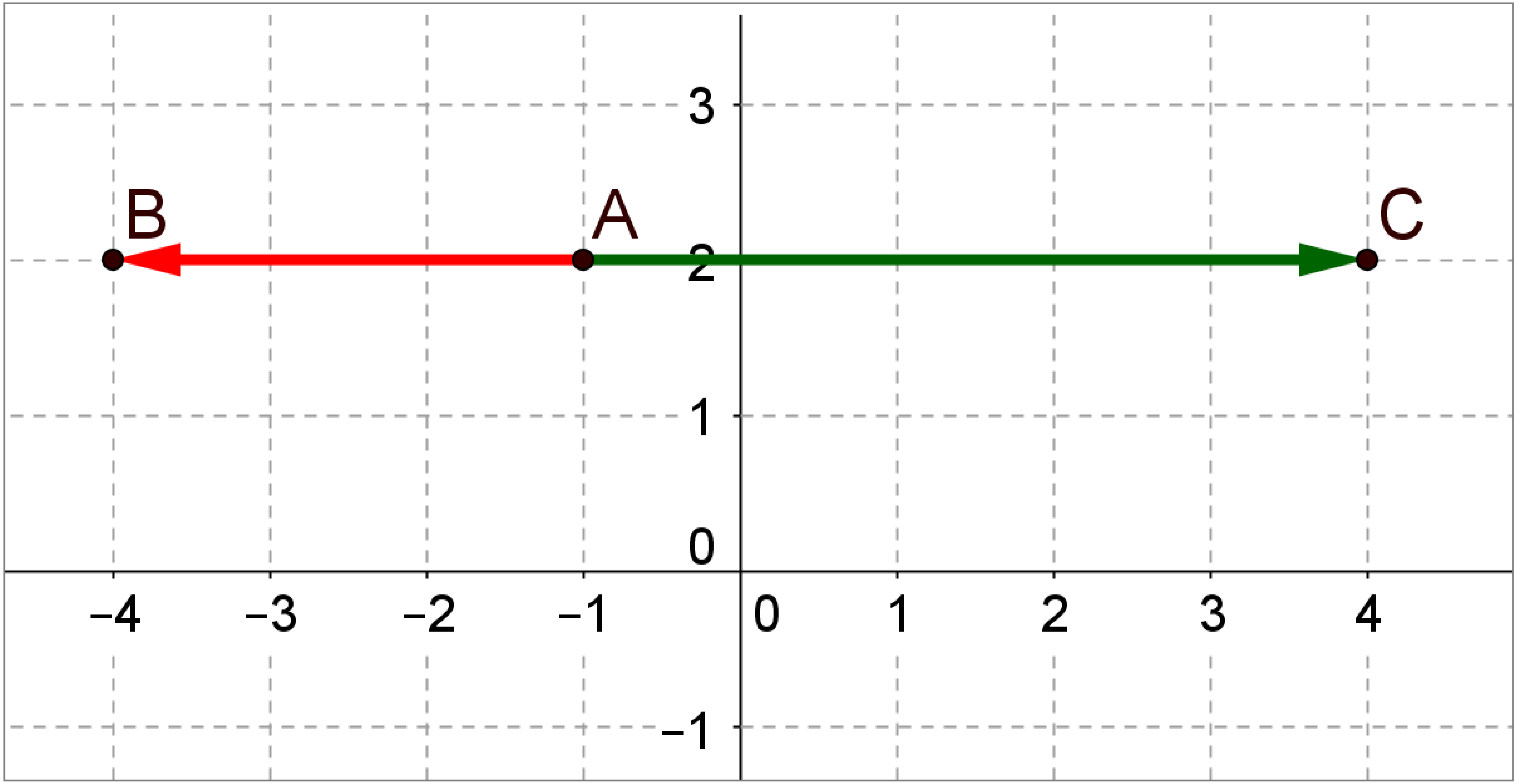
# N°5



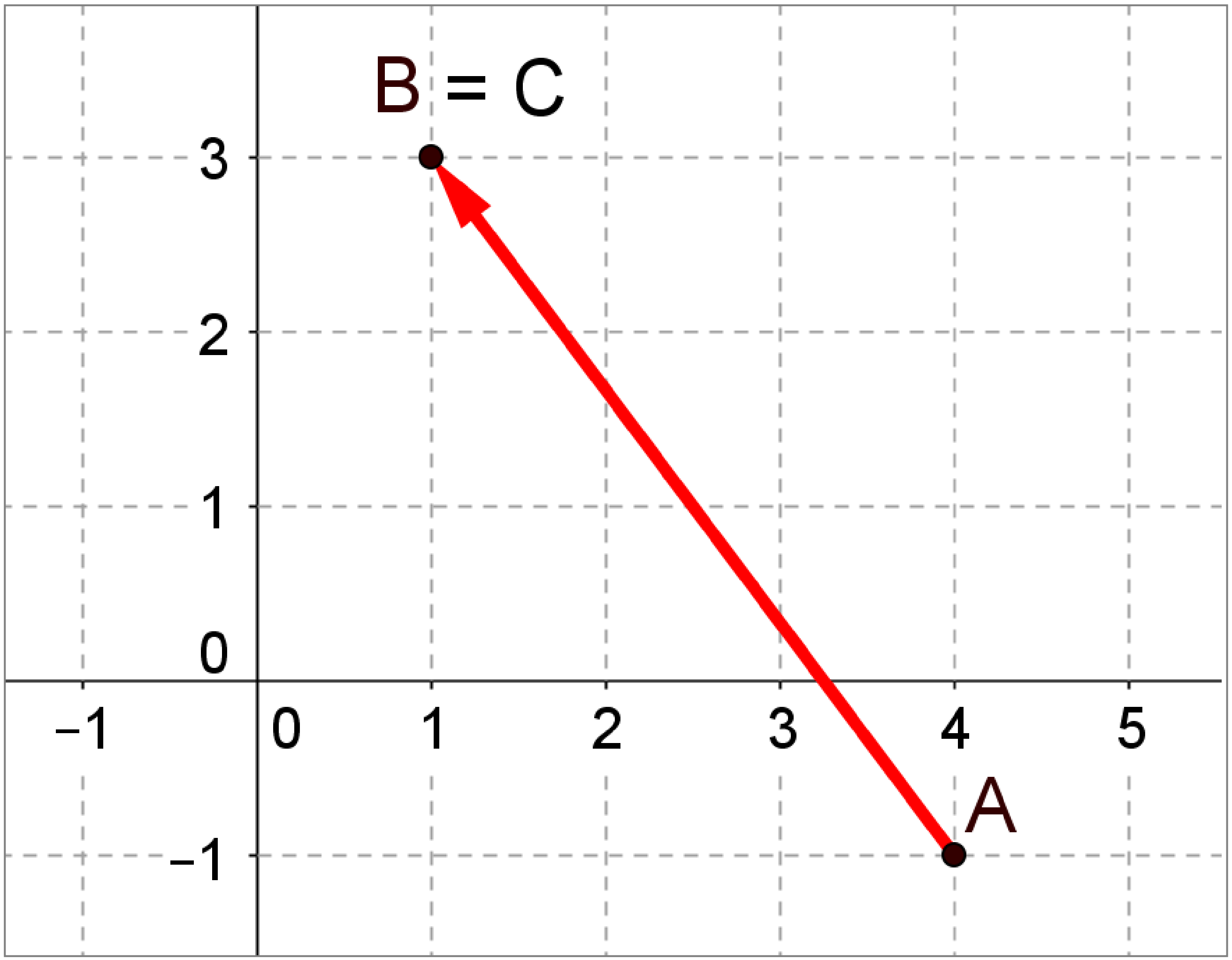
# N°6



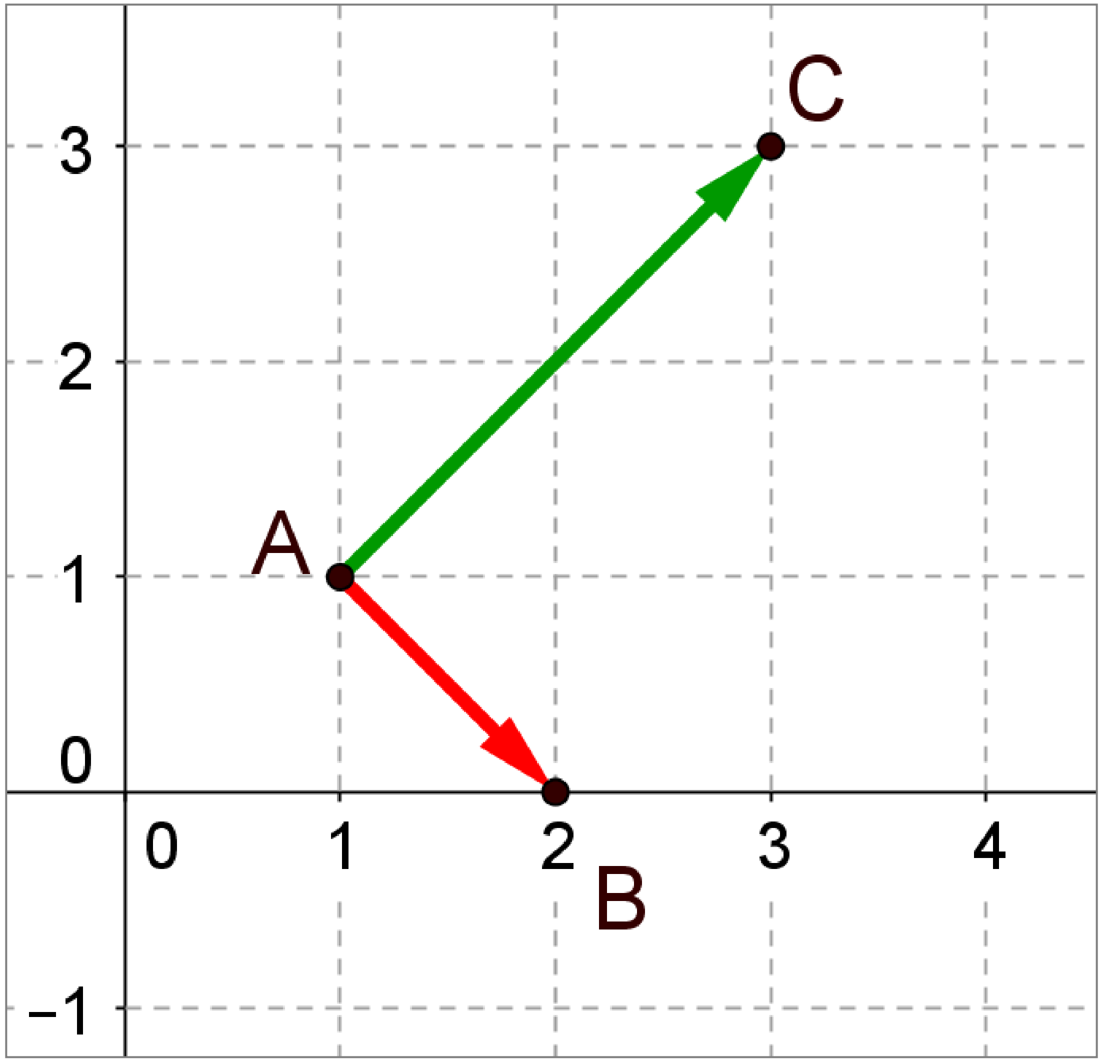
# N°7



# N°8



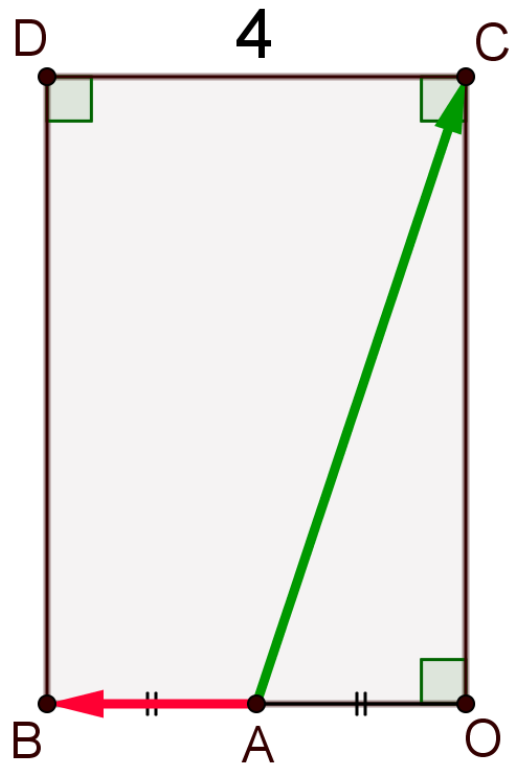
# N°9



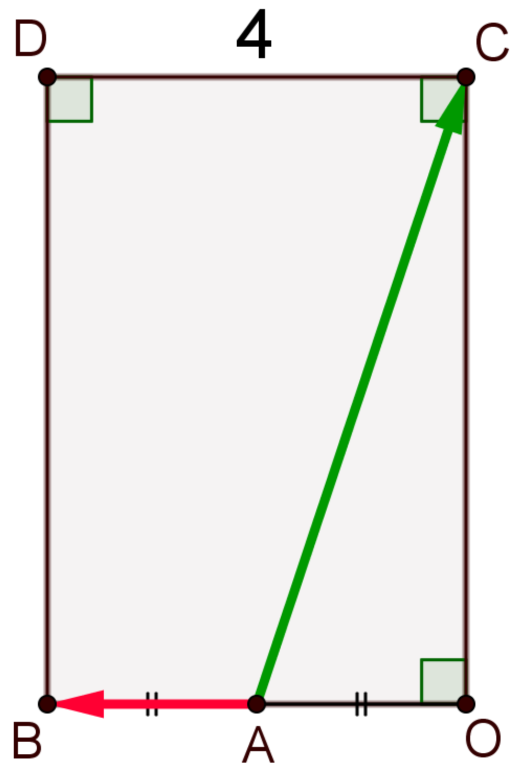
