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Worksheet 3

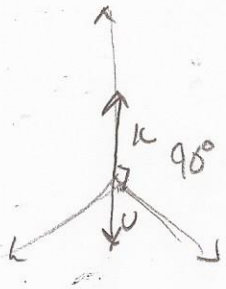
Exercise 1. Determine the dot product of $\mathbf{u} = 2\mathbf{i} - 6\mathbf{j}$ and $\mathbf{v} = 12\mathbf{k}$.

$\vec{U} = \langle 2, -6, 0 \rangle$ $\vec{V} = \langle 0, 0, 12 \rangle$

$U \cdot V = (2 \times 0) + (-6 \times 0) + (0 \times 12) = \boxed{0}$

or $\sqrt{2^2 + 6^2} \times \sqrt{12^2} \times \cos 90°$

$\sqrt{40} \times 12 \times 0 = \boxed{0}$



Exercise 2. Determine the angle between $\mathbf{u} = \langle 1, -1, 0 \rangle$ and $\mathbf{v} = \langle 1, 0, 1 \rangle$. (Hint: use the Law of Cosines!)

$\vec{U} = \langle 1, -1, 0 \rangle$ $\vec{V} = \langle 1, 0, 1 \rangle$

$\vec{U} \cdot \vec{V} = (1 \times 1) + (-1 \times 0) + (0 \times 1) = 1$

$1 = |U| \cdot |U| \cdot \cos\theta$

$\sqrt{2} \cdot \sqrt{2} \cdot \cos\theta$

$\frac{1}{2} = \cos\theta = \boxed{\theta = \frac{\pi}{3}}$