VECTORS

1. a) Using the attached Fig. 1, fill out the left-hand part of the Table below. Sketch $\vec{A} + \vec{B}$ and $\vec{A} - \vec{B}$.

Vector	x-coord.	y-coord.	length	x'-coord.	y'-coord.	length
$\vec{A}$						
$\vec{B}$						
$\vec{A} + \vec{B}$						
$\vec{A} - \vec{B}$						

b) calculate the scalar product $\vec{A} \cdot \vec{B}$

c) calculate the vector product $\vec{A} \times \vec{B}$

2. Consider the same pair of vectors, $\vec{A}$ and $\vec{B}$, but in a new system of coordinates x', y' which is rotated by 45° counterclockwise compared to the original sytem x, y in Fig. 1. Sketch the new axes and fill out the right-hand part of the above Table.

b) Calculate the scalar product $\vec{A} \cdot \vec{B}$ in new coordinates.

3. Among the five pairs of vectors below, select those where vectors are perpendicular to each other. You can use graph paper for a sketch.
$(1, 1)$ and $(-1, -1)$
$(1, -1)$ and $(-1, 1)$
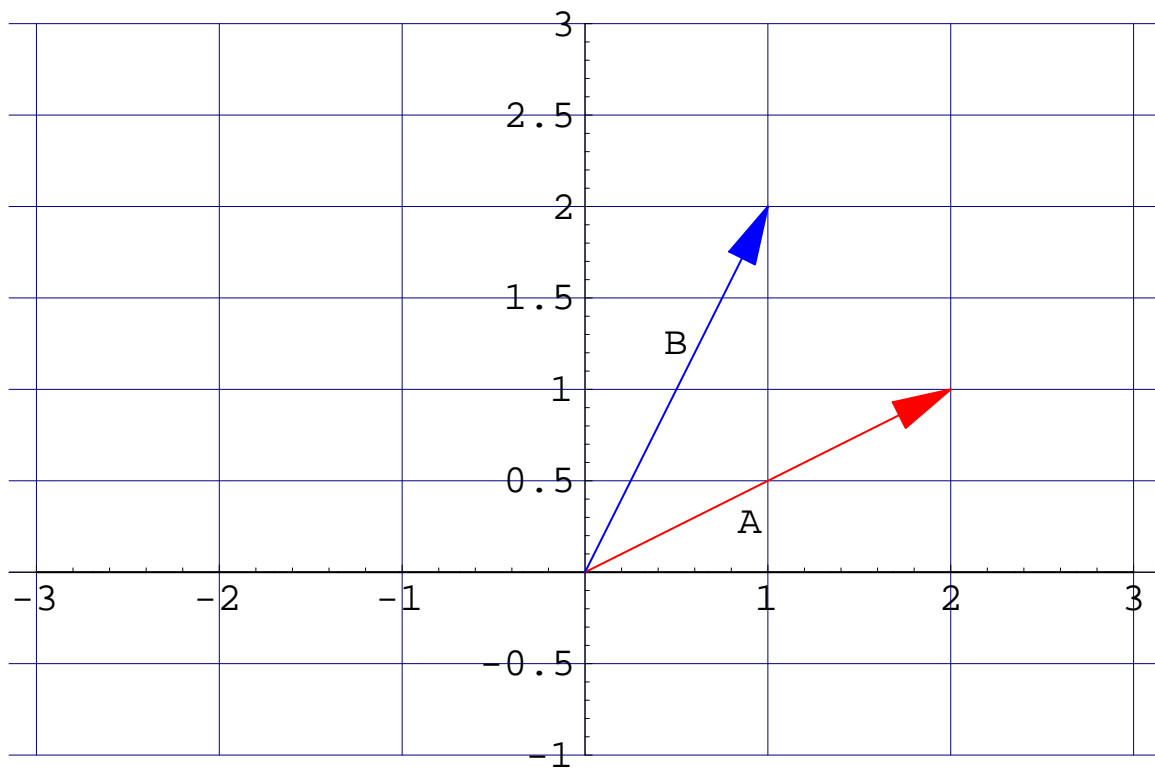$(1, 1)$ and $(-1, 1)$

Figure 1:

$(1, 1)$ and $(1, -1)$

$(1, -1)$ and $(-1, 1)$

b) for the last two pairs of vectors above find the vector product within each pair.