1. Define functions $f_1 : \langle x_1, x_2 \rangle \mapsto \langle x_2, -x_1 \rangle$, and $f_2 : \langle x_1, x_2 \rangle \mapsto \langle 2x_1, \frac{1}{2}x_2 \rangle$, and $f_3 : \langle x_1, x_2 \rangle \mapsto \langle x_1 + x_2, x_2 \rangle$, and $f_4 : \langle x_1, x_2 \rangle \mapsto \langle x_2, x_1 + x_2 \rangle$. Verify (but do not show your work) that each $f_i$ is linear.

**Part (a):** Draw (and show your answer below) how these four functions transform the “F”-shape. Your answers should be similar to the drawing on the right in Figure II.3 on page 22.

**Part (b):** Which of the $f_i$’s are rigid? Which of the $f_i$’s are orientation-preserving?
2. Do Exercise II.2, page 22 (using Figure II.4).

3. Let $f(x)$ denote the transformation of the previous problem (#II.2). Express $f^{-1}$, the inverse of $f$, as an affine map in the form $f^{-1}(x) = Nx + w$. 
Math 155A - Homework 1, page 3.

4. Do Exercise II.8, page 27 (using Figure II.9)

5. Do Exercise II.9, page 28 (again using Figure II.9)
6. Do Exercise II.11 on page 31 (using Figure II.12)