

$$\textcircled{1} \quad \vec{A} = \langle 3, -1, 4 \rangle \quad \vec{B} = \langle -2, 3, -1 \rangle$$

$$\begin{aligned} \vec{A} \times \vec{B} &= \langle A_1 B_2 - A_2 B_1, A_2 B_3 - A_3 B_2, A_3 B_1 - A_1 B_3 \rangle \\ &= \langle 1 - 12, -8 - (-3), 9 - 2 \rangle = \langle -11, -5, 7 \rangle \end{aligned}$$

$$\vec{B} \times \vec{A} = -\vec{A} \times \vec{B} = \langle 11, 5, -7 \rangle$$

$$\textcircled{2} \quad |\vec{A}| = \sqrt{A_x^2 + A_y^2 + A_z^2} = \sqrt{9 + 1 + 16} = 5.10$$

$$|\vec{B}| = \sqrt{B_x^2 + B_y^2 + B_z^2} = \sqrt{4 + 9 + 1} = 3.74$$

$$|\vec{A} \times \vec{B}| = \sqrt{121 + 25 + 49} = 13.96$$

$$|\vec{A} \times \vec{B}| = |\vec{A}| |\vec{B}| \sin \theta$$

$$\sin \theta = \frac{|\vec{A} \times \vec{B}|}{|\vec{A}| |\vec{B}|} = \frac{13.96}{(5.10)(3.74)} = 0.732$$

$$\theta = 0.821 \text{ rad} = 47^\circ$$