1. Let $\mathcal{L}$ be the line given by $ax + by + c = 0$. Find (with proof) points P and Q such that $\mathcal{L}$ is the line equidistant between P and Q.

2. Find an explicit formula for the reflection about the line equidistant between the (distinct) points $P = (x_0, y_0)$ and $Q = (x_1, y_1)$.

3. Stillwell 3.3.1

4. Stillwell 3.4.1

5. Stillwell 3.6.2

6. Stillwell 3.6.3

7. Stillwell 3.6.4 **A picture is fine for this problem.**

8. Stillwell 3.6.5
   The wording of this problem is a little vague. Here's my interpretation of it. Let $\mathcal{L}$, $\mathcal{M}$, and $\mathcal{N}$ be lines. Show that there exist lines $\mathcal{L}'$, $\mathcal{M}'$, and $\mathcal{N}$ such that $\mathcal{M}'$ is perpendicular to $\mathcal{N}$ and such that reflection through $\mathcal{L}$, $\mathcal{M}$, and $\mathcal{N}$ (in that order) is equivalent to reflection through $\mathcal{L}'$, $\mathcal{M}'$, and $\mathcal{N}$ (in that order). You may assume that no two of $\mathcal{L}$, $\mathcal{M}$, and $\mathcal{N}$ are parallel. **A picture is fine for this problem.**

9. Stillwell 3.6.6 **A picture is fine for this problem.**

10. Stillwell 3.6.7