

Name: SOLUTIONS

Quiz #2 - September 3, 2004

1. Find a unit vector orthogonal to $\langle 3, 1, -1 \rangle$ and $\langle 1, -1, 2 \rangle$.

$$\langle 3, 1, -1 \rangle \times \langle 1, -1, 2 \rangle = \langle 1, -7, -4 \rangle$$

$$|\langle 1, -7, -4 \rangle| = \sqrt{1+49+16} = \sqrt{66}$$

$$\left\langle \frac{1}{\sqrt{66}}, -\frac{7}{\sqrt{66}}, -\frac{4}{\sqrt{66}} \right\rangle$$

2. Write the vector equation for the line passing through the points $(1, -2, -1)$ and $(3, -1, 2)$.

$$\langle x, y, z \rangle = \langle 1, -2, -1 \rangle + t \langle 2, 1, 3 \rangle$$

3. Find the volume of the parallelepiped determined by the vectors \vec{a} , \vec{b} and \vec{c} :

$$\vec{a} = \langle 1, -1, 3 \rangle, \vec{b} = \langle 3, 1, -1 \rangle, \vec{c} = \langle 1, -1, 2 \rangle.$$

$$\vec{b} \times \vec{c} = \langle 1, -7, -4 \rangle \text{ from \# 1}$$

$$\text{vol} = |\vec{a} \cdot (\vec{b} \times \vec{c})|$$

$$= |\langle 1, -1, 3 \rangle \cdot \langle 1, -7, -4 \rangle|$$

$$= |1 + 7 - 12| =$$

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