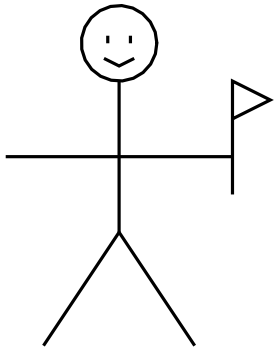
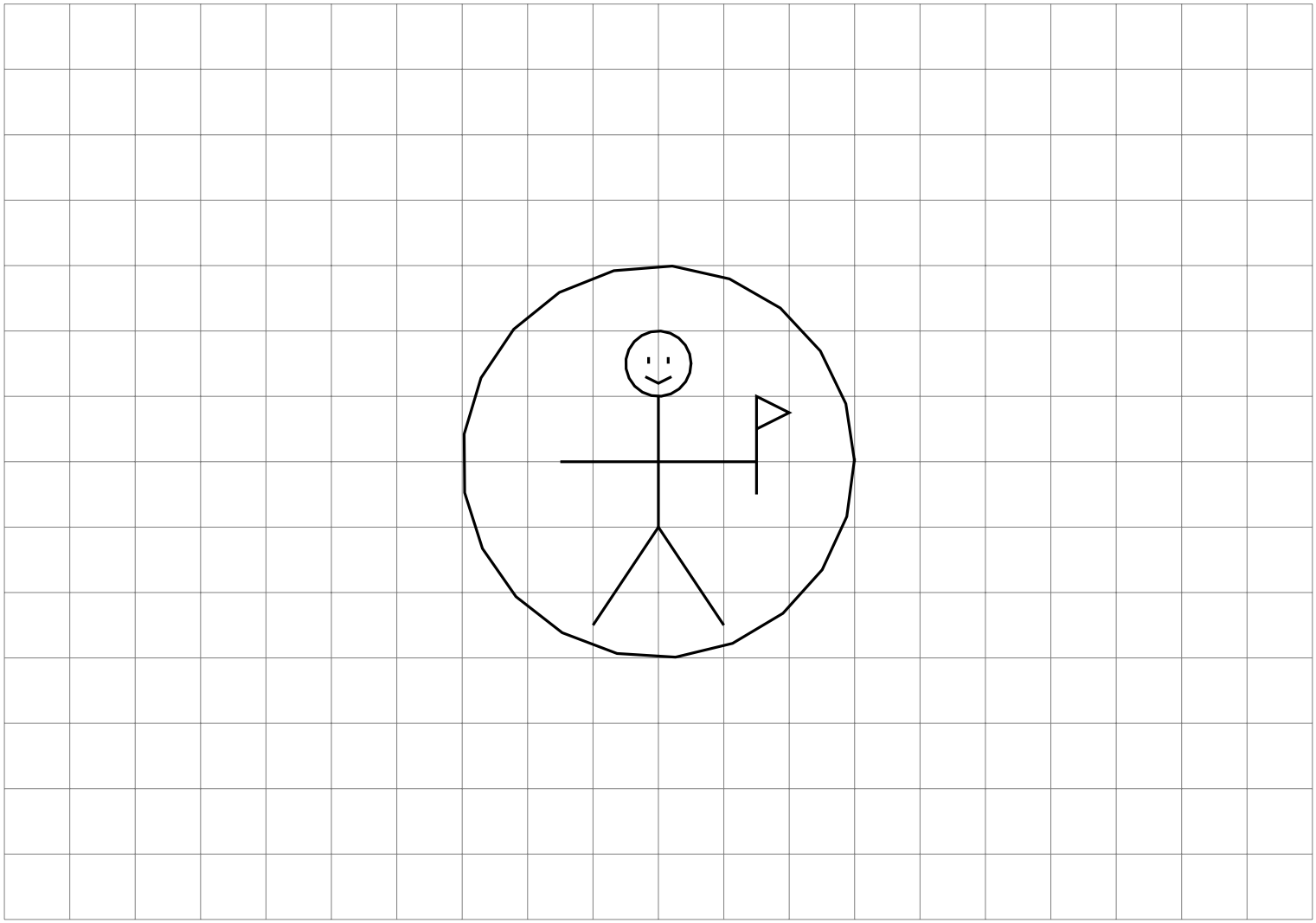
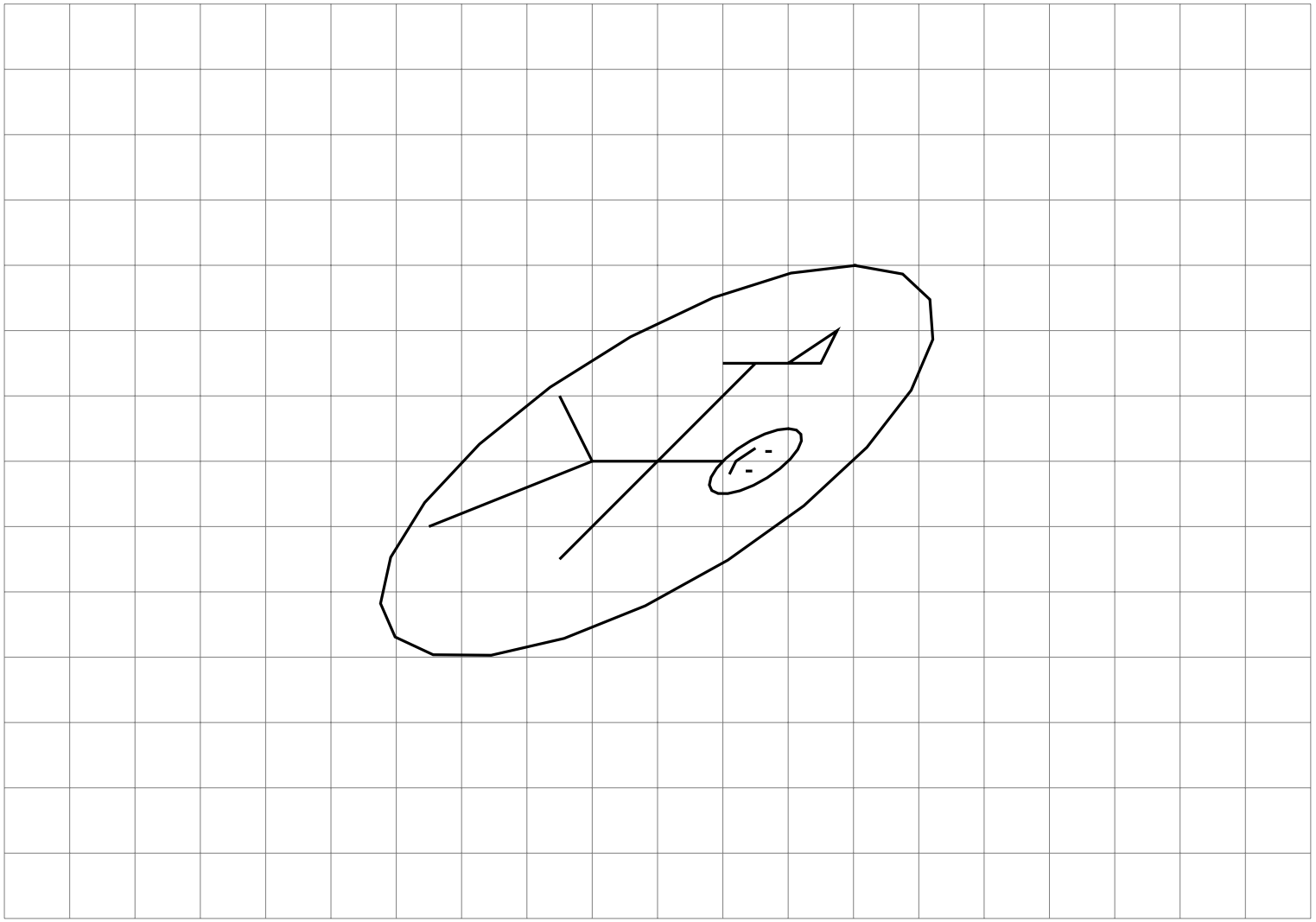
The Adventures of Eigenvalue Guy