# N°10

# Correction

# N°1

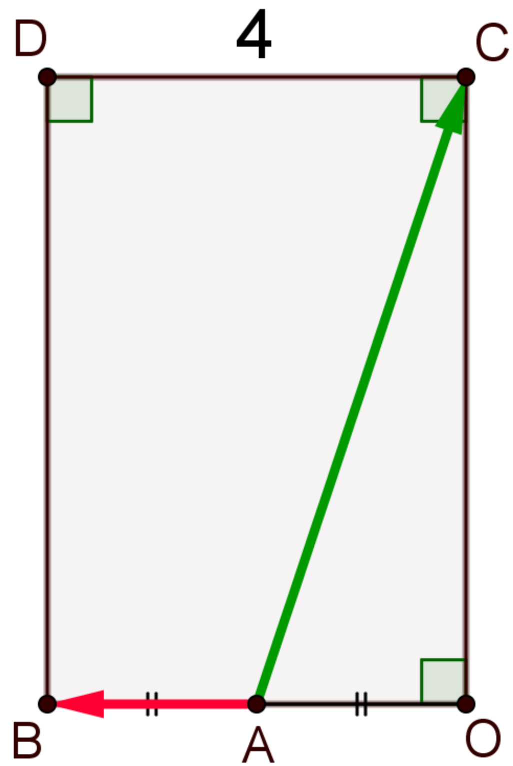


# N°1




O est le projeté orthogonal de C sur (AB).

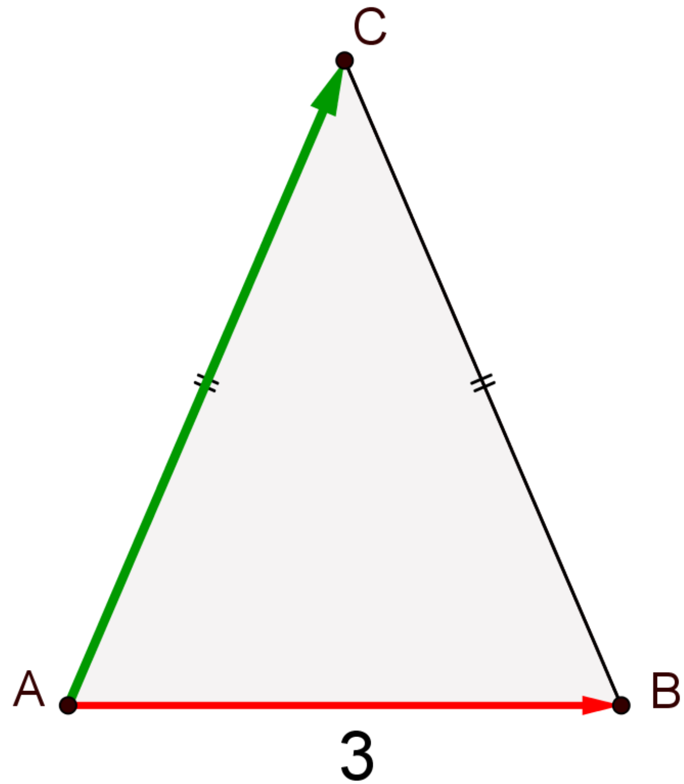
# N°1



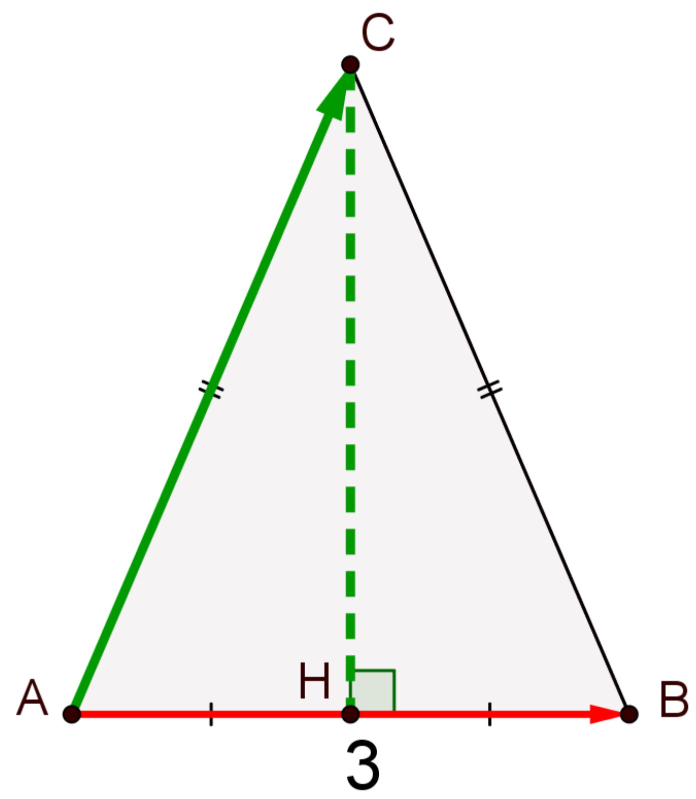

O est le projeté orthogonal de C sur (AB).

