Sol ②
$$\|v\| = \sqrt{(-\sqrt{3})^2+(1)^2} = \sqrt{4} = 2$$

$$\vec{u}_{\text{of } \vec{v}} = \frac{\vec{v}}{\|\vec{v}\|} = \frac{-\sqrt{3}\,i + j}{2} = \frac{-\sqrt{3}}{2}i + \frac{1}{2}j$$

($\frac{-\sqrt{3}}{2} = \cos\phi$, $\frac{1}{2} = \sin\phi$)

∴ the angle ϕ is 30° in the second quarter. الربع الثاني

since $\cos\phi = \frac{-\sqrt{3}}{2}$ & $\sin\phi = \frac{1}{2}$

$$\therefore \phi = \frac{5\pi}{6}$$

2/ by length of the vector $\vec{v}$ and the unit vector of $\vec{v}$.

If $\vec{v}$ is a non-zero vector then we can represent it by its length and its unit vector (as it is a vector has the same direction.

i.e. $\vec{v} = \|\vec{v}\|\,\vec{u}_{\text{of } \vec{v}}$

Exaunple: Find the components of $\vec{v}$, if $\vec{v}$ is a vector of length $\sqrt{5}$ and lie on the line through a(0,0,4) & b(2,5,0)

Sol:
$$\vec{ab} = (2-0, 5-0, 0-4) = (2, 5, -4)$$

$$\|\vec{ab}\| = \sqrt{2^2+5^2+(-4)^2} = \sqrt{4+25+16} = \sqrt{45} = 3\sqrt{5}$$