9z

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section 22
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h $a\langle 1,1,1\rangle, \langle 3,-2,-1\rangle$

$\langle 1,1,1\rangle \cdot \langle 3,-2,-1\rangle$

$= 3 - 2 - 1$

$= 0$

a is orthogonal

$b\langle 4,3\rangle, \langle 3,-4\rangle$

$\langle 4,3\rangle \cdot \langle 3,-4\rangle$

$= 8 - 12$

$= -4$

b is no orthogonal

$\cos\theta = \frac{-4}{\sqrt{25}\sqrt{9+16}} = \frac{-4}{5\sqrt{20}} = \frac{-4^2}{10\sqrt{5}} = -\frac{2}{5\sqrt{5}}$

$\theta \approx 100.3^\circ$

a is obtuse

2. $v \times w$

$v = \langle 0,1,-1\rangle, w\langle 1,-1,0\rangle$

$\begin{matrix} i & j & k \\ 0 & 1 & -1 \\ 1 & -1 & 0 \end{matrix}$

$v \times w = (0-1)i + (0+1)j + (0-1)k$

$= -i + j - k$

$= \langle -1,1,-1\rangle$