Turn in your solution to at least two of the problems. **Explain your solution in full sentences. Give detailed reasonings.** Include diagrams and figures if appropriate.

Problem 1. A vertex of a unit square is exactly on the center of another unit square. What is the area of the intersection of the squares?

Problem 2. Consider the $ABCD$ square. Draw a regular triangle ABE so that E is inside the square. How large is the angle $\angle EDC$?

Problem 3. Find a solid so that if we look at it from three different directions then it looks like a circle and a square and a triangle.

Problem 4. Emily, John, Kathy and Roy play soccer in the backyard. They break the neighbor's window. When the neighbor asks them they say the following:

- Emily: Kathy or Roy broke the window.
- John: Roy broke the window.
- Kathy: It wasn't me.
- Roy: It wasn't me either.

The neighbor knows them well so he is sure that three of them tell the truth. Who broke the window?