For problems #1 and #2, write the transformation which takes the unit square (blue) to the transformed square (red). Use the form

$$T \begin{pmatrix} x \\ y \end{pmatrix} = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} e \\ f \end{pmatrix}.$$

Check your work online! For #3 and #4, sketch a diagram of the unit square (blue) and the parallelogram it transforms into (red, possibly shaded if there is a flip). Also, check your work algebraically (using matrix multiplication) like we did in class today. Finally, check online using the Sage worksheet.

1.

2.
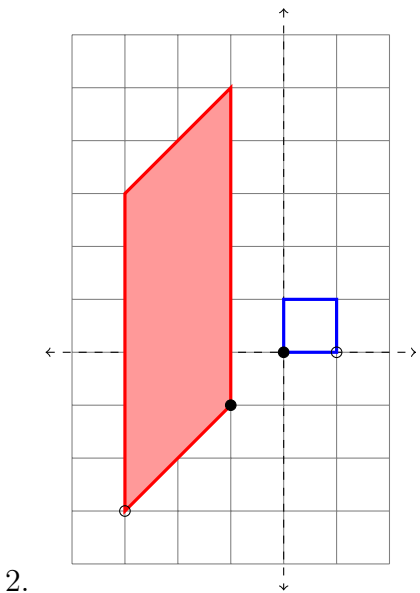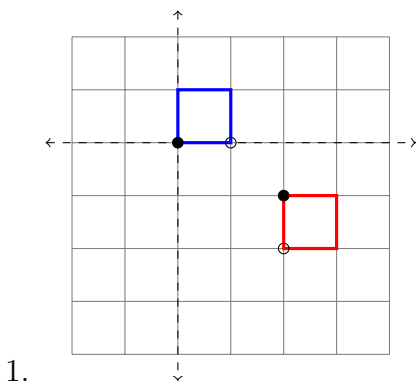
3.

$$T \begin{pmatrix} x \\ y \end{pmatrix} = \begin{bmatrix} 3 & -1 \\ 0 & 2 \end{bmatrix} \begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} -1 \\ 3 \end{pmatrix}.$$

4.

$$T \begin{pmatrix} x \\ y \end{pmatrix} = \begin{bmatrix} 0 & 2 \\ 1 & 0 \end{bmatrix} \begin{pmatrix} x \\ y \end{pmatrix} + \begin{pmatrix} 3 \\ -4 \end{pmatrix}.$$