$$\overrightarrow{AB} \cdot \overrightarrow{AC} = \overrightarrow{AB} \cdot \overrightarrow{AO} = -AB^2 = \mathbf{-4}$$

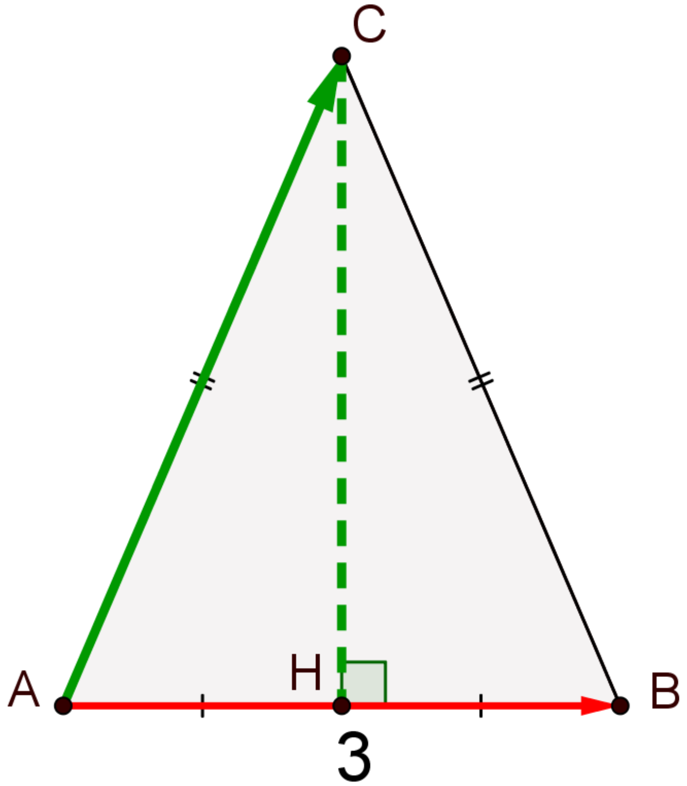
# N°2



# N°2

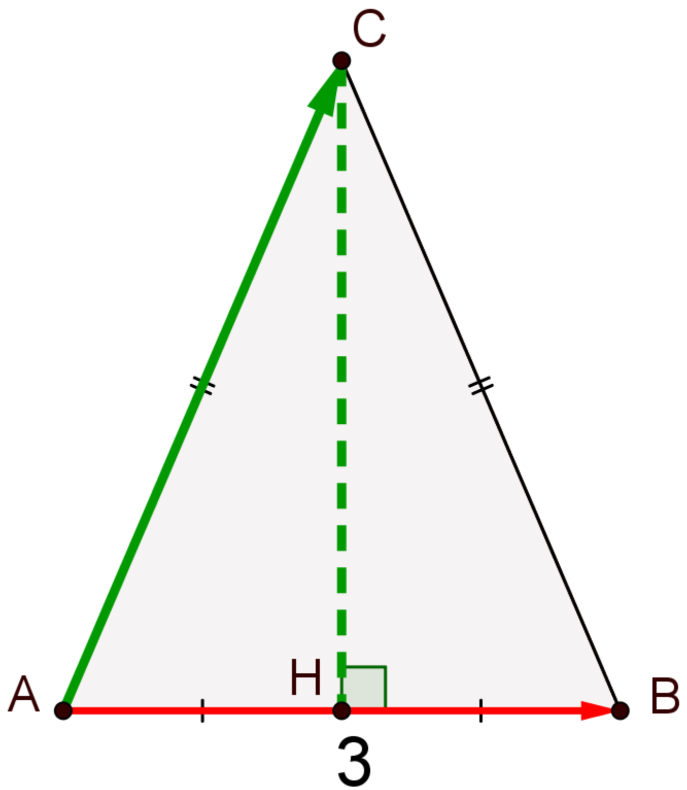


# N°2




H le projeté de C sur (AB) est le milieu de [AB].

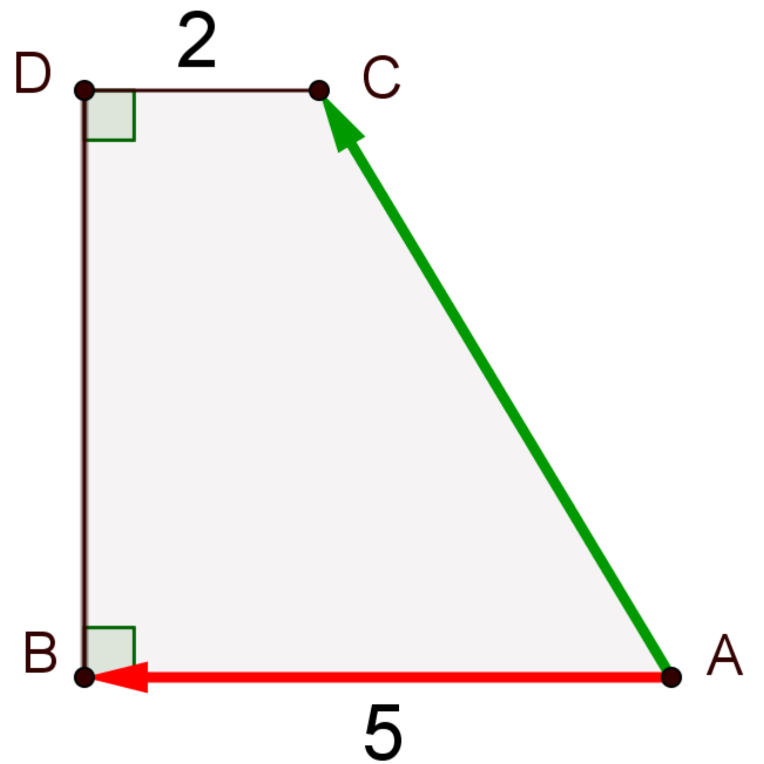
# N°2



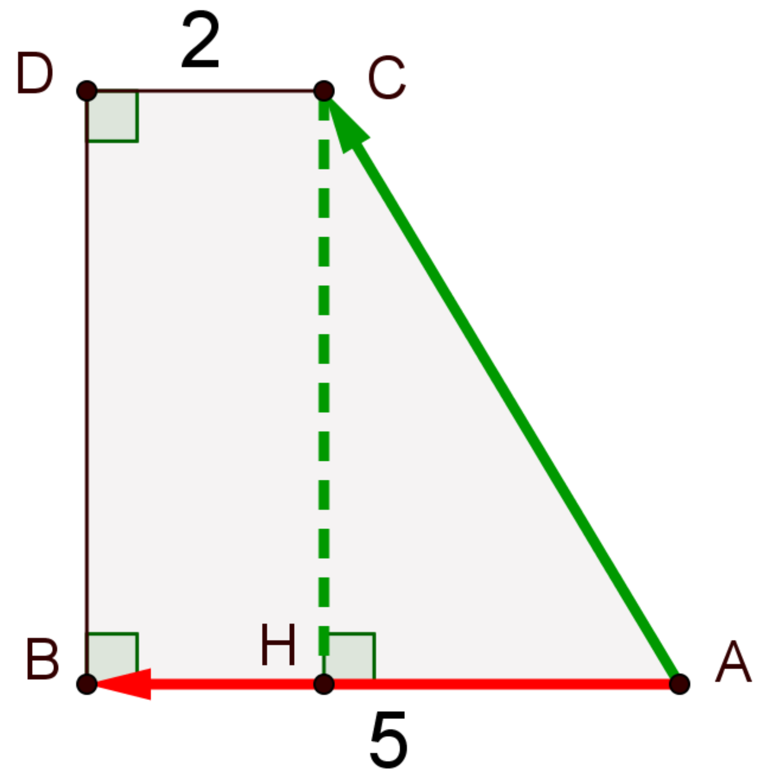

H le projeté de C sur (AB) est le milieu de [AB].

$$\overrightarrow{AB} \cdot \overrightarrow{AC} = \overrightarrow{AB} \cdot \overrightarrow{AH} = AB \times AH = 3 \times 1{,}5 = \mathbf{4,5}$$

