

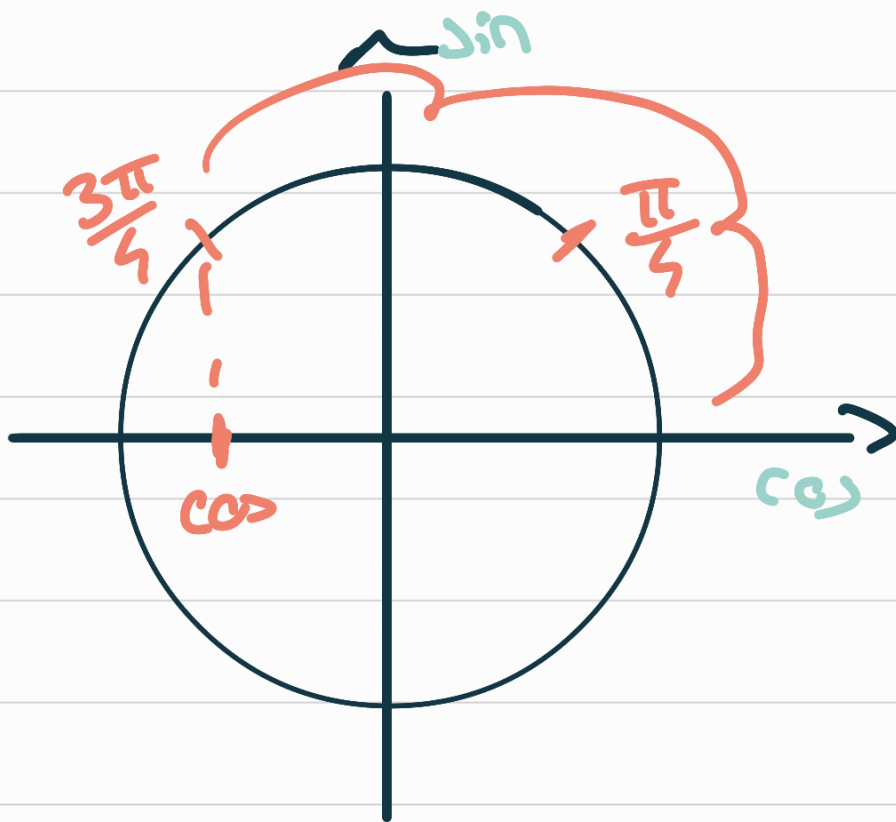
# Produit scalaire

exercice 1:

$$\vec{AB} \cdot \vec{AC} = AB \times AC \times \cos(\widehat{BAC})$$

$$= 5 \times 3 \times \cos\left(\frac{3\pi}{4}\right)$$

$$= 5 \times 3 \times -\frac{\sqrt{2}}{2} = -\frac{15\sqrt{2}}{2}$$



## exercice 2 :

$$\vec{u} \cdot \vec{v} = \|\vec{u}\| \times \|\vec{v}\| \cos(\vec{u}, \vec{v})$$

$$7 = 2 \times \|\vec{v}\| \cos\left(\frac{\pi}{6}\right)$$

$$\frac{7}{2} = \cancel{2} \times \|\vec{v}\| \times \frac{\sqrt{3}}{\cancel{2}}$$

$$\|\vec{v}\| = \frac{7}{\sqrt{3}}$$

## exercice 3:

$$1) \vec{MN} (3; -5)$$

A      B

$$\vec{AB} (x_B - x_A; y_A - y_B)$$

$$\vec{MP} (1; -4)$$

$$\vec{MN} \cdot \vec{MP} = 3 \times 1 + (-5) \times (-4)$$

$$= 3 + 20$$

$$= 23.$$

$$2) \underbrace{\vec{MN} \cdot \vec{MP}}_{23} = MN \times MP \times \cos(\widehat{NMP})$$

