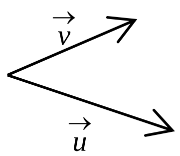
EXERCICE 2B.1

Déterminer le cosinus de $\left(\vec{u},\vec{v}\right)$ puis l'angle $\left(\vec{u},\vec{v}\right)$ (ou une approximation, si c'est possible) :

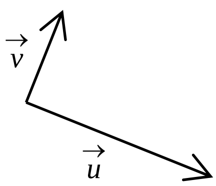
$\lVert\vec{u}\rVert=4 \quad \lVert\vec{v}\rVert=8 \quad \vec{u}.\vec{v}=32$ → $\cos\left(\vec{u},\vec{v}\right)=$ → $\left(\vec{u},\vec{v}\right)=$	$\lVert\vec{u}\rVert=\sqrt{2} \quad \lVert\vec{v}\rVert=2\sqrt{2} \quad \vec{u}.\vec{v}=2\sqrt{3}$ → $\cos\left(\vec{u},\vec{v}\right)=$ → $\left(\vec{u},\vec{v}\right)=$
$\lVert\vec{u}\rVert=2 \quad \lVert\vec{v}\rVert=3 \quad \vec{u}.\vec{v}=-6$ → $\cos\left(\vec{u},\vec{v}\right)=$ → $\left(\vec{u},\vec{v}\right)=$	$\lVert\vec{u}\rVert=1 \quad \lVert\vec{v}\rVert=6 \quad \vec{u}.\vec{v}=-3$ → $\cos\left(\vec{u},\vec{v}\right)=$ → $\left(\vec{u},\vec{v}\right)=$
$\lVert\vec{u}\rVert=3 \quad \lVert\vec{v}\rVert=7 \quad \vec{u}.\vec{v}=14$ → $\cos\left(\vec{u},\vec{v}\right)=$ → $\left(\vec{u},\vec{v}\right)\simeq$	$\lVert\vec{u}\rVert=6 \quad \lVert\vec{v}\rVert=1 \quad \vec{u}.\vec{v}=7$ → $\cos\left(\vec{u},\vec{v}\right)=$ → $\left(\vec{u},\vec{v}\right)=$
$\lVert\vec{u}\rVert=2 \quad \lVert\vec{v}\rVert=\sqrt{3} \quad \vec{u}.\vec{v}=-3$ → $\cos\left(\vec{u},\vec{v}\right)=$ → $\left(\vec{u},\vec{v}\right)=$	$\lVert\vec{u}\rVert=3\sqrt{2} \quad \lVert\vec{v}\rVert=2 \quad \vec{u}.\vec{v}=-6$ → $\cos\left(\vec{u},\vec{v}\right)=$ → $\left(\vec{u},\vec{v}\right)=$

EXERCICE 2B.2

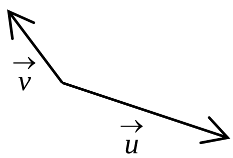
Dans chaque cas, indiquer si le produit scalaire $\vec{u}.\vec{v}$ est positif (>0), négatif (<0) ou nul $(=0)$.



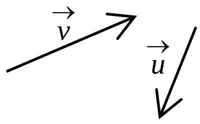
$\vec{u}.\vec{v}$ ....



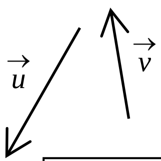
$\vec{u}.\vec{v}$ ....



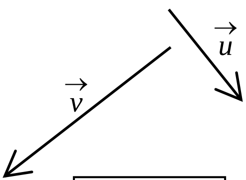
$\vec{u}.\vec{v}$ ....



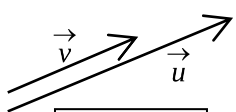
$\vec{u}.\vec{v}$ ....



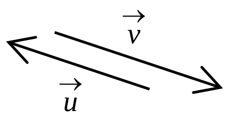
$\vec{u}.\vec{v}$ ....



$\vec{u}.\vec{v}$ ....



$\vec{u}.\vec{v}$ ....



$\vec{u}.\vec{v}$ ....

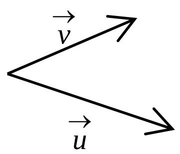
CORRIGE – NOTRE DAME DE LA MERCI - MONTPELLIER

EXERCICE 2B.1

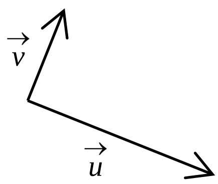
Déterminer le cosinus de $(\vec{u},\vec{v})$ puis l'angle $(\vec{u},\vec{v})$ à l'aide de la formule : $\vec{u}.\vec{v}=\|\vec{u}\|\times\|\vec{v}\|\times\cos(\vec{u},\vec{v})$