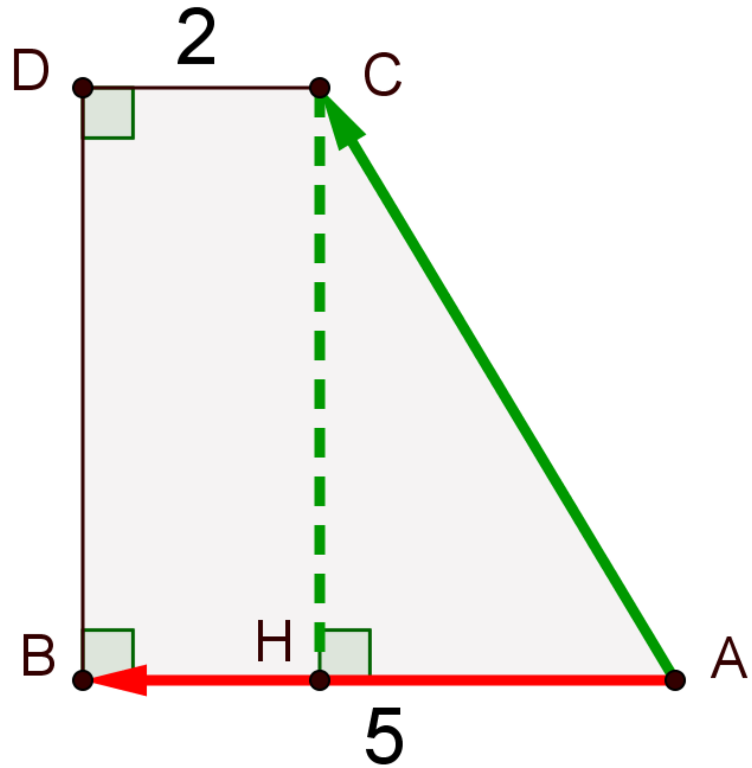
# N°3



# N°3

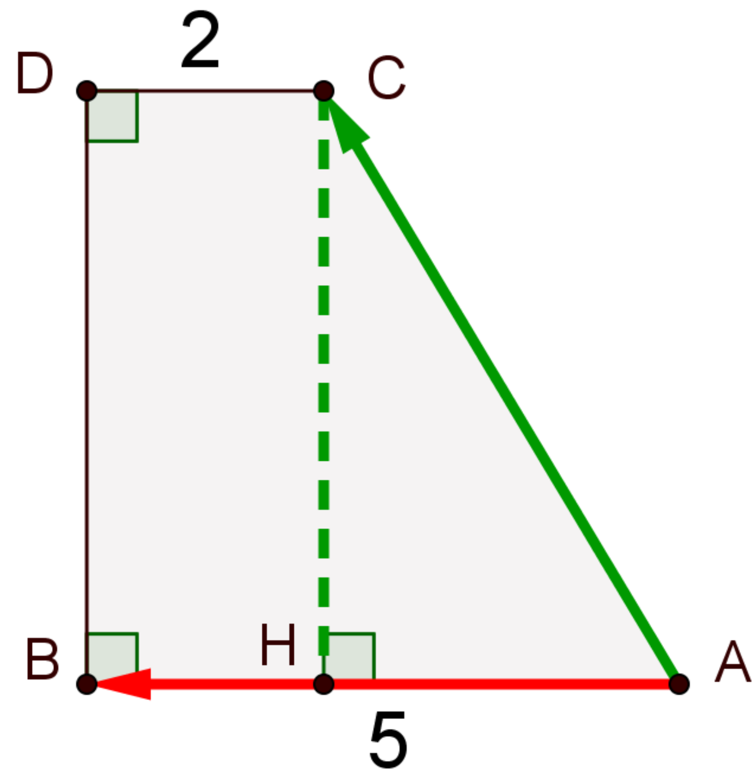


# N°3




H est le projeté de C sur (AB).

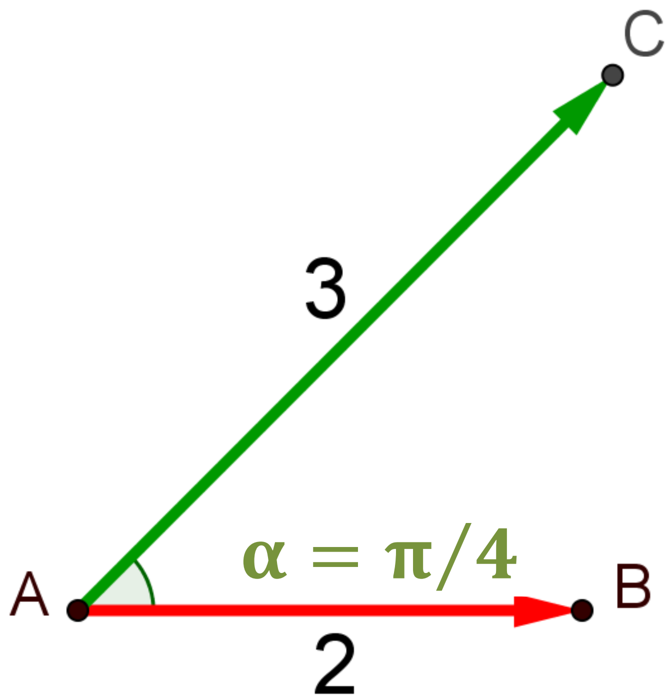
# N°3



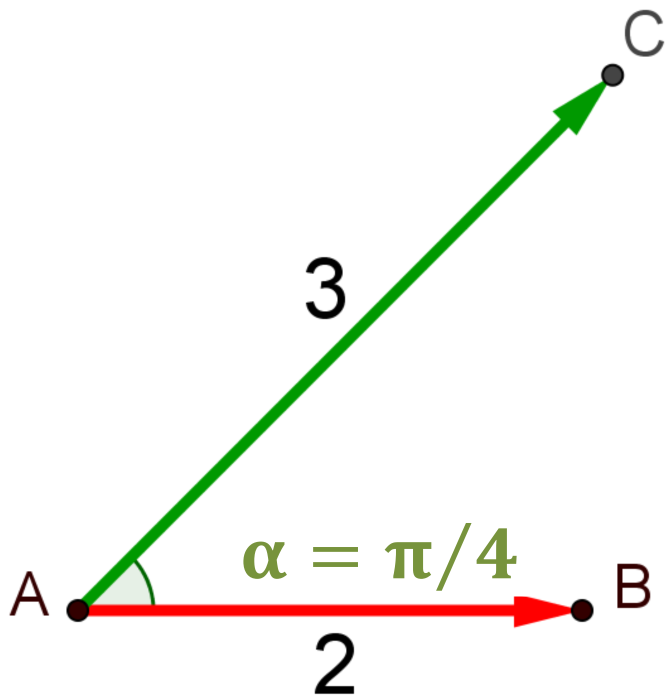

H est le projeté de C sur (AB).

$$\overrightarrow{AB} \cdot \overrightarrow{AC} = \overrightarrow{AB} \cdot \overrightarrow{AH} = AB \times AH = 5 \times 3 = \mathbf{15}$$

# N°4

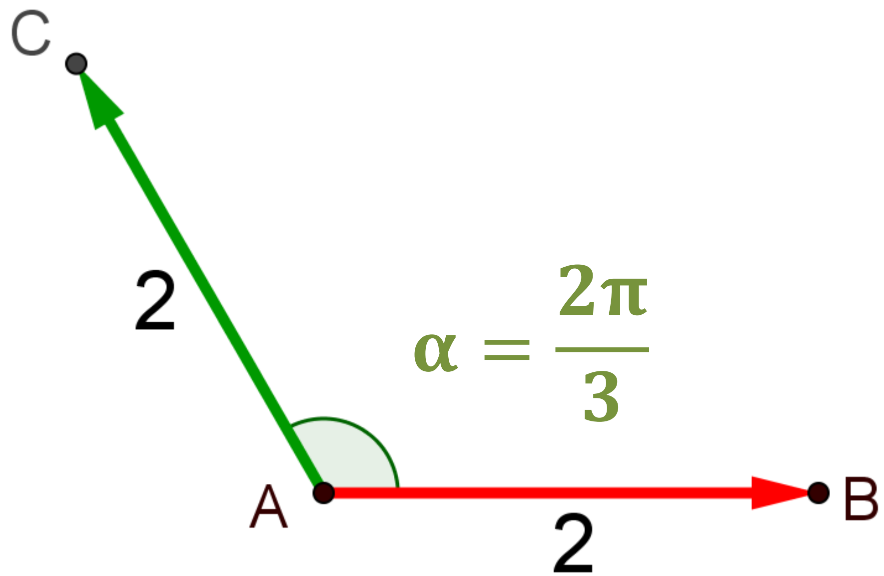


# N°4

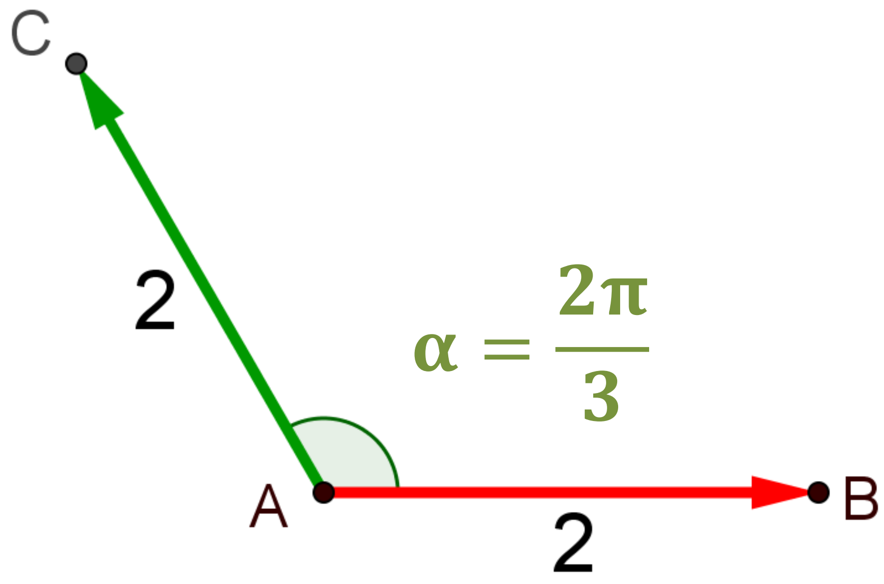



$$\overrightarrow{AB} \cdot \overrightarrow{AC} = AB \times AC \times \cos\left(\frac{\pi}{4}\right) = 3 \times 2 \times \frac{\sqrt{2}}{2} = 3\sqrt{2}$$