$$AB = \sqrt{(x_B - x_A)^2 + (y_B - y_A)^2}$$

$$MN = \sqrt{3^2 + (-5)^2}$$

$$= \sqrt{9 + 25}$$

$$= \sqrt{34}$$

$$MP = \sqrt{1^2 + (-4)^2}$$

$$= \sqrt{1 + 16}$$

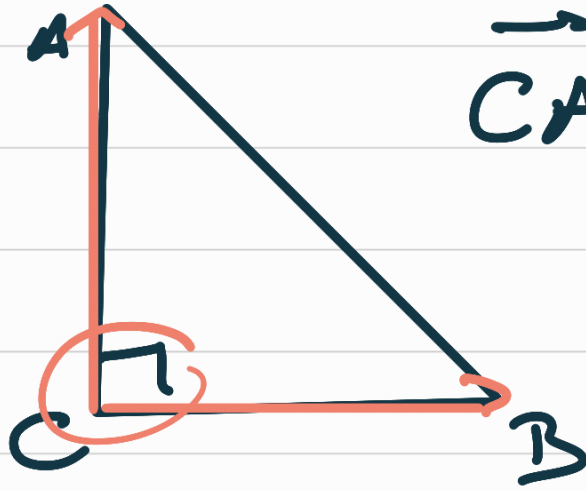
$$= \sqrt{17}$$

$$23 = \sqrt{34} \times \sqrt{17} \times \cos(\widehat{NMP})$$

$$\frac{23}{\sqrt{34} \times \sqrt{17}} = \cos(\widehat{NMP})$$

$$\widehat{NMP} = \arccos\left(\frac{23}{\sqrt{34} \times \sqrt{17}}\right)$$
$$\approx 17^\circ$$