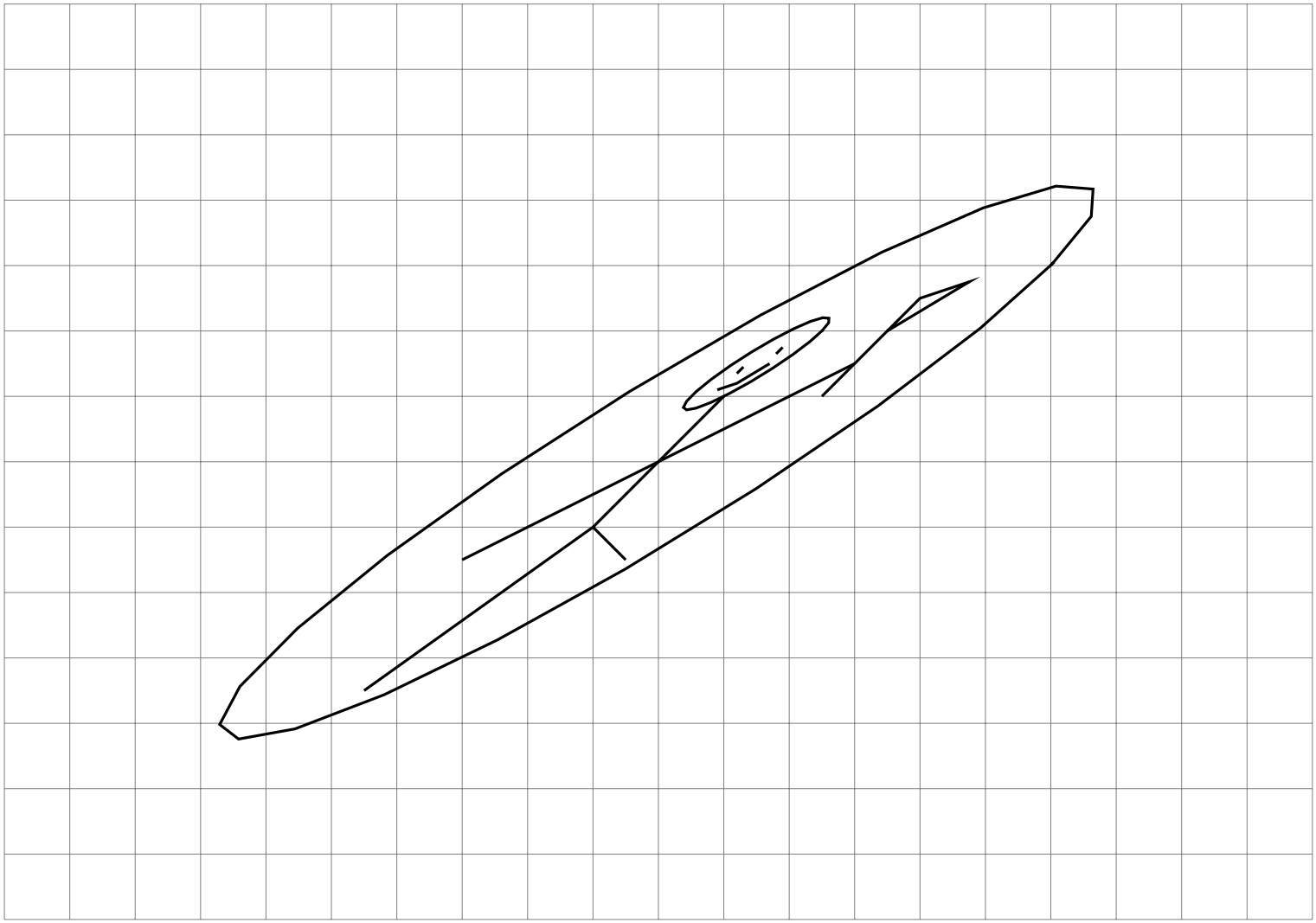
This is Eigenvalue Guy. He is about to embark on a great adventure.