# N°5

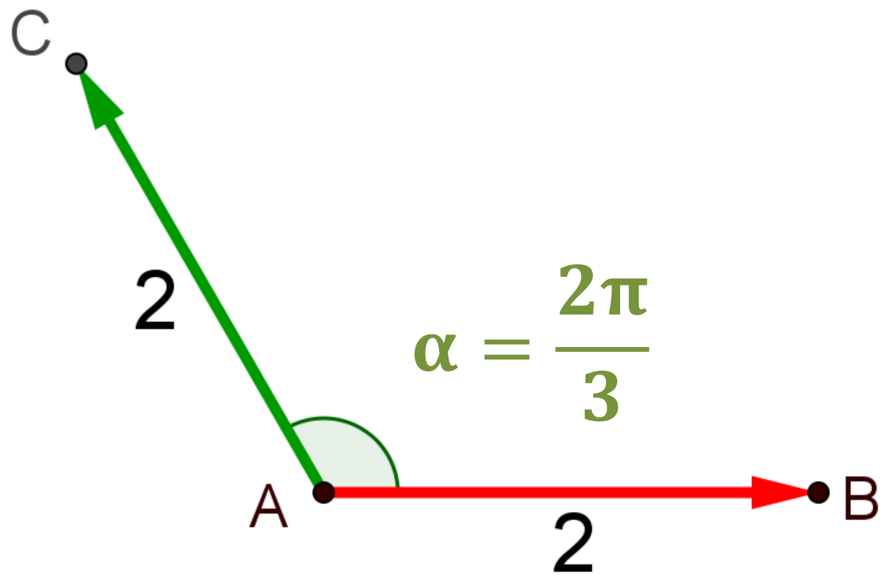


# N°5




$$\overrightarrow{AB} \cdot \overrightarrow{AC} = AB \times AC \times \cos\left(\frac{2\pi}{3}\right) = 2 \times 2 \times \frac{-1}{2}$$

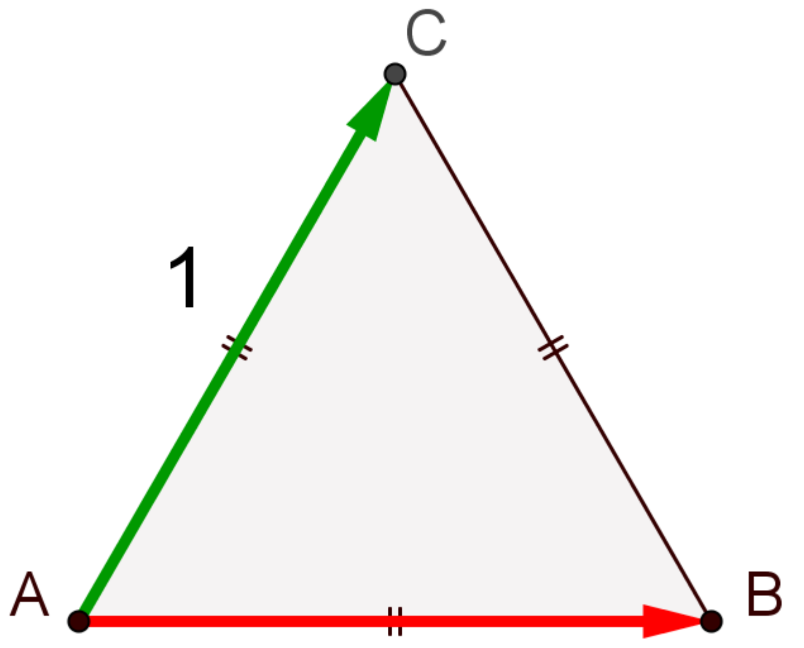
# N°5



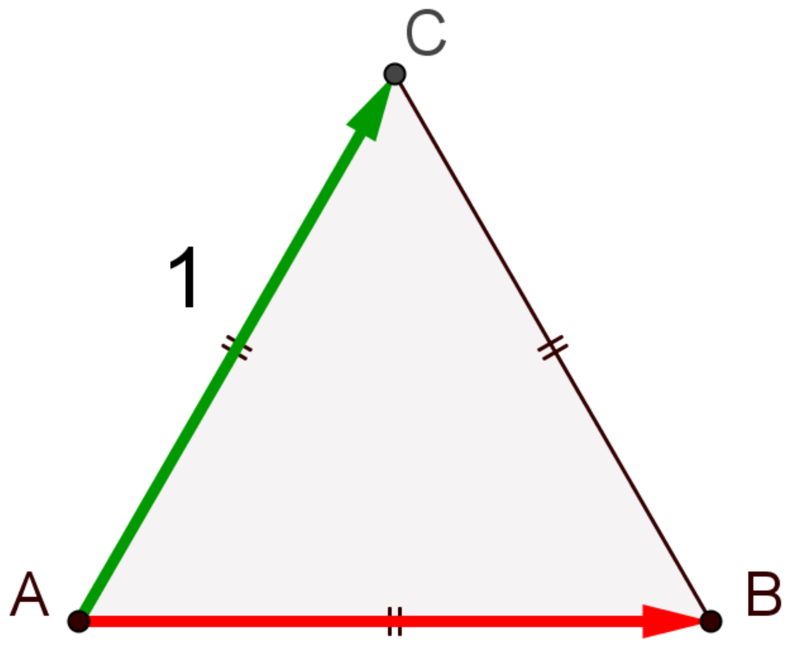

$$\overrightarrow{AB} \cdot \overrightarrow{AC} = AB \times AC \times \cos\left(\frac{2\pi}{3}\right) = 2 \times 2 \times \frac{-1}{2}$$

