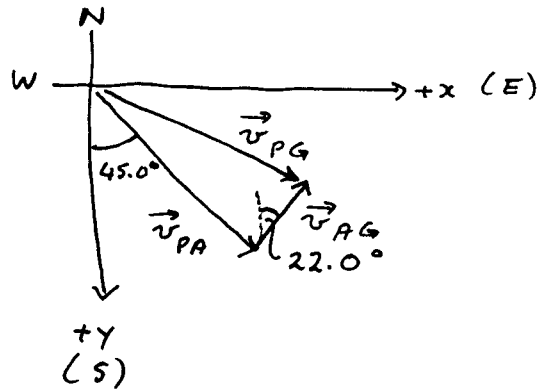


Problem 7-32

Let P = plane, A = air, G = ground

Choose +x East, +y South.



$$\vec{v}_{PG} = \vec{v}_{PA} + \vec{v}_{AG}$$

$$v_{PA,x} = 320 \sin 45.0^\circ = 226.3 \text{ km/h}$$

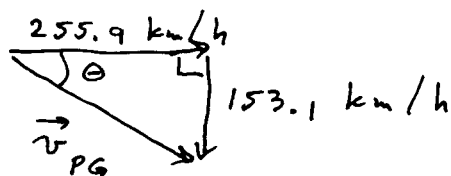
$$v_{PA,y} = 320 \cos 45.0^\circ = 226.3 \text{ km/h}$$

$$v_{AG,x} = 79.0 \sin 22.0^\circ = 29.59 \text{ km/h}$$

$$v_{AG,y} = -79.0 \cos 22.0^\circ = -73.25 \text{ km/h}$$

$$\text{Then, } v_{PG,x} = v_{PA,x} + v_{AG,x} = 255.9 \text{ km/h}$$

$$v_{PG,y} = v_{PA,y} + v_{AG,y} = 153.1 \text{ km/h}$$



$$v_{PG} = \sqrt{(255.9)^2 + (153.1)^2} \text{ km/h}$$
$$= 298 \text{ km/h}$$

$$\theta = \tan^{-1} \left(\frac{153.1}{255.9} \right) = 30.9^\circ$$

$$\therefore \vec{v}_{PG} = 298 \text{ km/h, } 30.9^\circ \text{ south of east}$$