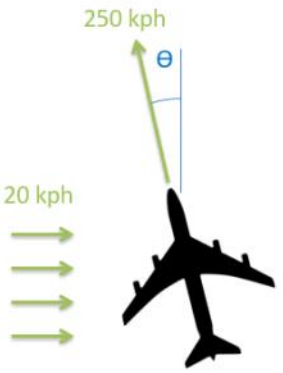
Problem 2

Relative Motion 2D Worked Example

- A plane has an airspeed of 250 kilometers per hour (airspeed is the velocity of the plane relative to the air) and is flying though an easterly crosswind with a speed of 20 kilometers per hour. If the plane wants to maintain a direct northerly course, what is the angle the plane must point into the wind (theta)?



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$$\vec{V}_{A/o} = \vec{V}_{A/w} + \vec{V}_{w/o}$$

$$0 \quad V_{\cancel{Ax/o}} = V_{Ax/w} + V_{wx/o}$$

$$V_{Ay/o} = V_{Ay/w} + \cancel{V_{wy/o}}\ 0$$

$$0 = -250 \sin\theta + 20$$

$$\theta = \sin^{-1}\left(\frac{20}{250}\right) = \boxed{4.59^\circ}$$