Donc $\overrightarrow{AB} \cdot \overrightarrow{AC} = \mathbf{-2}$

# N°6

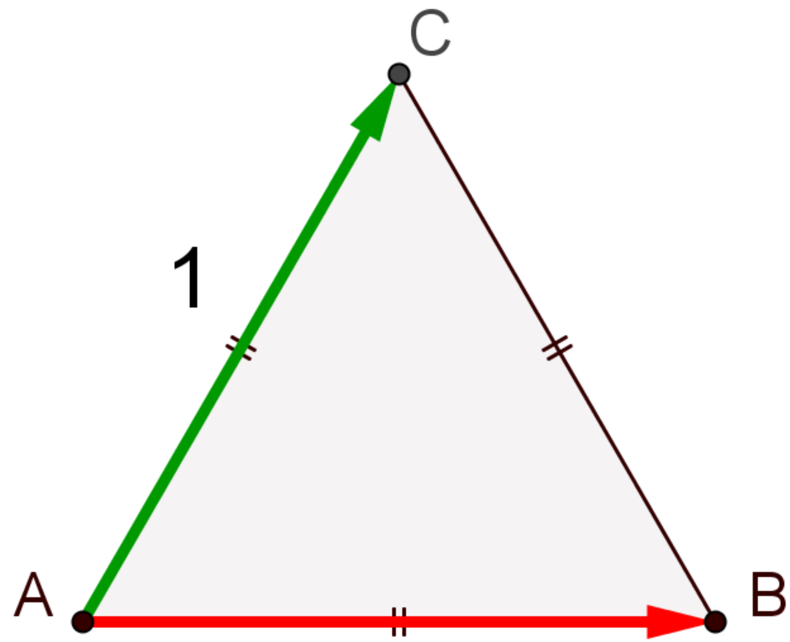


# N°6




Le triangle ABC est équilatéral : $\widehat{BAC} = \frac{\pi}{3}$

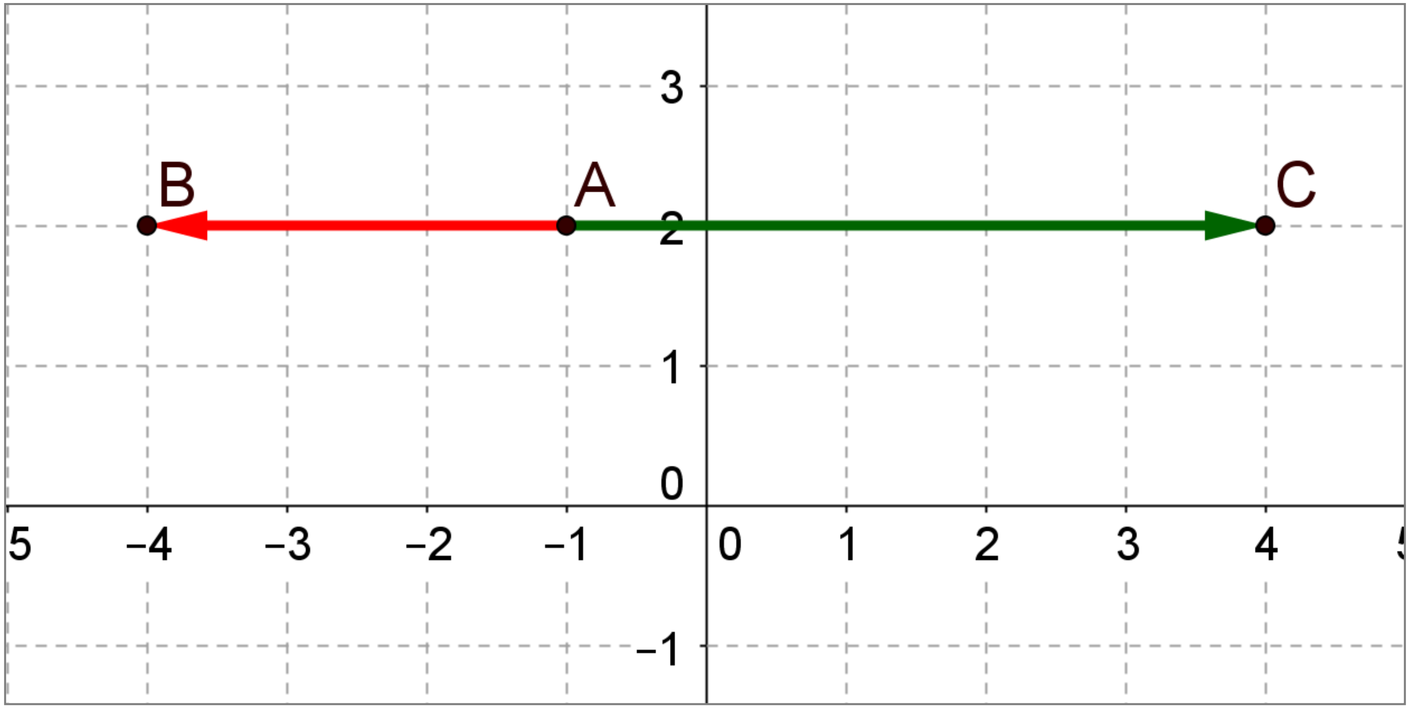
# N°6



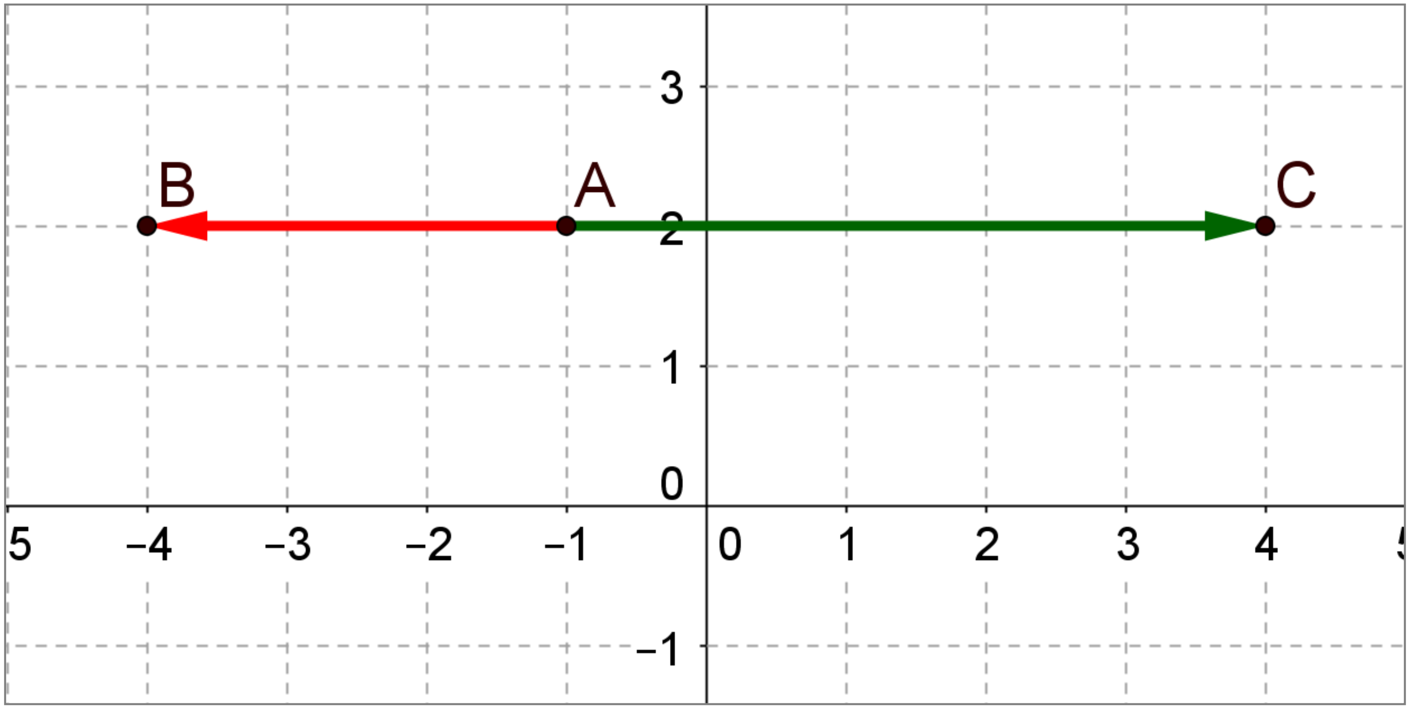

Le triangle ABC est équilatéral : $\widehat{BAC} = \frac{\pi}{3}$

$$\overrightarrow{AB} \cdot \overrightarrow{AC} = AB \times AC \times \cos\left(\frac{\pi}{3}\right) = 1 \times 1 \times \frac{1}{2} = \mathbf{\frac{1}{2}}$$

# N°7

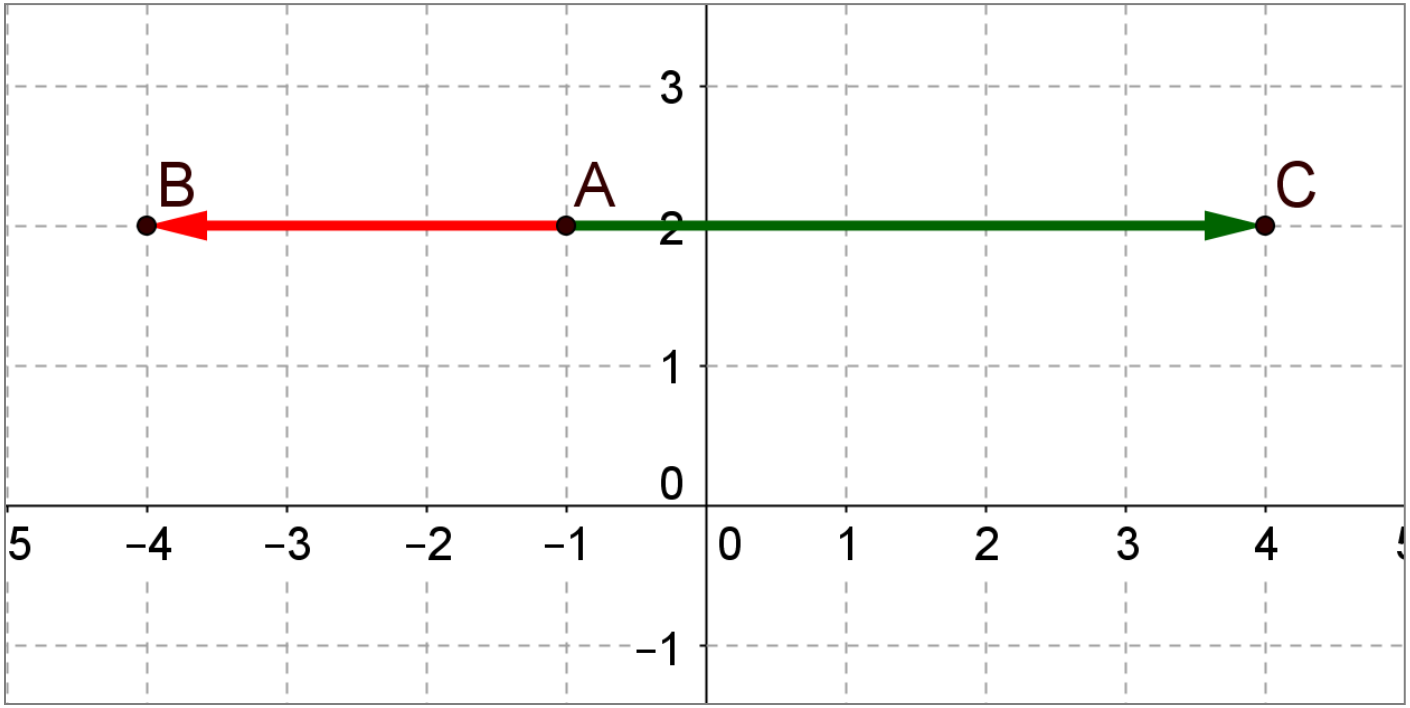


# N°7




$$\overrightarrow{AB} \cdot \overrightarrow{AC} = AB \times AC \times \cos(\pi) = 5 \times 3 \times (-1)$$

