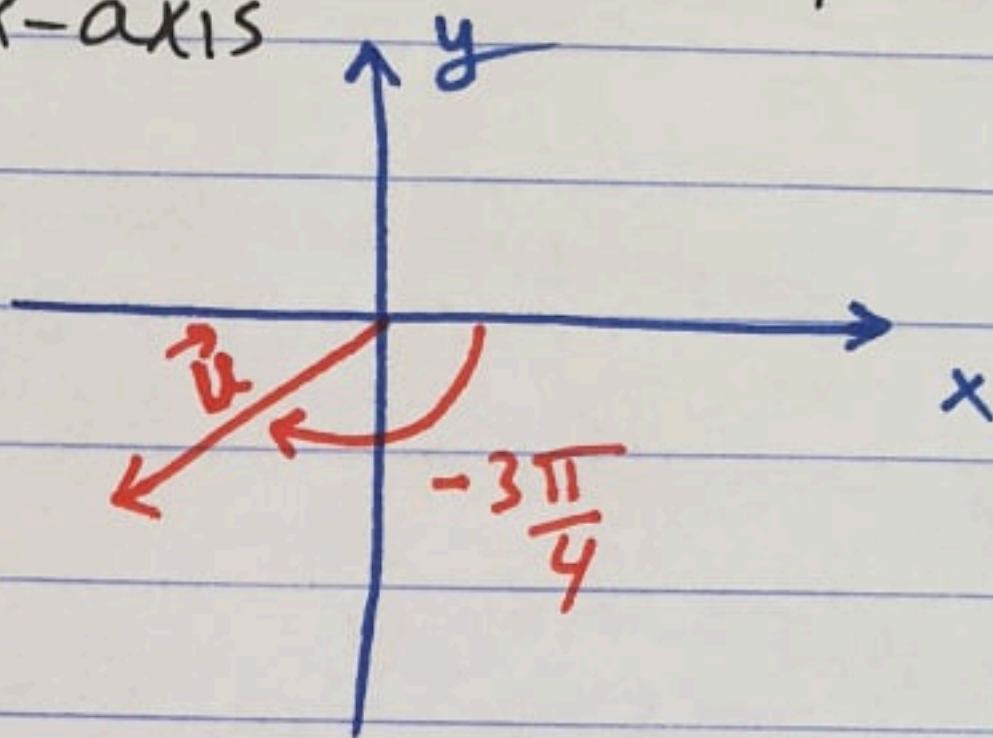


12.2 Lecture Problems

14 Find the component form of the unit vector makes an angle $\theta = -\frac{3\pi}{4}$ with the positive x-axis

$$|\vec{u}| = 1$$

$$\vec{u} = \langle u_1, u_2 \rangle$$



$$= \left\langle \cos\left(-\frac{3\pi}{4}\right), \sin\left(-\frac{3\pi}{4}\right) \right\rangle$$

$$= \left\langle \frac{-1}{\sqrt{2}}, \frac{-1}{\sqrt{2}} \right\rangle$$

Note that $|\vec{u}| = \sqrt{\frac{1}{2} + \frac{1}{2}} = 1$

$$\boxed{41} \quad \vec{u} = 2\vec{i} + \vec{j} \quad \vec{v} = \vec{i} + \vec{j}$$

$$\vec{w} = \vec{i} - \vec{j}$$

Find a, b s.t. $\vec{u} = a\vec{v} + b\vec{w}$

$$2\vec{i} + \vec{j} = a(\vec{i} + \vec{j}) + b(\vec{i} - \vec{j})$$

$$2 = a + b$$

$$1 = a - b$$

$$3 = 2a$$

$$\Rightarrow$$

$$a = \frac{3}{2}$$

$$\Rightarrow$$

$$b = a - 1$$

$$= \frac{3}{2} - 1$$

$$= \frac{1}{2}$$