'A Hurricane Direction Shift'

a) \( \mathbf{h} = ai + bj \)

\[
a = -(5\sqrt{6} - 5\sqrt{2}) = (5\sqrt{2} - 5\sqrt{6})
\]
\[
b = (5\sqrt{6} + 5\sqrt{2})
\]

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

[2 marks]

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:

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

[3 marks]