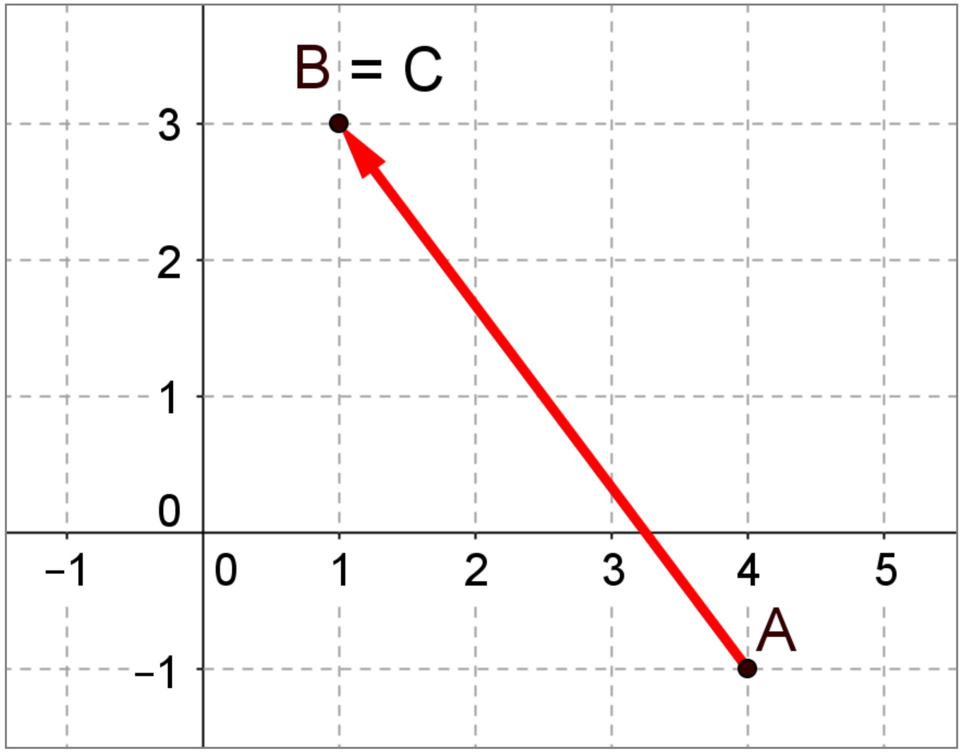
# N°7



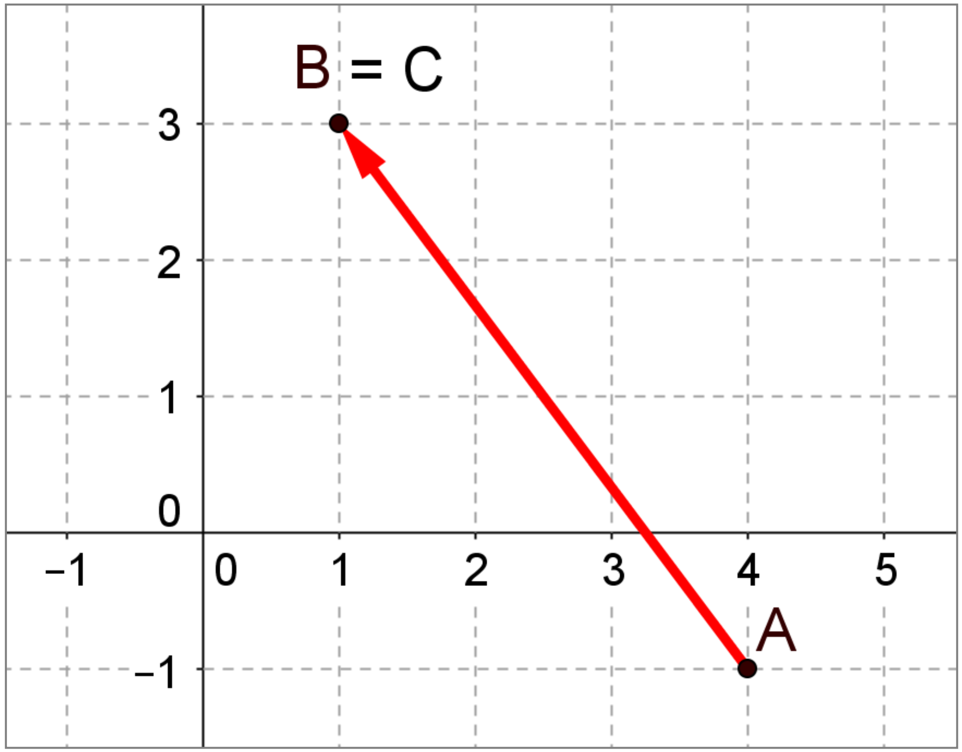

$$\overrightarrow{AB} \cdot \overrightarrow{AC} = AB \times AC \times \cos(\pi) = 5 \times 3 \times (-1)$$

Donc $\overrightarrow{AB}.\overrightarrow{AC} = \mathbf{-15}$

# N°8

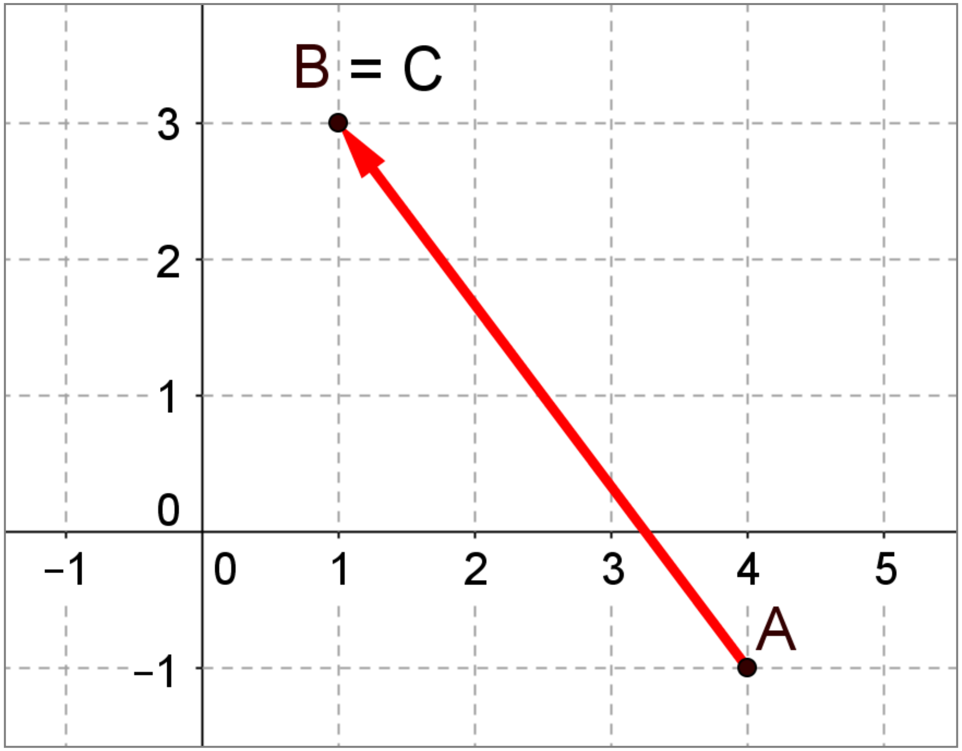


# N°8




$\overrightarrow{AB}$ a pour coordonnées $(-3\ ;4)$.

