

'A Hurricane Direction Shift'

a) $\mathbf{h} = a\mathbf{i} + b\mathbf{j}$

$$a = -(5\sqrt{6} - 5\sqrt{2}) = (5\sqrt{2} - 5\sqrt{6})$$

$$b = (5\sqrt{6} + 5\sqrt{2})$$

Thus, $\mathbf{h} = (5\sqrt{2} - 5\sqrt{6})\mathbf{i} + (5\sqrt{6} + 5\sqrt{2})\mathbf{j}$

b) New speed = $\sqrt{\left(\frac{15\sqrt{3}}{2}\right)^2 + \left(\frac{15}{2}\right)^2}$

Thus speed has decreased by $\frac{3}{4}$ It is now travelling in the direction of:

$$\text{direction} = 180 - \tan^{-1} \frac{1}{\sqrt{3}} = 150^\circ \text{ above the equator}$$