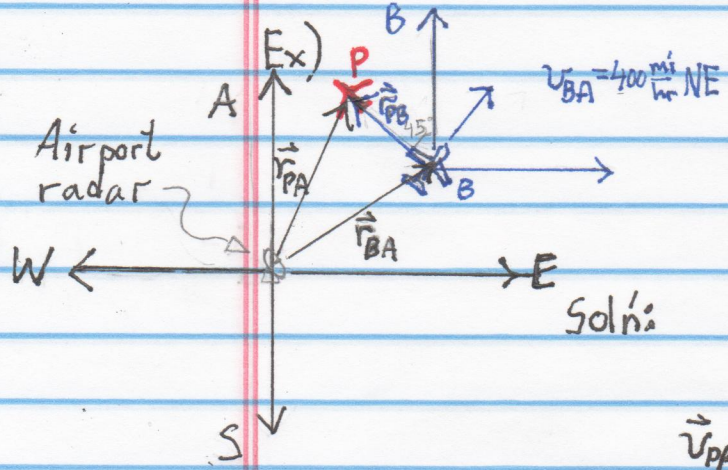

Airplane B sees airplane P flying 600 mi/hr NW. What velocity is airplane P moving rel. to airport radar if radar sees airplane B moving at 400 mi/hr NE?

Soln: $\vec{v}_{PA} = \vec{v}_{PB} + \vec{v}_{BA}$ want $\vec{v}_{PA}$!

$$\vec{v}_{PA} = 600\,\text{NW} + 400\,\text{NE}$$

Find components: $\vec{v}_{PB}$: $600\,\text{NW} \rightarrow -600\cos 45^\circ \hat{\imath} + 600\sin 45^\circ \hat{\jmath} = -424\hat{\imath} + 424\hat{\jmath}$

$\vec{v}_{BA}$: $400\,\text{NE} \rightarrow 400\cos 45\hat{\imath} + 400\sin 45\hat{\jmath} = 283\hat{\imath} + 283\hat{\jmath}$

So $\vec{v}_{PA} = (-424 + 283)\hat{\imath} + (424 + 283)\hat{\jmath}$

$$\vec{v}_{PA} = -141\hat{\imath} + 707\hat{\jmath}$$