Due: Wednesday, 10/16/19 at the *beginning* of class.

The same expectations and guidelines from the previous homework assignments apply to this one as well. You can re-read the previous homework assignments if you need any reminders.

Chapter 4: Problems 4.4, 4.15

Chapter 6: Problem 6.17(i,ii,iv). In (ii), $W = (x, y)$, so the line is $(0, 1) \cdot (x, y) = -1$, or $y = -1$. You don't need to write out full matrix formulas, although it could be useful for (iv). In (ii), for example, you can reflect across a horizontal line using the geometric properties of a reflection.

A: Using the method from class, find a matrix formula for the rotation by $\pi/3$ centered at the point $(7, -2)$. You can leave your answer in the form $\mathcal{R}(X) = R(X - C) + C$, but you should fill in all the entries of your matrix with numbers.

B: Using the method from class, find a matrix formula for the reflection in the mirror $k : (-1, 4) + s(2, 1)$. You can leave your answer in the form $\mathcal{M}_\ell = F(X - P) + P$, but you should fill in all the entries of your matrix with numbers.

C: Repeat the previous problem with the mirror $\ell : (3, 4) \cdot X = 8$. You can leave your answer in the form $\mathcal{M}_\ell = F(X - P) + P$, but you should fill in all the entries of your matrix with numbers.

D: Let $\mathcal{M}_\ell$ be the same reflection as in the previous problem, and let $U = (-4, 3)$. For this one problem, it's worth multiplying things out to write your matrix formulas in the form $MX + P$.

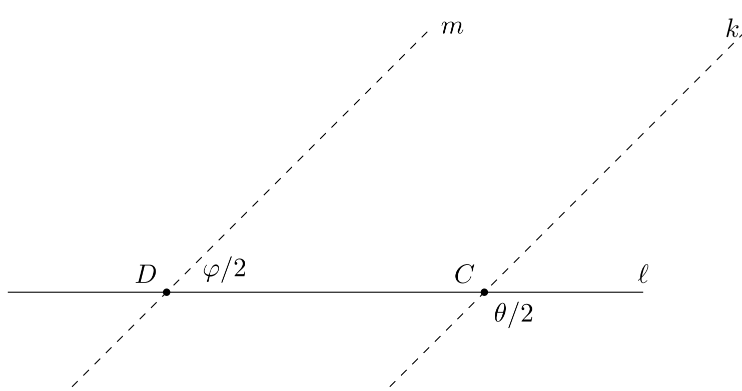
(1) Use your work from the previous problem to find a matrix formula for $\mathcal{M}_\ell \circ \mathcal{T}_U$.

(2) Use your work from the previous problem to find a matrix formula for $\mathcal{T}_U \circ \mathcal{M}_\ell$.

Hint: your answers should be the same – we'll see why on Monday, 10/14!

E: Find an isometry that maps $\angle(1, 1)(3, 2)(2, 2)$ to $\angle(3, -1)(3, 2)(4, 0)$.

F: Do this problem from the last sheet we worked on in class. Suppose $\frac{\varphi}{2} + \frac{\theta}{2} = \pi$, so that k and m are parallel to each other in the following diagram. Prove $\mathcal{R}_{\varphi,D} \circ \mathcal{R}_{\theta,C}$ is a translation $\mathcal{T}_V$. (You don't need to find the vector V.)



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