## exercice 4:



$$\vec{CA}(1; -2)$$

$$\vec{CB}(4; 2)$$

$$\vec{CA} \cdot \vec{CB}$$

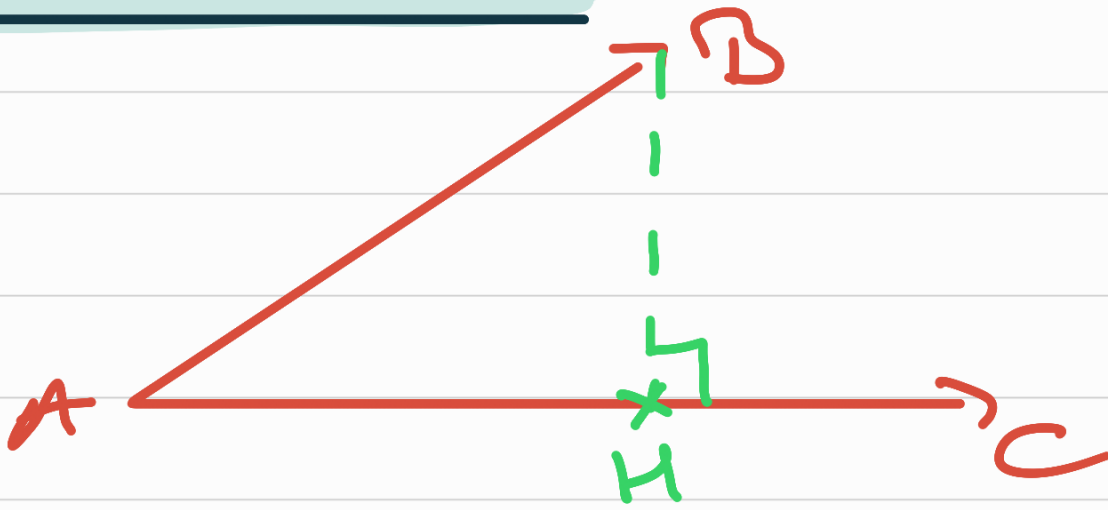
$$= 1 \times 4 + (-2) \times 2$$

$$= 4 - 4$$

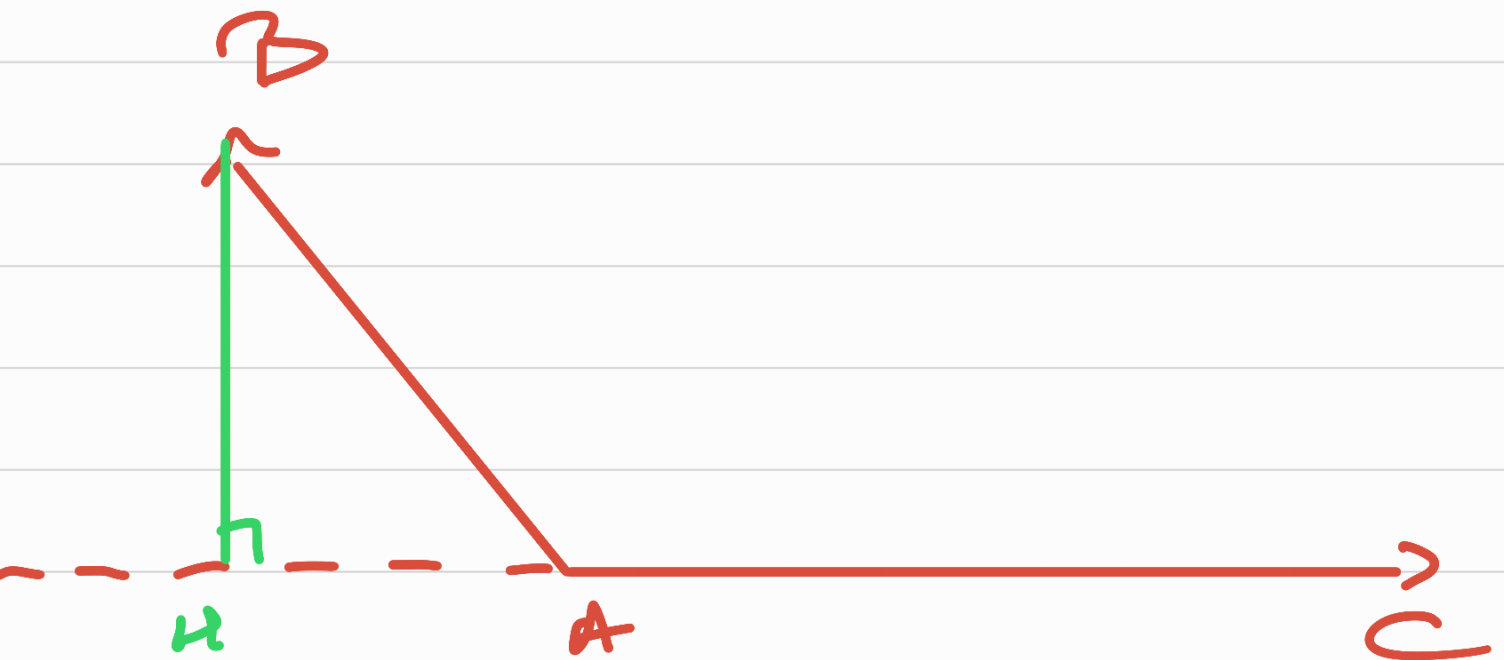
$$= 0$$

donc le triangle ABC est  
rectangle en C.

## exercice 5:



$$\begin{aligned}\vec{AB} \cdot \vec{AC} &= \vec{AH} \cdot \vec{AC} \\ &= AH \times AC \times 1\end{aligned}$$



$$\begin{aligned}\vec{AB} \cdot \vec{AC} &= \vec{AH} \cdot \vec{AC} \\ &= AH \times AC \times -1\end{aligned}$$

