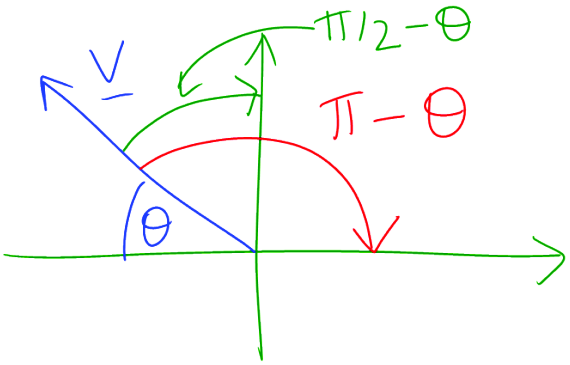
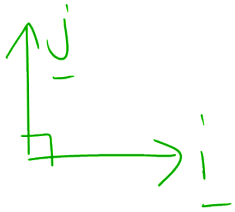
Resolution of Forces

Find the **i** and **j** components of the vector **v** shown in the following diagram:





The $\underline{i}$ component is

$$|\underline{v}| \cos(\pi - \theta)$$

$$= |\underline{v}| \left[\cos\pi \cos\theta + \sin\pi \sin\theta \right] \quad (\cos\pi = -1,\ \sin\pi = 0)$$

$$= -|\underline{v}| \cos\theta$$

The $\underline{j}$ component is

$$|\underline{v}| \cos\left(\frac{\pi}{2} - \theta\right)$$

$$= |\underline{v}| \left[\cos\frac{\pi}{2} \cos\theta + \sin\frac{\pi}{2} \sin\theta \right] \quad (\cos\frac{\pi}{2} = 0,\ \sin\frac{\pi}{2} = 1)$$

$$= |\underline{v}| \sin\theta$$

So $\underline{v} = -|\underline{v}| \cos\theta\, \underline{i} + |\underline{v}| \sin\theta\, \underline{j}$