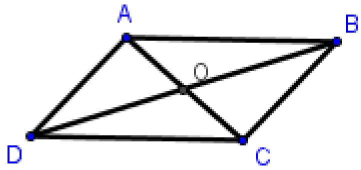
Tronc commun science	Produit scalaire(Correction)	prof: atmani najib

Exercice 1:



1. a) On a $AC^2 + BD^2 = \overrightarrow{AC}^2 + \overrightarrow{BD}^2$

$= (\overrightarrow{AB} + \overrightarrow{AD})^2 + (\overrightarrow{AD} - \overrightarrow{AB})^2$

$= \overrightarrow{AB}^2 + 2\overrightarrow{AB}.\overrightarrow{AD} + \overrightarrow{AD}^2 + \overrightarrow{AD}^2 - 2\overrightarrow{AD}.\overrightarrow{AB} + \overrightarrow{AB}^2$

$= AB^2 + 0 + AD^2 + AD^2 - 0 + AB^2$

$= 2(AB^2 + AD^2)$

b) On a $AC^2 + BD^2 = 2(AB^2 + AD^2)$

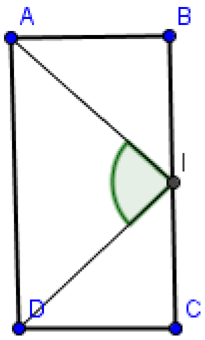
donc $AB^2 = \dfrac{AC^2 + BD^2}{2} - AD^2 = \dfrac{6^2 + 4^2}{2} - \sqrt{7}^2 = 19$ d'où $AB = \sqrt{19}$

2. a) D'après le théorème d'ALKASHI

on a $\cos(AOB) = \dfrac{OA^2 + OB^2 - AB^2}{2 \times OA \times OB} = \dfrac{3^2 + 2^2 - \sqrt{19}^2}{2 \times 3 \times 2} = \dfrac{9 + 4 - 19}{12} = \dfrac{1}{2}$

b) On a $\cos(AOB) = \dfrac{1}{2}$ donc $AOB = \dfrac{\pi}{3}$

Exercice2:



1. On a $(\overrightarrow{BA} + \overrightarrow{IB}).(\overrightarrow{BA} - \overrightarrow{IB}) = \overrightarrow{BA}^2 - \overrightarrow{IB}^2$

$= BA^2 - IB^2$

$= 4^2 - 4^2$

$= 0$

2. On a $\overrightarrow{IA}.\overrightarrow{ID} = (\overrightarrow{IB} + \overrightarrow{BA}).(\overrightarrow{IC} + \overrightarrow{CD})$ (car $\overrightarrow{CD} = \overrightarrow{BA}$

$= (\overrightarrow{IB} + \overrightarrow{BA}).(-\overrightarrow{IB} + \overrightarrow{BA})$ et $\overrightarrow{IC} = -\overrightarrow{IB}$)

$= 0$

3. D'après l'expression trigonométrique du produit scalaire

On a $\cos(AID) = \dfrac{\overrightarrow{IA}.\overrightarrow{ID}}{IA \times ID} = \dfrac{0}{IA \times ID} = 0$

puisque $\cos(AID) = 0$ donc $AID = \dfrac{\pi}{2}$