He is going to demonstrate the effects of the linear transformation corresponding to the matrix $A = \begin{pmatrix} 1 & 1 \\ 1 & 0 \end{pmatrix}$.

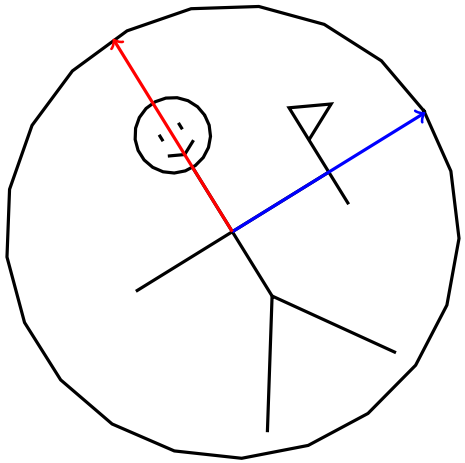


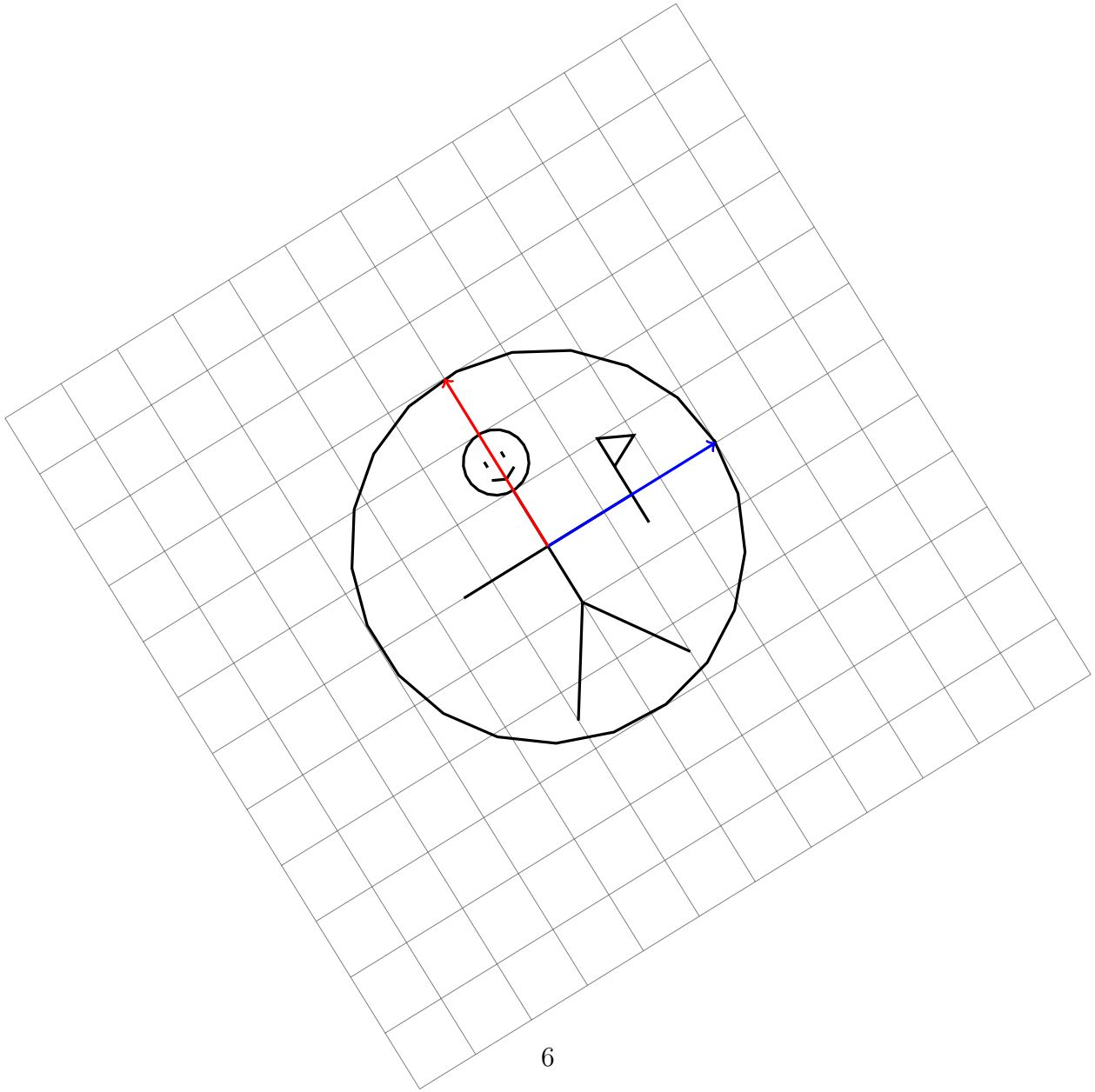


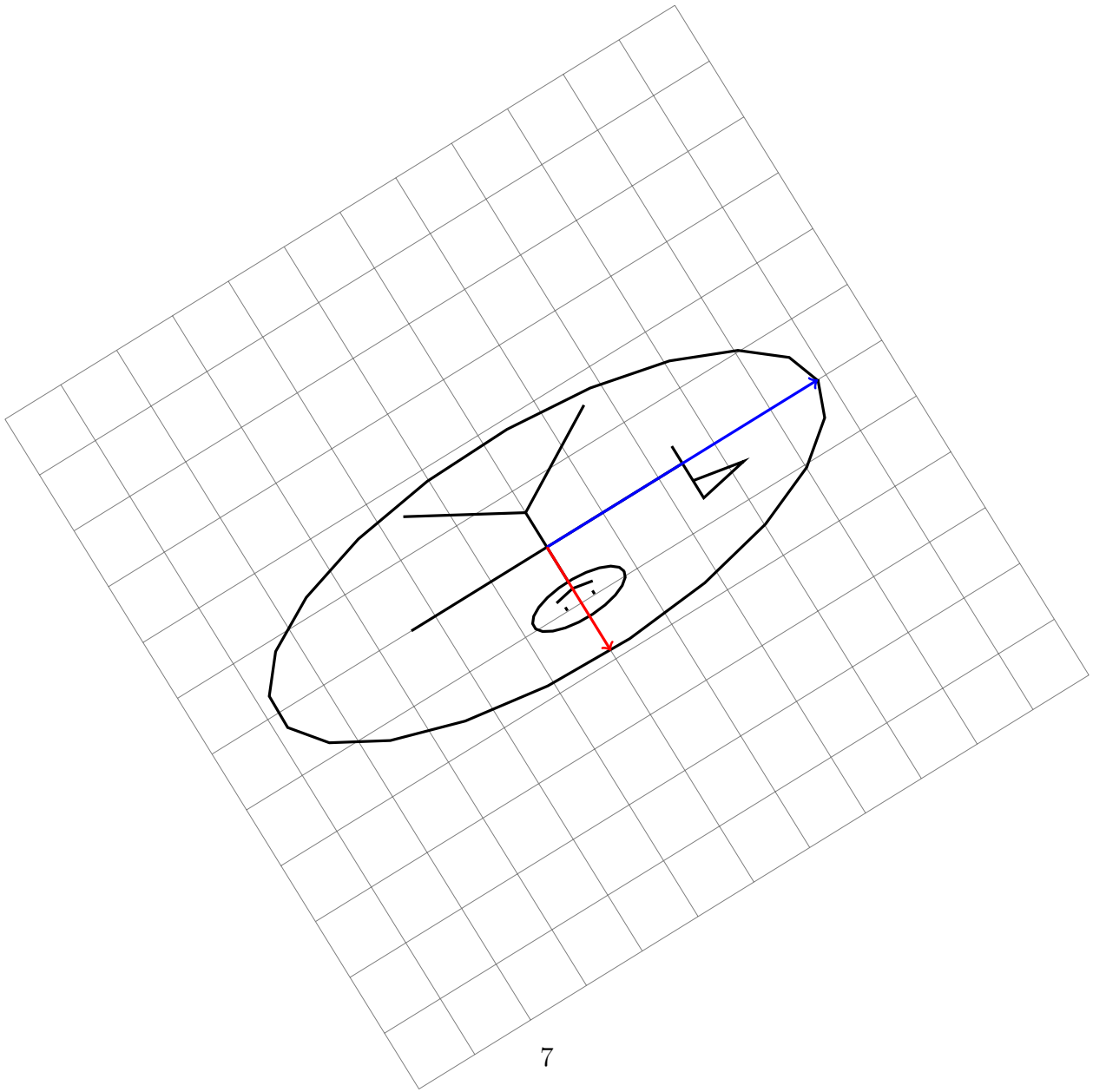


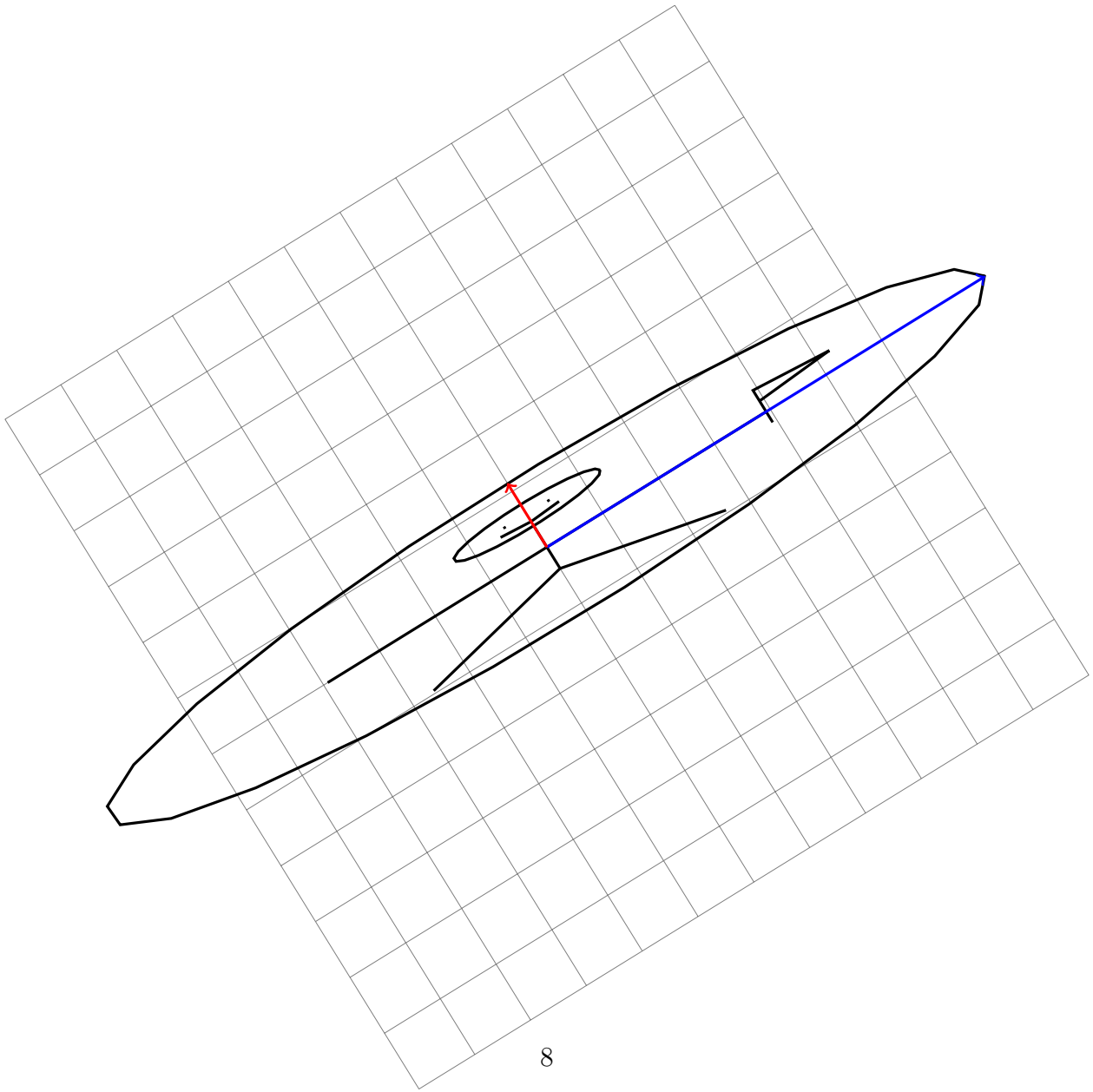
Now with Eigenvectors!

