correction de l'interro n°8

exo 1

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

$= 3 \times 2 \times \cos 135$

$= -3\sqrt{2}$ $\left(\frac{2}{2} - 4,2\right)$

2. $\vec{AB}\cdot\vec{AC} = \vec{AK}\cdot\vec{AC}$

$= -AK \times AC$

$= -3 \times 2$

$= -6$

3. $\vec{AB}\begin{pmatrix}1\\-2\end{pmatrix}$ $\vec{AC}\begin{pmatrix}-3\\-2\end{pmatrix}$

$\vec{AB}\cdot\vec{AC} = 1 \times (-3) - 2 \times (-2)$

$= -3 + 4$

$= 1$

4. $\vec{AB}\cdot\vec{AC} = \vec{AB}\cdot\vec{BD}$

$= \frac{1}{2}\left[AD^2 - AB^2 - BD^2\right]$

$= \frac{1}{2}\left[6^2 - 5^2 - 4^2\right]$

$= -\frac{5}{2}$

exo 2

Posons $\vec{u}\cdot\vec{v} = 0$

$m(m+1) - 2 \times 3 = 0$

$m^2 + m - 6 = 0$

$\Delta = 1^2 - 4 \times 1 \times (-6)$

$\Delta = 25$

$m_1 = \frac{-1-\sqrt{25}}{2 \times 1}$

$m_1 = \frac{-1-5}{2}$ $m_2 = \frac{-1+5}{2}$

$m_1 = -\frac{6}{2} = -3$ $m_2 = \frac{4}{2} = 2$

exo 3

1. $(\vec{u}+\vec{v})\cdot(\vec{u}-\vec{v}) = \|\vec{u}\|^2 - \|\vec{v}\|^2$

$= 4^2 - 7^2$

$= 16 - 49$

$= -33$

2. $(2\vec{u}-\vec{v})\cdot(\vec{u}-3\vec{v}) = 2\|\vec{u}\|^2 - 2\vec{u}\cdot3\vec{v} - \vec{v}\cdot\vec{u} + 3\|\vec{v}\|^2$

$= 2\|\vec{u}\|^2 - 6\vec{u}\cdot\vec{v} - \vec{u}\cdot\vec{v} + 3\|\vec{v}\|^2$

$= 2\|\vec{u}\|^2 - 7\vec{u}\cdot\vec{v} + 3\|\vec{v}\|^2$

$= 2 \times 4^2 - 7 \times 2 + 3 \times 7^2$

$= 32 - 14 + 147$

$= 165$

3. $(\vec{v} - 3\vec{u})^2 = \|\vec{v}\|^2 - 2\vec{v}\cdot3\vec{u} + \|3\vec{u}\|^2$

$= \|\vec{v}\|^2 - 6\vec{u}\cdot\vec{v} + 9\|\vec{u}\|^2$

$= 7^2 - 6 \times 2 + 9 \times 4^2$

$= 49 - 12 + 144 = 181$

exo 4

1. $\vec{AB}\begin{pmatrix}5\\-2\end{pmatrix}$ $\vec{AC}\begin{pmatrix}4\\2\end{pmatrix}$

2. $\vec{AB}.\vec{AC} = 5\times4 - 2\times2$
$= 20-4$
$= 16$

3. $AB = \sqrt{5^2+(-2)^2}$
$= \sqrt{25+4}$
$= \sqrt{29}$

$AC = \sqrt{4^2+2^2}$
$= \sqrt{16+4}$
$= \sqrt{20}$

4. $\vec{AB}.\vec{AC} = AB\times AC\times\cos(\widehat{BAC})$
$16 = \sqrt{29}\times\sqrt{20}\times\cos(\widehat{BAC})$
$\cos(\widehat{BAC}) = \dfrac{16}{\sqrt{29}\times\sqrt{20}}$

$\widehat{BAC} \simeq 48°$

exo 5.

1. $AC^2 = AD^2 + DC^2$
$= 3^2+5^2$
$= 9+25$
$= 34$
Donc $AC = \sqrt{34}$

$DE^2 = DA^2 + AE^2$
$= 3^2 + 2,5^2$
$= 9 + 6,25$
$= 15,25$
$DE = \sqrt{15,25}$

2. $\vec{AC}.\vec{DE} = (\vec{AD}+\vec{DC}).(\vec{DA}+\vec{AE})$
$= \vec{AD}.\vec{DA} + \vec{AD}.\vec{AE} + \vec{DC}.\vec{DA} + \vec{DC}.\vec{AE}$
$= -AD^2 + 0 + 0 + DC\times AE$
$= -3^2 + 5\times2,5$
$= -9+12,5$
$= 3,5$

3. $\vec{AC}.\vec{DE} = AC\times DE\times\cos(\theta)$
$3,5 = \sqrt{34}.\sqrt{15,25}.\cos(\theta)$
$\cos\theta = \dfrac{3,5}{\sqrt{34}\times\sqrt{15,25}}$

$\theta \simeq 81°$