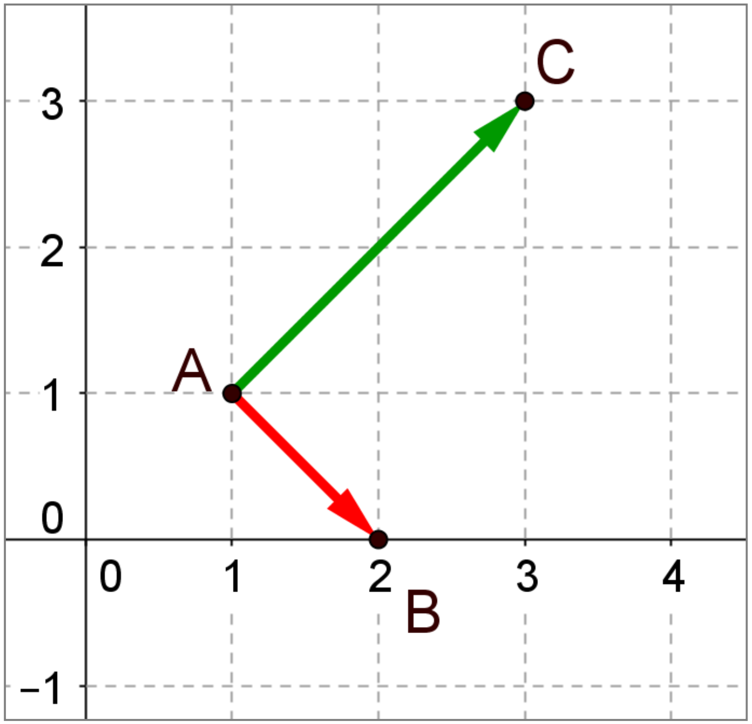
# N°8



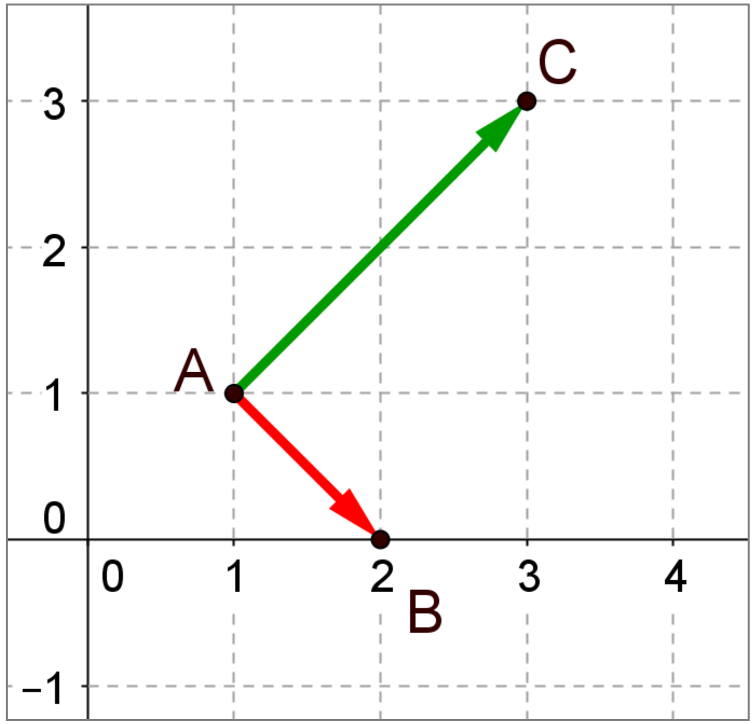

$\overrightarrow{AB}$ a pour coordonnées $(-3\ ;4)$.

$\overrightarrow{AB}\cdot\overrightarrow{AC} = AB^2 = (-3)^2 + 4^2 = \mathbf{25}$

# N°9

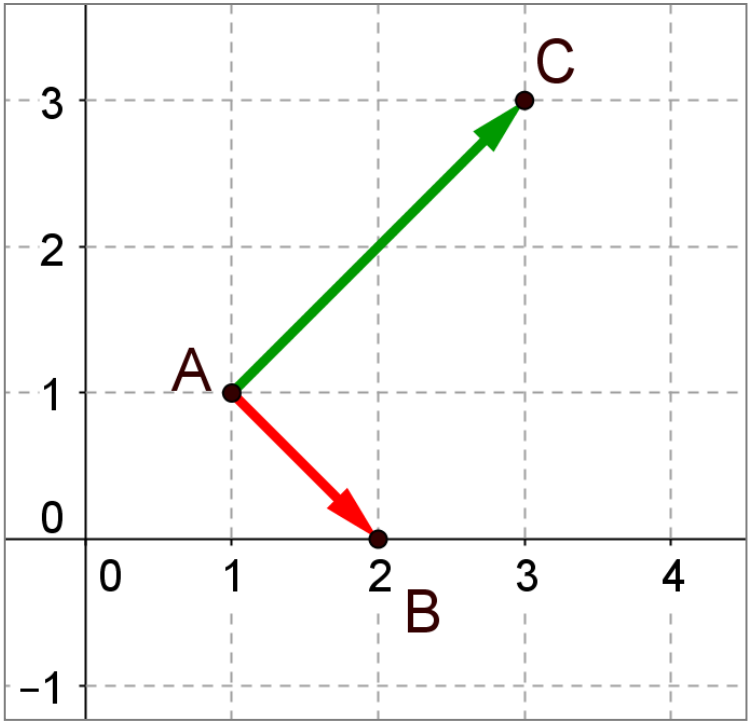


# N°9




$\overrightarrow{AB}$ a pour coordonnées $(1\,;-1)$ et $\overrightarrow{AC}$ $(2\,;2)$.

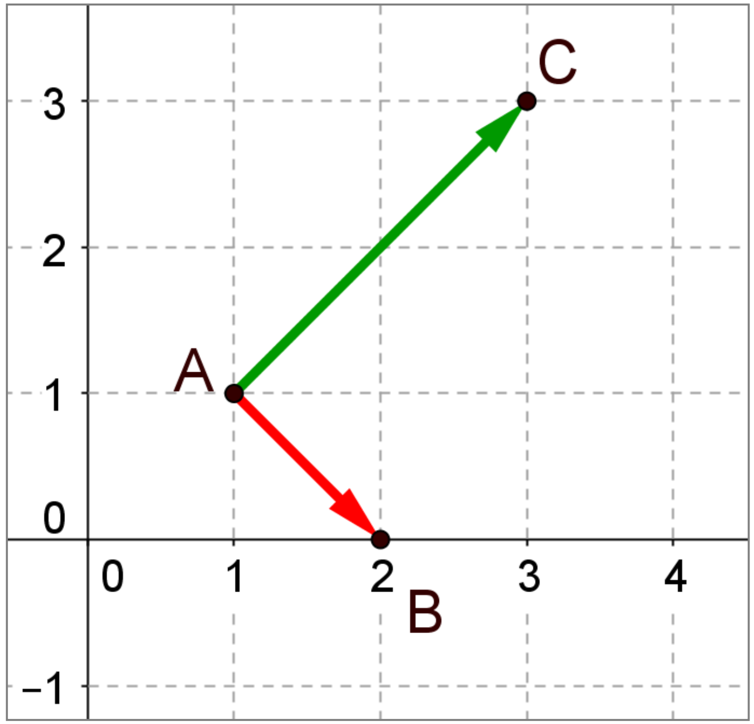
# N°9




$\overrightarrow{AB}$ a pour coordonnées $(1\,;-1)$ et $\overrightarrow{AC}$ $(2\,;2)$.

$$\overrightarrow{AB}\cdot\overrightarrow{AC} = 1\times 2+(-1)\times 2 = \mathbf{0}$$

# N°9



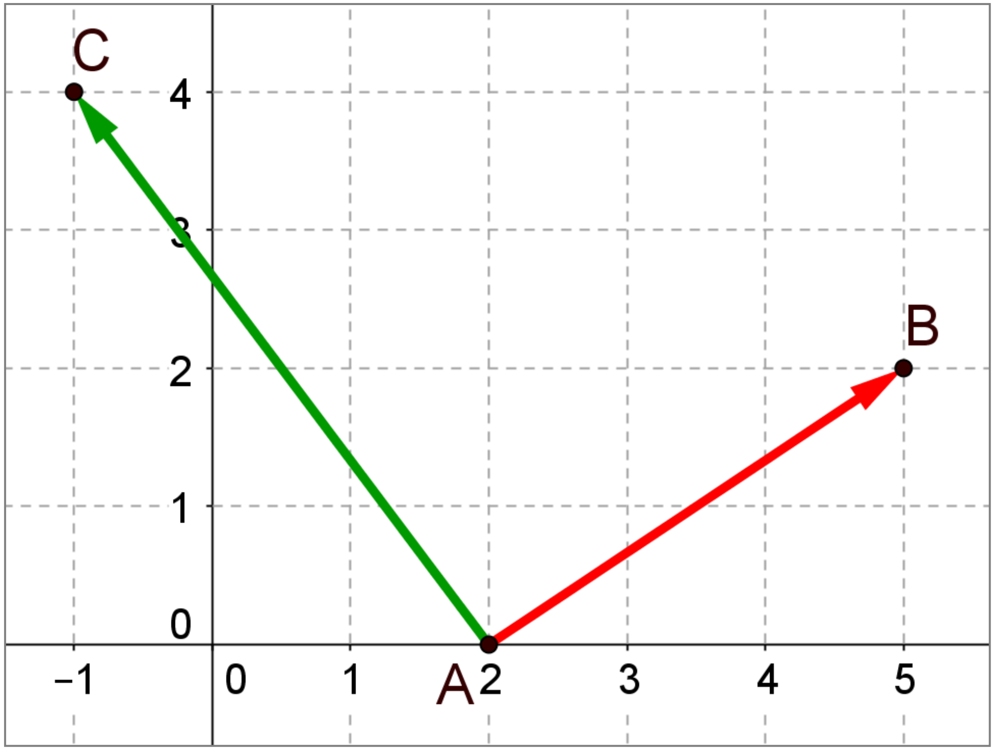

$\overrightarrow{AB}$ a pour coordonnées $(1\,;-1)$ et $\overrightarrow{AC}\ (2\,;2)$.

$$\overrightarrow{AB}\cdot\overrightarrow{AC} = 1\times 2+(-1)\times 2 = \mathbf{0}$$

Les deux vecteurs sont orthogonaux.

# N°10

# N°10




$\overrightarrow{AB}$ a pour coordonnées $(3\ ;2)$ et $\overrightarrow{AC}$ $(-3\ ;4)$.

# N°10


$\overrightarrow{AB}$ a pour coordonnées $(3\,;2)$ et $\overrightarrow{AC}$ $(-3\,;4)$.

$$\overrightarrow{AB}\cdot\overrightarrow{AC} = 3\times(-3)+2\times 4 = \mathbf{-1}$$

# Fin