## Part I - Projections

The following exercise is for visualizing projections. Let $\mathbf{a}=\langle 2,3\rangle, \mathbf{b}=\langle 7,2\rangle$. Mark each vector on both pictures below.

1. Compute the angle between them. Look at the pictures below to see your answer makes sense.
2. Compute the vector projection $\mathbf{p r o j}_{\mathbf{a}} \mathbf{b}$. Verify your answer by drawing the vector projection $\mathbf{p r o j}_{\mathbf{a}} \mathbf{b}$ on the graph below.

3. Compute the vector projection $\mathbf{p r o j}_{\mathbf{b}} \mathbf{a}$. Verify your answer by drawing the vector projection $\mathbf{p r o j}_{\mathbf{b}} \mathbf{a}$ on the graph below.


## Part II - An Application

A parallelogram, which is not a rectangle, has three of its consecutive vertices given by $A(1,2,4), B(2,0,5)$ and $C(4,6,0)$. The line through the points $A$ and $E$ intersects the line through $D$ and $C$ at a right angle. Depending on the parallelogram and where the point $E$ falls, there are three pictures possible.


1. Find the coordinates of the fourth vertex D of the parallelogram.
2. Find the coordinates of the point E .
3. Find the angles of the parallelogram.
4. Decide which of the three pictures is a correct representation.
