NAME: (print!) _Andrew King_   Section: _23_

1. Determine whether the two vectors are orthogonal and if not, whether the angle between them is acute or obtuse. **a.** $\langle 1, 1, 1 \rangle$, $\langle 3, -2, -1 \rangle$.

b. $\langle 4, 3 \rangle$, $\langle 2, -4 \rangle$.

$\langle 1,1,1 \rangle \cdot \langle 3,-2,-1 \rangle = (1\cdot3)+(1\cdot-2)+(1\cdot-1) = 3-2-1 = 0$

They are orthogonal

$\langle 4,3 \rangle \cdot \langle 2,-4 \rangle = (4\cdot2)+(3\cdot-4) = 8-12 = -4$

$\cos\theta = A\cdot B / (|A||B|) \Rightarrow \cos\theta = -4/(\sqrt{25}\cdot\sqrt{20}) = -4/\sqrt{500}$

$\cos^{-1}(-4/\sqrt{500}) = 100.3°$

They are obtuse

2. Calculate $\mathbf{v} \times \mathbf{w}$, if
$$\mathbf{v} = \langle 0, 1, -1 \rangle \quad , \quad \mathbf{w} = \langle 1, -1, 0 \rangle .$$

$= [(1\cdot0)-(-1\cdot-1)]i - [(0\cdot0)-(1\cdot-1)]j + [(0\cdot-1)-(1\cdot1)]k =$

$= (0-1)i - (0+1)j + (0-1)k = \langle -1, -1, -1 \rangle$

$\mathbf{v} \times \mathbf{w} = \langle -1, -1, -1 \rangle$