$\|\vec{u}\|=4 \quad \|\vec{v}\|=8 \quad \vec{u}.\vec{v}=32$ → $\cos(\vec{u},\vec{v})=\dfrac{\vec{u}.\vec{v}}{\|\vec{u}\|\times\|\vec{v}\|}=\dfrac{32}{8\times4}=1$ → $(\vec{u},\vec{v})=\cos^{-1}(1)=0\ [2\pi]$	$\|\vec{u}\|=\sqrt{2} \quad \|\vec{v}\|=2\sqrt{2} \quad \vec{u}.\vec{v}=2\sqrt{3}$ → $\cos(\vec{u},\vec{v})=\dfrac{\vec{u}.\vec{v}}{\|\vec{u}\|\times\|\vec{v}\|}=\dfrac{2\sqrt{3}}{\sqrt{2}\times2\sqrt{2}}=\dfrac{2\sqrt{3}}{4}=\dfrac{\sqrt{3}}{2}$ → $(\vec{u},\vec{v})=\cos^{-1}\left(\dfrac{\sqrt{3}}{2}\right)=\dfrac{\pi}{6}\ [2\pi]$ ou $(\vec{u},\vec{v})=-\dfrac{\pi}{6}\ [2\pi]$
$\|\vec{u}\|=2 \quad \|\vec{v}\|=3 \quad \vec{u}.\vec{v}=-6$ → $\cos(\vec{u},\vec{v})=\dfrac{\vec{u}.\vec{v}}{\|\vec{u}\|\times\|\vec{v}\|}=\dfrac{-6}{2\times3}=-1$ → $(\vec{u},\vec{v})=\cos^{-1}(-1)=\pi\ [2\pi]$	$\|\vec{u}\|=1 \quad \|\vec{v}\|=6 \quad \vec{u}.\vec{v}=-3$ → $\cos(\vec{u},\vec{v})=\dfrac{\vec{u}.\vec{v}}{\|\vec{u}\|\times\|\vec{v}\|}=\dfrac{-3}{1\times6}=-\dfrac{1}{2}$ → $(\vec{u},\vec{v})=\cos^{-1}\left(-\dfrac{1}{2}\right)=\dfrac{2\pi}{3}[2\pi]$ ou $(\vec{u},\vec{v})=-\dfrac{2\pi}{3}[2\pi]$
$\|\vec{u}\|=3 \quad \|\vec{v}\|=7 \quad \vec{u}.\vec{v}=14$ → $\cos(\vec{u},\vec{v})=\dfrac{\vec{u}.\vec{v}}{\|\vec{u}\|\times\|\vec{v}\|}=\dfrac{14}{3\times7}=\dfrac{14}{21}=\dfrac{2}{3}$ → $(\vec{u},\vec{v})=\cos^{-1}\left(\dfrac{2}{3}\right)\simeq0{,}841\ [2\pi]\text{rad}$ ou $(\vec{u},\vec{v})\simeq-0{,}841\ [2\pi]$ rad	$\|\vec{u}\|=6 \quad \|\vec{v}\|=1 \quad \vec{u}.\vec{v}=7$ → $\cos(\vec{u},\vec{v})=\dfrac{\vec{u}.\vec{v}}{\|\vec{u}\|\times\|\vec{v}\|}=\dfrac{7}{6\times1}=\dfrac{7}{6}$ → un cosinus ne peut être supérieur à 1, il n'y a pas de solution
$\|\vec{u}\|=2 \quad \|\vec{v}\|=\sqrt{3} \quad \vec{u}.\vec{v}=-3$ → $\cos(\vec{u},\vec{v})=\dfrac{\vec{u}.\vec{v}}{\|\vec{u}\|\times\|\vec{v}\|}=\dfrac{-3}{2\times\sqrt{3}}=\dfrac{-3\sqrt{3}}{6}=-\dfrac{\sqrt{3}}{2}$ → $(\vec{u},\vec{v})=\cos^{-1}\left(-\dfrac{\sqrt{3}}{2}\right)=\dfrac{5\pi}{6}\ [2\pi]$ ou $(\vec{u},\vec{v})=-\dfrac{5\pi}{6}\ [2\pi]$	$\|\vec{u}\|=3\sqrt{2} \quad \|\vec{v}\|=2 \quad \vec{u}.\vec{v}=-6$ → $\cos(\vec{u},\vec{v})=\dfrac{\vec{u}.\vec{v}}{\|\vec{u}\|\times\|\vec{v}\|}=\dfrac{-6}{3\sqrt{2}\times2}=\dfrac{-6}{6\sqrt{2}}=-\dfrac{\sqrt{2}}{2}$ → $(\vec{u},\vec{v})=\cos^{-1}\left(-\dfrac{\sqrt{2}}{2}\right)=\dfrac{3\pi}{4}\ [2\pi]$ ou $(\vec{u},\vec{v})=-\dfrac{3\pi}{4}\ [2\pi]$

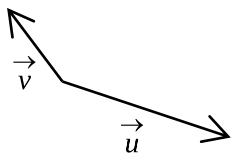
EXERCICE 2B.2 : Indiquer si le produit scalaire $\vec{u}.\vec{v}$ est positif (>0), négatif (<0) ou nul $(=0)$.



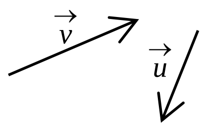
$\vec{u}.\vec{v}\ >0$



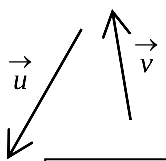
$\vec{u}.\vec{v}\ =0$



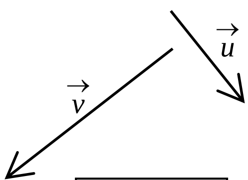
$\vec{u}.\vec{v}\ <0$



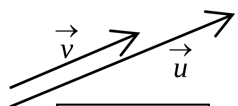
$\vec{u}.\vec{v}\ <0$



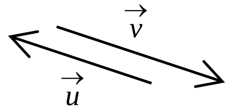
$\vec{u}.\vec{v}\ <0$



$\vec{u}.\vec{v}\ =0$



$\vec{u}.\vec{v}\ >0$



$\vec{u}.\vec{v}\ <0$