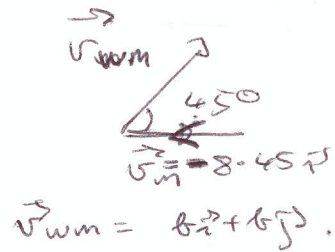


H 1989 (12)

$$\begin{aligned} \vec{v}_m &= 20\vec{j} \\ \vec{v}_{wm} &= a\vec{i} \end{aligned}$$



(i)

$$\vec{v}_w = \vec{v}_{wm} + \vec{v}_m \quad \text{in both cases}$$

$$\Rightarrow a\vec{i} + 20\vec{j} = b\vec{i} + b\vec{j} - 8.45\vec{i}$$

$$\Rightarrow \left. \begin{aligned} \text{(i)} &: a = b - 8.45 \\ \text{(j)} &: 20 = b \end{aligned} \right\} \Rightarrow \begin{aligned} a &= 20 - 8.45 \\ a &= 11.55 \end{aligned}$$

$$\begin{aligned} \vec{v}_w &= \vec{v}_{wm} + \vec{v}_m \\ &= a\vec{i} + 20\vec{j} \\ &= 11.55\vec{i} + 20\vec{j} \end{aligned}$$

[mag<sup>n</sup> 23.1 ms<sup>-1</sup> and Dir<sup>n</sup> E 60° N

(ii)

$$\vec{v}_w = 11.55\vec{i} + 20\vec{j}$$

$$\vec{v}_m = -8.6030\vec{i} + 8.8-30\vec{j} = -4\sqrt{3}\vec{i} + 4\vec{j}$$

$$\begin{aligned} \vec{v}_{wm} &= \vec{v}_w - \vec{v}_m \\ &= 11.55\vec{i} + 20\vec{j} - [-4\sqrt{3}\vec{i} + 4\vec{j}] \\ &= 18.48\vec{i} + 16\vec{j} \end{aligned}$$

$$\text{Dir}^n = E \tan^{-1} \frac{16}{18.48} N = E 40.886^\circ N$$