Watch what happens to Eigenvector Guy when we use the same transformation, but he has aligned his body with the two eigenvectors of $A = \begin{pmatrix} 1 & 1 \\ 1 & 0 \end{pmatrix}$.



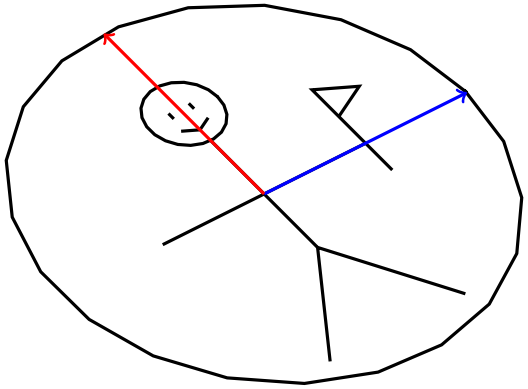


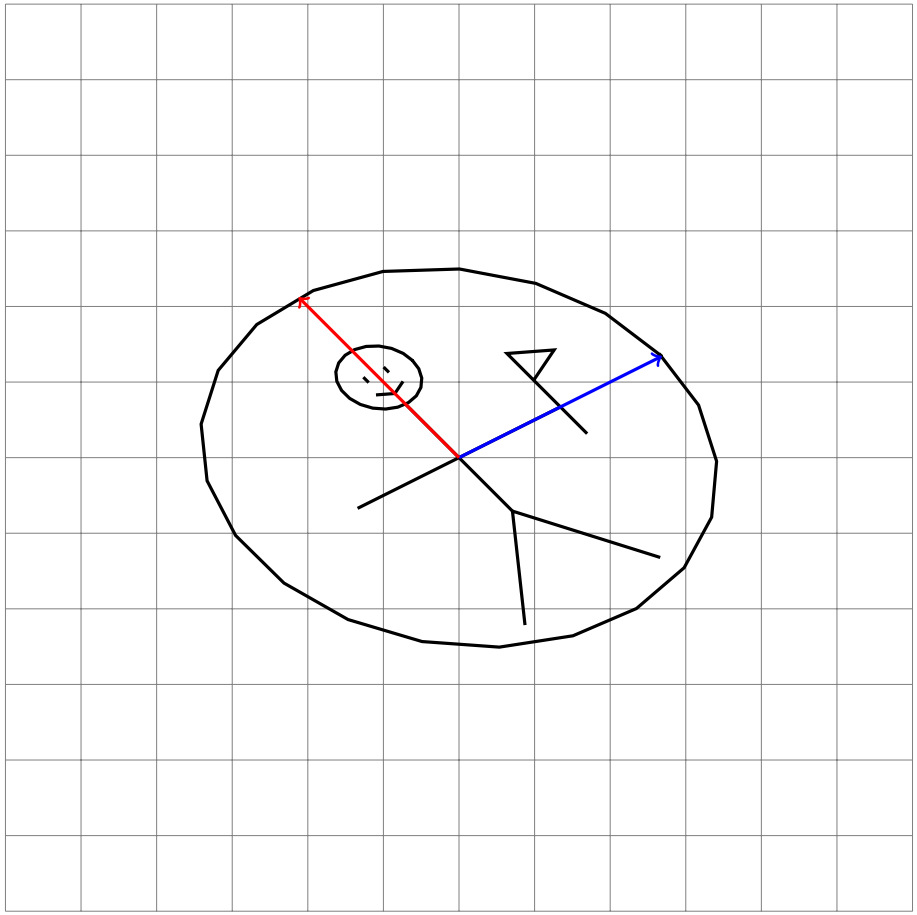