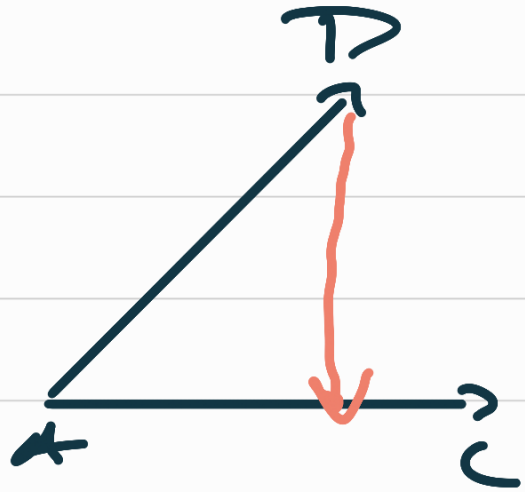
$$\bullet \vec{AC} \cdot \vec{AD}$$

$$= \vec{AC} \times \vec{AO}$$

$$= AC \times AO$$

$$= 8 \times 4$$

$$= 32$$

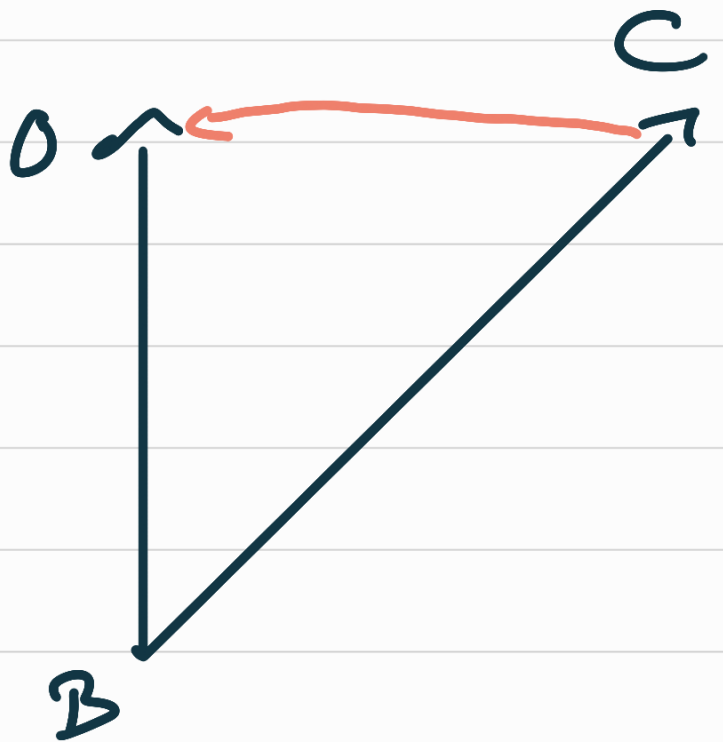


$$\bullet \vec{BO} \cdot \vec{BC}$$

$$= \vec{BO} \cdot \vec{BO}$$

$$= BO \times BO$$

$$= 3 \times 3 = 9.$$

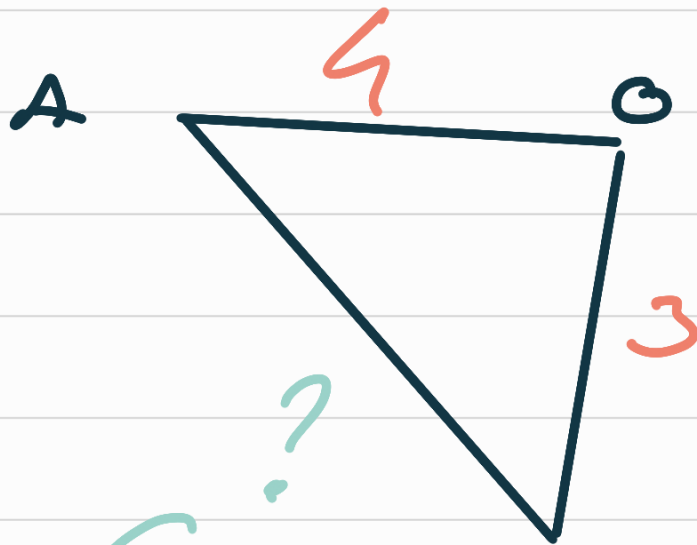
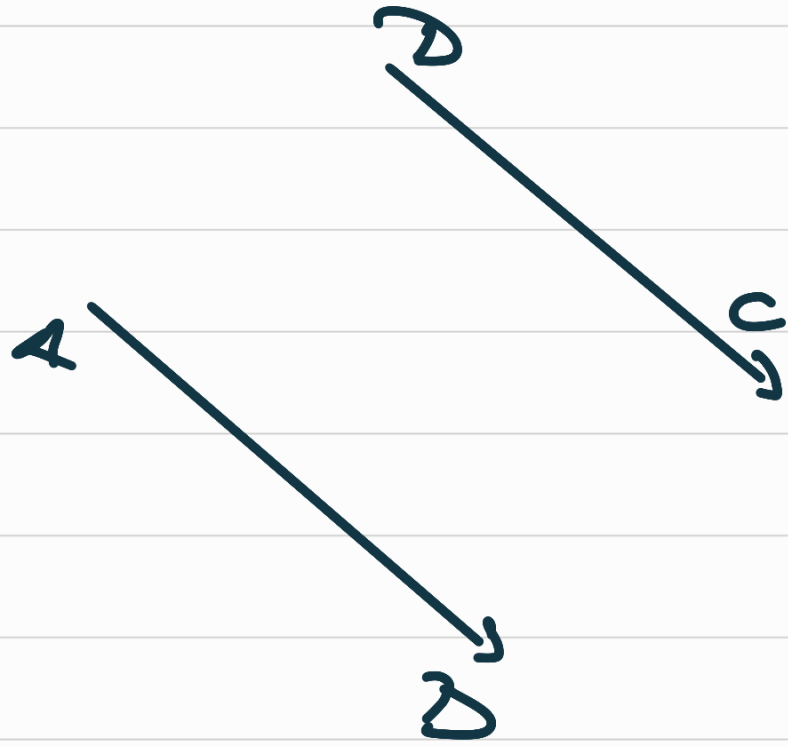


