Mathematics 308—Fall 1996

Review for the mid-term

1. Every line in the plane gives rise to a reflection in that line. If the line goes through the origin, it is a linear transformation, otherwise just affine.

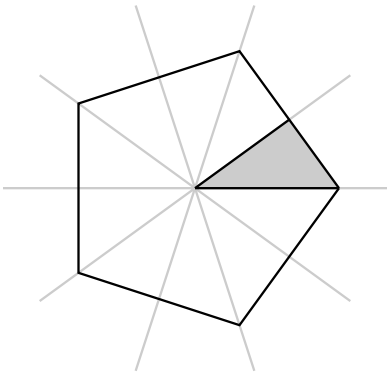
a. Suppose the line goes through the origin, at angle θ with respect to the x-axis. What is the matrix of the linear transformation reflecting through this line? How does your answer fit in with the fact that angle θ and $\theta + 180^\circ$ give rise to the same reflection?

b. Same situation as in (a). Write a PostScript procedure **`reflect`** which changes the CTM by a reflection in line at angle θ.

c. Write down the affine transformation corresponding to reflection in the line $Ax + By + C = 0$.

2. Use calculus to construct a few control points for some graphs or parametrized curves.

3. Find a parametrization for some simple plane curve and then show how to use **`mkpath`** to draw it.

4. Draw the chess-board, with squares 1 cm square.

5. Write a program to draw the following picture