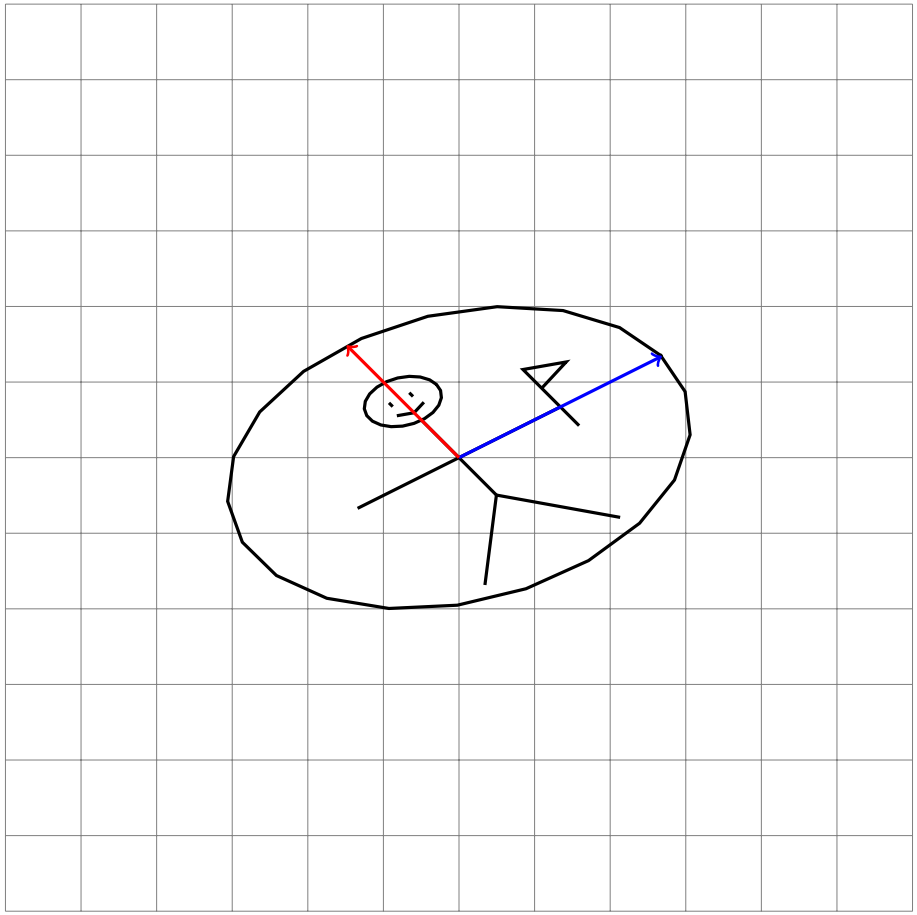


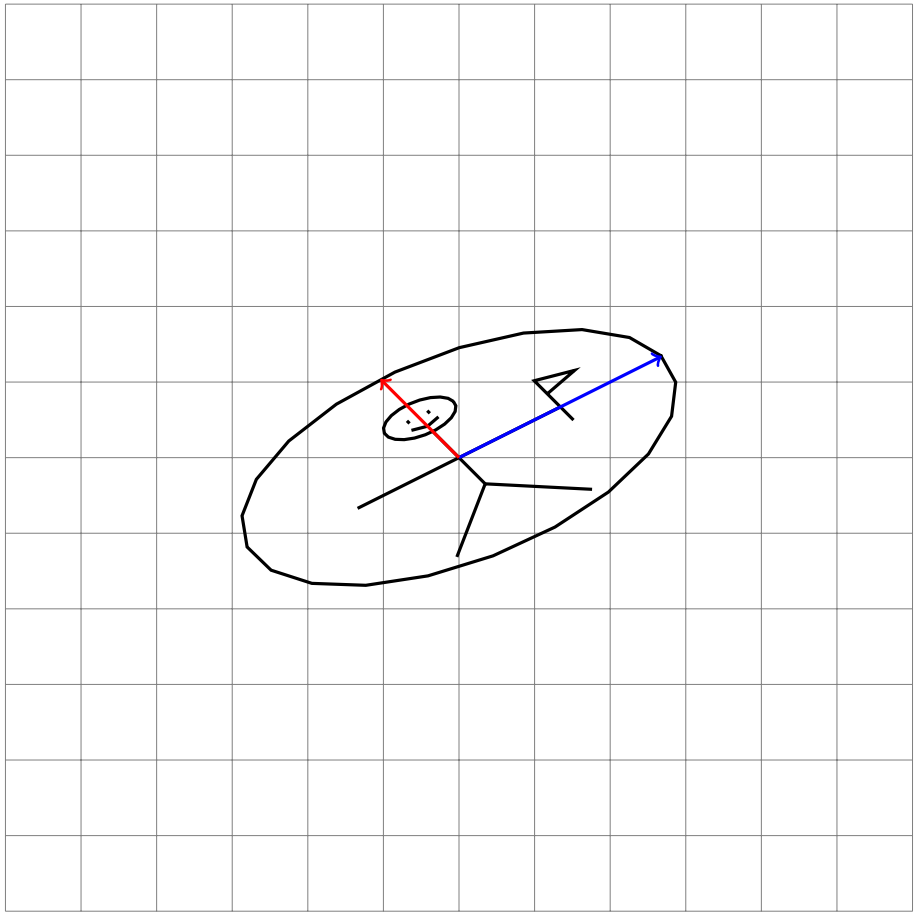
More Examples

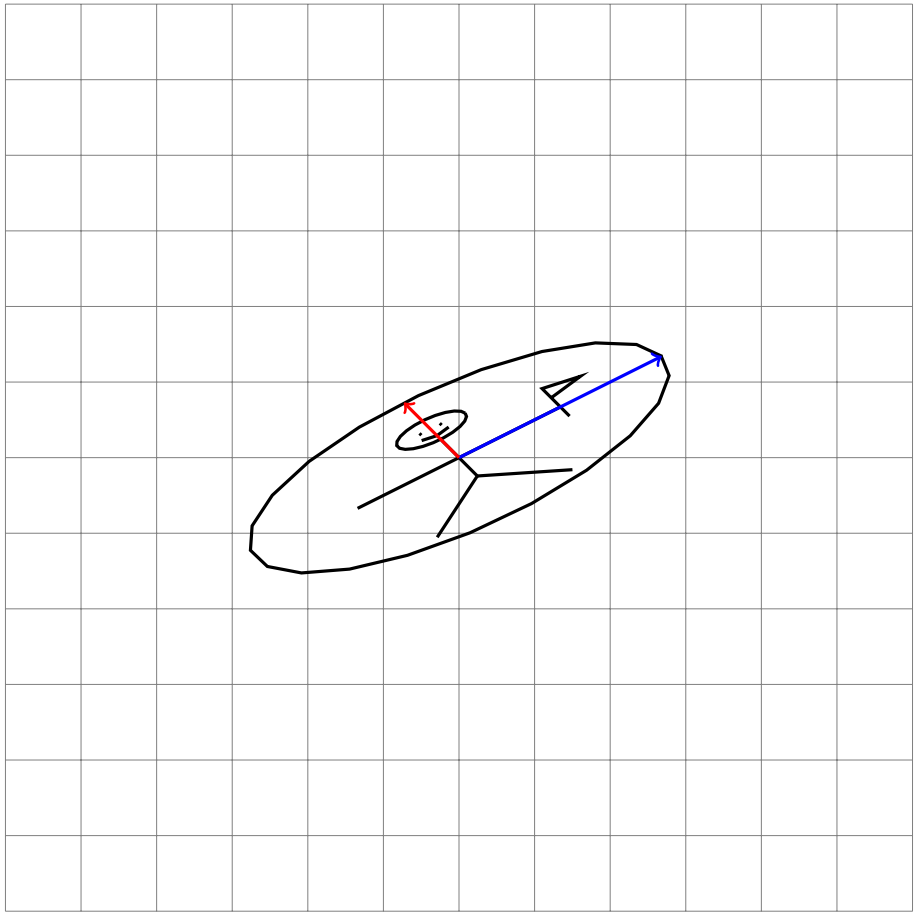
Here $A = \begin{pmatrix} 0.9 & 0.2 \\ 0.1 & 0.8 \end{pmatrix}$. Eigenvalue Guy has aligned his body with the two eigenvectors of A.





