Math 1451, Honor Calculus Practice1, Spring 2016.

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1. Given two vectors $\mathbf{u} = \langle b^2 - b, -2b, 2 \rangle$ and $\mathbf{v} = \langle b - 1, b, b \rangle$. Find the range of b such that the angle between $\mathbf{u}$ and $\mathbf{v}$ is less than $\frac{\pi}{2}$.

2. Show that if $\mathbf{u} + \mathbf{v}$ and $\mathbf{u} - \mathbf{v}$ are orthogonal, then the vectors $\mathbf{u}$ and $\mathbf{v}$ must have the same length.

3. Use a scalar projection to show that the distance from a point $P_1(x_1, y_1)$ to the line $ax + by + c = 0$ is
$$\frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}}$$

Use this formula to find the distance from the point $(-2, 3)$ to the line $3x - 4y + 5 = 0$.