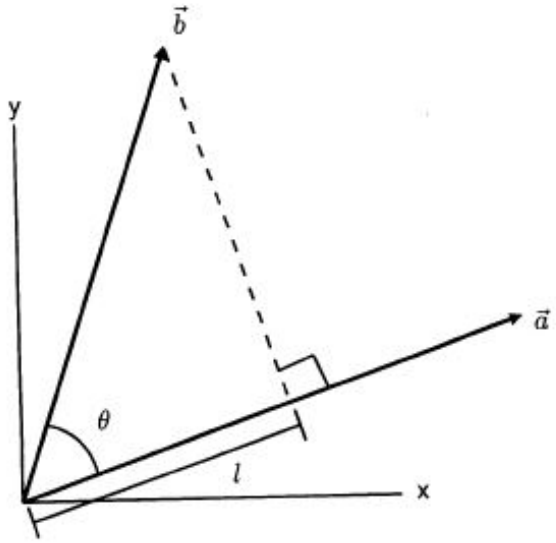
QP43



Two vectors $\vec{a} = 3\hat{i} + \hat{j}$ and $\vec{b} = \hat{i} + 3\hat{j}$ lie in the $x - y$ plane as shown.

a) (1 point) What is the magnitude of the projection of $\vec{b}$ upon $\vec{a}$ indicated as l in the figure?

b) (1 point) What is the angle between $\vec{a}$ and $\vec{b}$ as indicated as θ in the figure?

c) (1 point) What is the magnitude and direction of the cross product $\vec{a} \times \vec{b}$ Hint: you might want to calculate the magnitude without calculating a determinant by using your answer to (b) and the fact that $sin^2\theta + cos^2\theta = 1$ for any angle θ.

d) (1 point) Draw a vector $\vec{c}$ connecting the endpoints of $\vec{a}$ and $\vec{b}$. What is the area of the triangle enclosed by the vectors $\vec{a}$, $\vec{b}$ and $\vec{c}$?