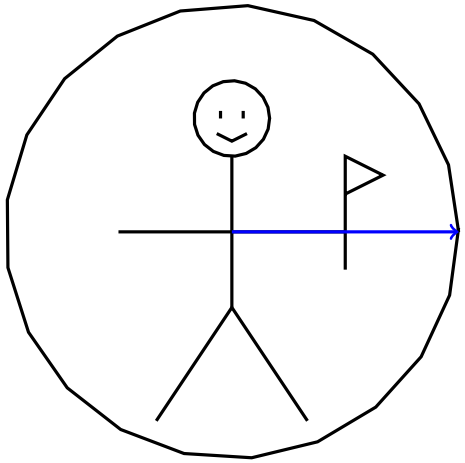


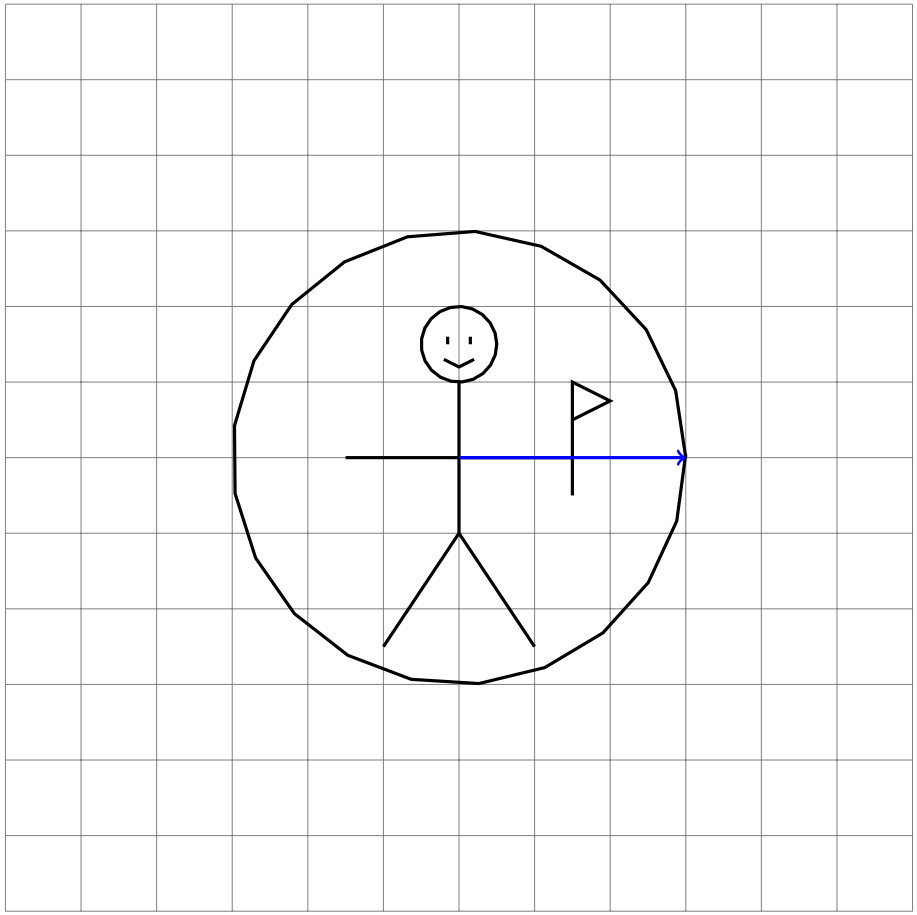


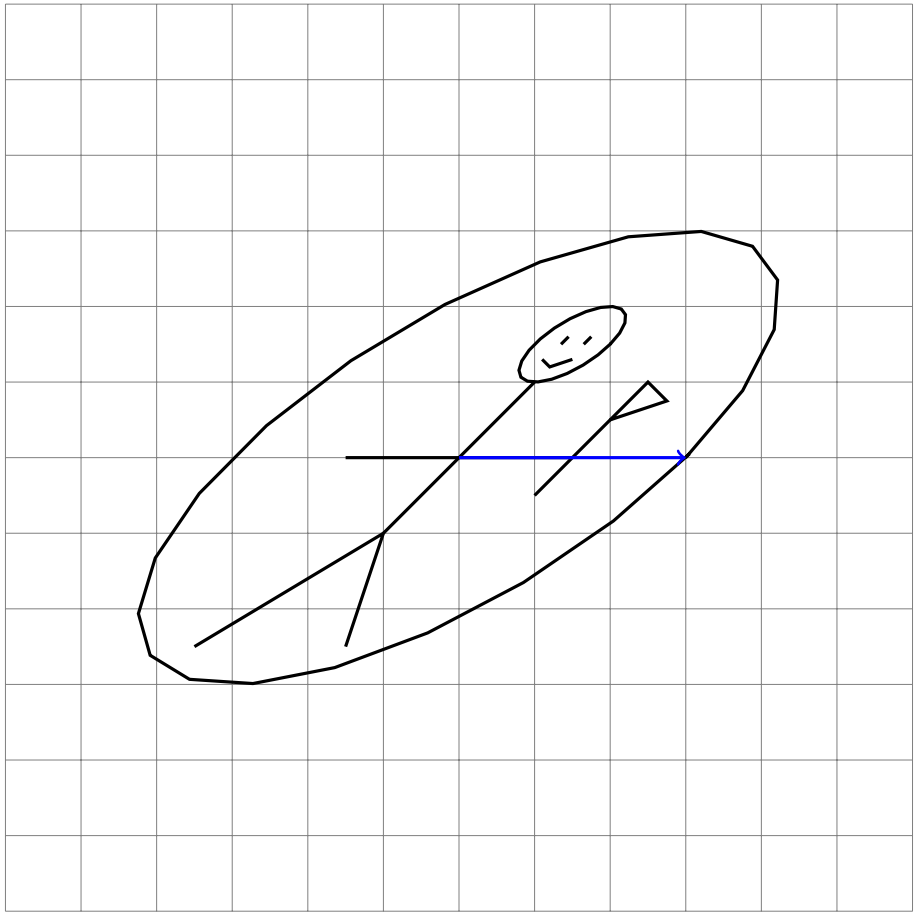


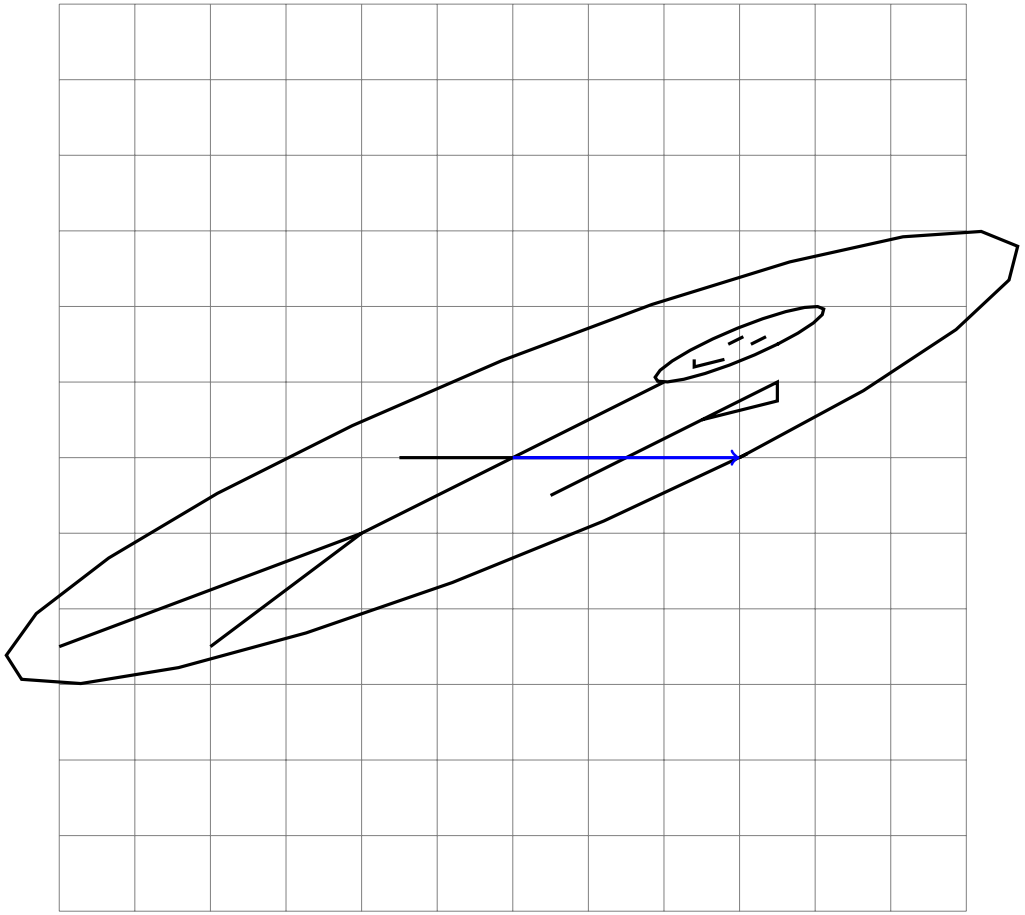
Eigenvalue Guy Gets Sheared

Here the matrix is $A = \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$.









Complex Eigenvalues

Here the matrix is $A = \begin{pmatrix} 0.5 & -0.5 \\ 1 & 1.5 \end{pmatrix}$, which has eigenvalues $\lambda = 1 \pm 0.5i$.