I. Duplicating and Subdividing:

These first several problems which were postponed from PS 8, don' t use anything more sophisticated than the ideas we've used in class to get our results (parallel lines, similar triangles, diagonals bisect each other, etc), but they also aren't just replicating what we've already done – they're coming up with *new* techniques. Brainstorm not only with friends in the class but also with people outside of class - I've found that all sorts of people can get caught up in these questions, so allow yourself enough time to really think about them over the course of several days, and enjoy them!

You will need several copies of the fence again, just as you did for the last problem set. It is still on the main website for this course, under both PS 8 and PS 9.

1. (Exercise 2, Lesson 4, *Lessons in Mathematics and Art.*) Considering the solid outline to be one section of fence, draw another section of fence that is an exact duplicate of the original, with the top of its *near* fencepost at the point P.

   Note: I know P is close to where a diagonal through the midpoint of the side hits, but that's just coincidence, so don't use that; P could be *anywhere* along the top rail. The point is that sometimes we want to draw an exact copy of a rectangle some arbitrary distance from the original. To help ensure that your fence is in the same plane as the original, extensions of the fence-top and fence-bottom have been provided.

2. (Exercise 3, Lesson 4, *Lessons in Mathematics and Art.*) Draw a duplicate of the section of fence (in the same plane as the original), with the top of its *far* fencepost at the point P.

   Note: Again, there is nothing special about where P is, it could be anywhere on the extension of the top fence rail. Your new rectangle may or may not overlap with the original section of fence. This is handy for drawing such things as a partially open sliding glass door or window, for instance.

3. (Exercise 4, Lesson 4, *Lessons in Mathematics and Art.*) Draw 2 vertical fenceposts to divide the fence into 3 equal sections. This

may seem easy at first, but 3 equal sections is much different from 2, 4, 8, 16 etc. Think outside the box! (Literally!)

II. **Anamorphic Art:**

On the next couple pages are a perspective grid with a primitive flower traced onto it, and a rectangular grid for you to transfer it to. These are also available on the web (with the fence) if you find you need another copy.

4. Just to review some other perspective ideas, find where you should place your eye so that this grid looks like a rectangular grid. (Assume that the lines representing horizontal lines receding into the distance are orthogonal to the picture plane.

   Hint: Either rotate the picture 90 degrees, or draw a "verizon" line rather than a horizon line.

5. By noting where the tracing of the flower crosses the grid, mark the corresponding points on the rectangular grid on the next page, and connect them appropriately to obtain an anamorphic drawing. **Note:** I have rotated the rectangular grid by 90 degrees to make it fit on the page better.

   Concepts to take into account:

   i. Points on the perspective grid where the horizontal and vertical lines of the grid intersect correspond exactly to points on the straight-on grid where the horizontal and vertical lines intersect, and so places where the flower crosses such an intersection point are the most reliable transfer points.

   ii. Proportion is preserved on the lines that are still parallel on the perspective grid (in this case, on the vertical lines). So, for instance, halfway up a square on the perspective grid will correspond to halfway up the corresponding square on the straight-on grid. Thus places where the drawing crosses one of these lines are the second-most reliable transfer points.

   iii. Proportion is *not* preserved on the lines that are *not* parallel on the perspective grid (in this case, on the lines that represent horizontal lines). So, for instance, halway back along a square on the perspective grid will correspond to less than

halfway back on the straight-on grid. Places where the drawing crosses one of *these* lines are not very reliable transfer points at all.

(Once you have the picture transferred, if you want to then color it in, go right ahead.)

6. Roughly where should the viewer place their eye (to the left, right, top, or bottom of your drawing?), and at what angle should they look at this picture?