$$\vec{AB} \cdot \vec{DC}$$

$$= \vec{AB} \cdot \vec{AB}$$

$$= \vec{AB} \times \vec{AB}$$

$$= 5 \times 5 = 25.$$



$$AB^2 = AO^2 + OB^2$$

$$= 4^2 + 3^2 = 25$$

$$\cdot \vec{DC} \cdot \vec{BD}$$

$$= \vec{BO} \cdot \vec{BD}$$

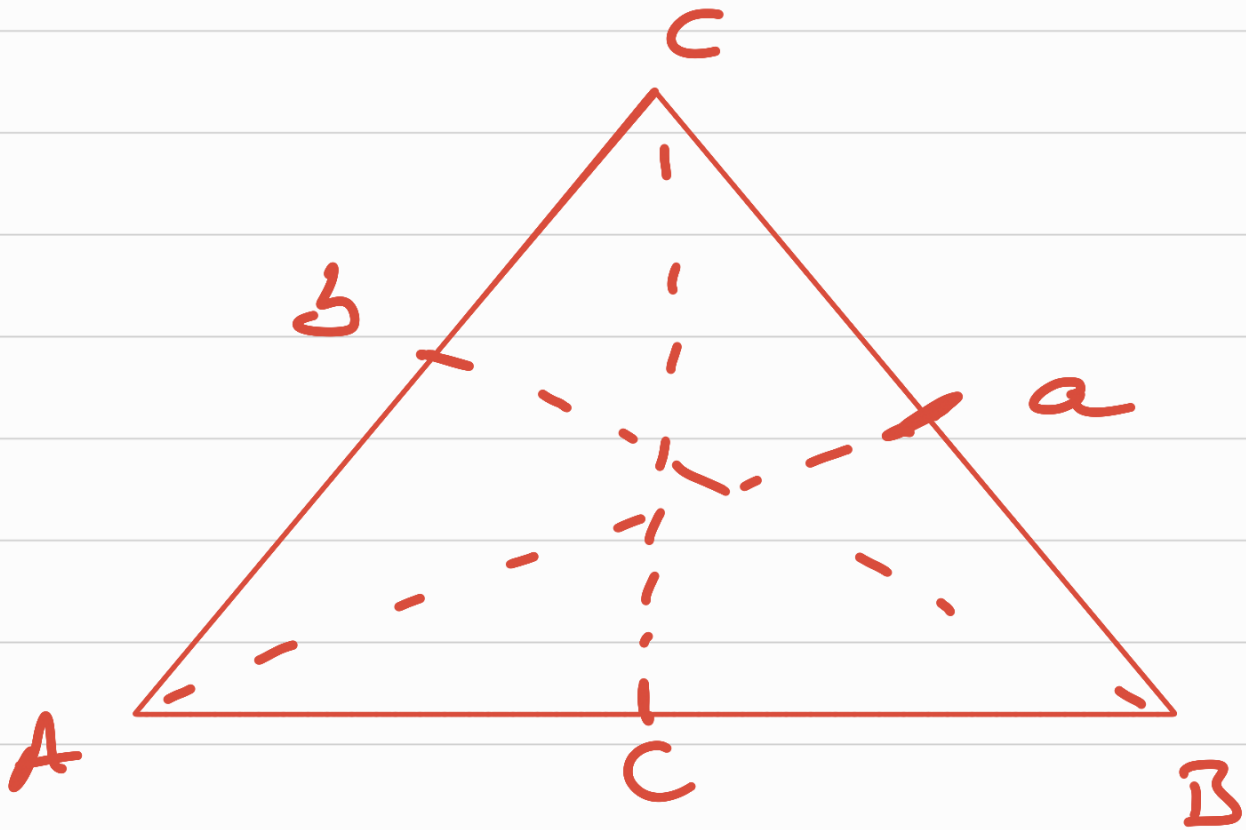
$$= 30 \times 30$$

$$= 3 \times 6$$

$$= 18$$



## exercice 8:

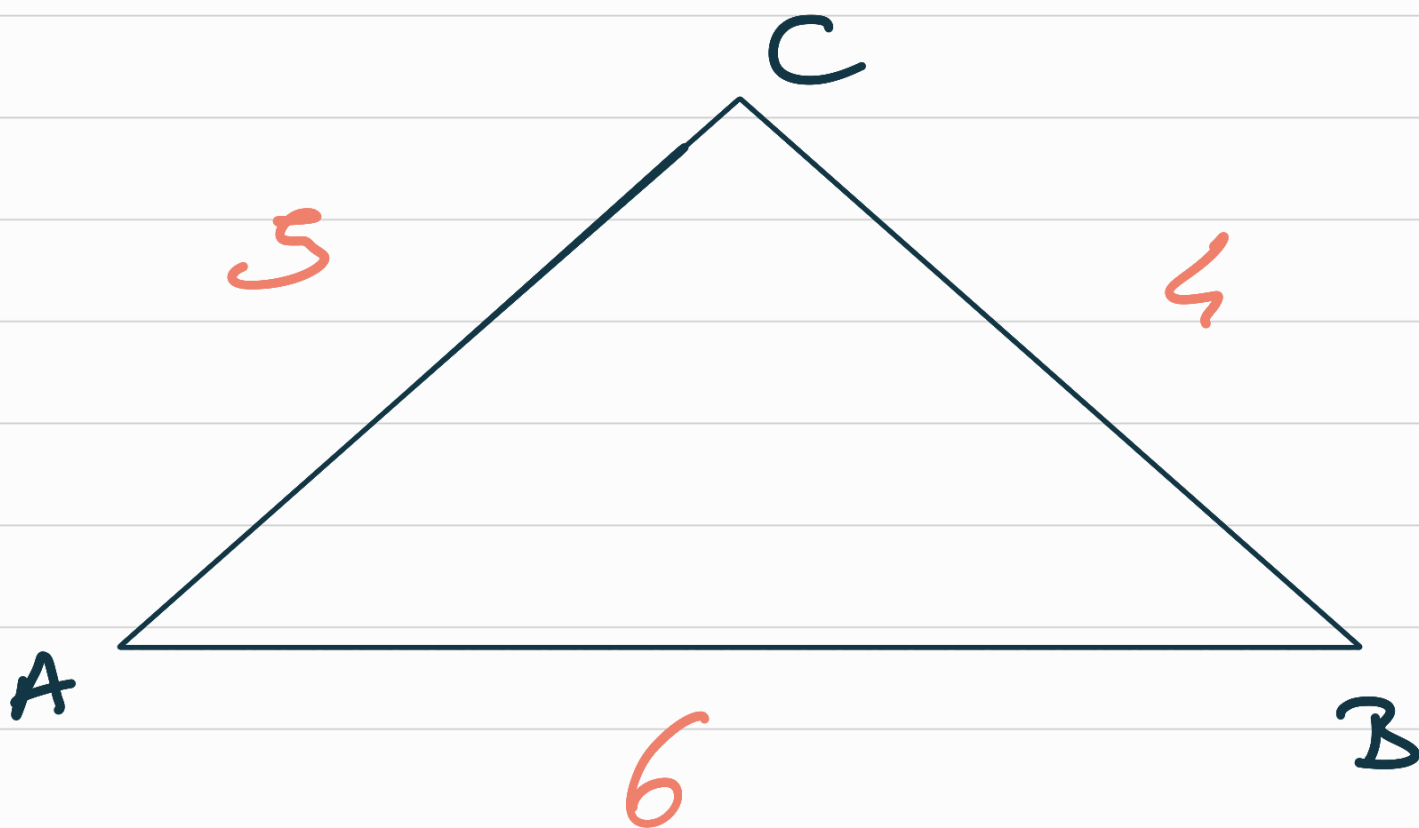


$$a^2 = b^2 + c^2 - 2bc \cos(\vec{A})$$

$$b^2 = a^2 + c^2 - 2ac \cos(\vec{B})$$

$$c^2 = a^2 + b^2 - 2ab \cos(\vec{C}).$$

$$a^2 = b^2 + c^2 - 2bc \cos(\hat{A})$$



$$4^2 = 5^2 + 6^2 - 2 \times 5 \times 6 \times \cos(\hat{A})$$

$$16 = 25 + 36 - 60 \times \cos(\hat{A})$$

$$16 = 61 - 60 \cos(\hat{A})$$

$$16 - 61 = -60 \cos(\hat{A})$$

$$-45 = -60 \times \cos(\vec{A})$$

$$\frac{-45}{-60} = \cos(\vec{A})$$

$$\frac{3}{4} = \cos(\vec{A})$$

$$\Rightarrow \vec{A} = \arccos\left(\frac{3}{4}\right) \approx 41^\circ.$$