Note: For the first problem, you will need print-outs of three paintings. Rather than photocopy pictures of them for you, which really doesn't work at all well, I have put links to the paintings with the problem set on my webpage, so you can print each one out yourself. There's no need for the print-outs to be in color, although you may enjoy the process more. Hand in the print-outs (along with any additional pieces of paper that you needed), as this is where most of your work for these problems will be. You may find you need a couple print outs for each.

Remember: my website for the course is
`http://acunix.wheatonma.edu/jsklensk/Art_Spring09/art.html`

1. The three pictures we will be considering are:

   (a) Leonardo's *The Last Supper* (1495-1498), 460cm × 880cm

   (b) Rafael's *School of Athens* (1509-1511), 500cm × 770cm

   (c) Masaccio's *Trinity* (1427-1428), 667cm × 317cm (the painting that motivated our looking into finding the correct viewing position)

   For each of these paintings, do the following:

   (i) Locate the primary vanishing point. In my experience, you may need to draw several lines, because it can be difficult to line your straight-edge up exactly with an orthogonal, and some may be off.

   Is this primary vanishing point in the picture or off the picture? Is it used to draw the eye anywhere important, or is it just used to give an illusion of depth?

   (ii) Determine the correct viewing position for your copy, and describe it. Try viewing it from the correct viewing position. Does it improve the illusion of depth in the picture? (Of course, with a print-out it's not the same experience as looking at it in person.)

   Note: For the last picture, *Trinity*, finding a square takes a bit more work. Try looking at the top of the columns. You will have to finish off the squares for yourself. Be sure to use the vanishing point to draw in the missing orthogonal.

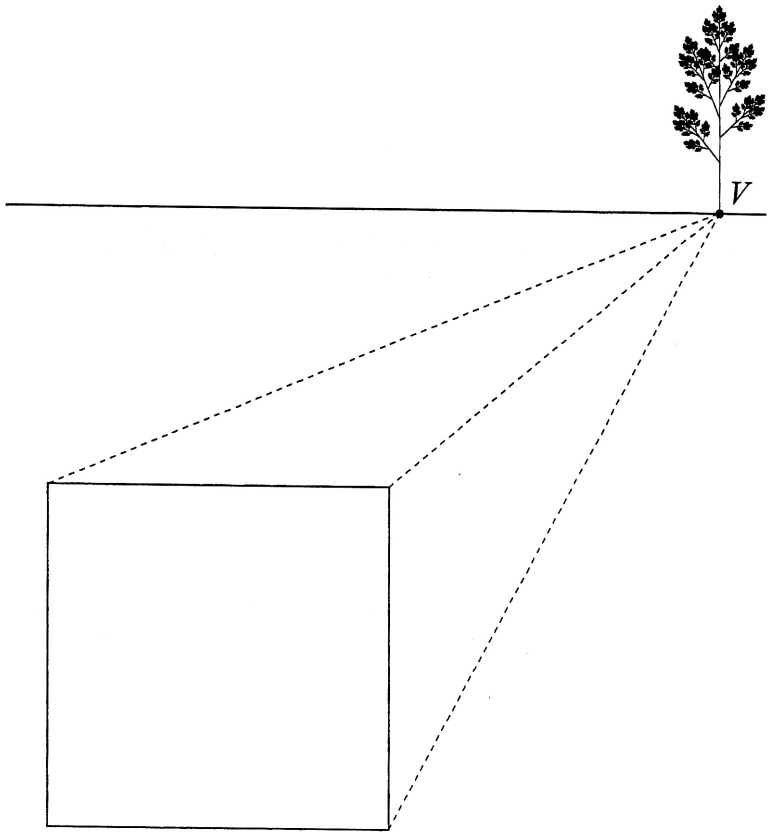
   (iii) I have given you the dimensions of each of the original paintings. For (c), measure the height and width of your print-out. Combine

your result in (ii) with your knowledge of proportion to get a pretty good estimate of the correct viewing position of the actual painting.

2. *Drawing your own cube:* (This is Exercise 1 from Lesson 3 in *Lessons in Mathematics and Art.*)

   In the figure below, a start has been made on the drawing of a cube in one-point perspective. The front face is a square, V is the vanishing point, and the dashed lines are guidelines for drawing receding edges of the cube. Suppose you want to choose the viewing distance *first*, and you choose it to be 6 inches. Finish drawing the cube.

   Hint: For help in thinking about it, look at Figure 7 from Lesson 3. The idea is to, in a sense, work backwards.



3. (This is Exercise 2 from Lesson 3 in *Lessons in Mathematics and Art*.)

   If the box below represents a cube, then we can use our usual techniques to find the correct viewing distance, and it would end up being the distance between the two trees, as illustrated.

   But suppose the box below is *not* a cube – suppose its front is a square, but its top face is in reality twice as long as it is wide from left to right. In this case, the viewing distance is *not* equal to the distance between the two trees. What *is* the viewing distance in that cae? (You may give your answer in terms of the distance between the trees, if that's easier.)

   Hint: Go through the same process we went through in class to find the viewing distance with a cube, but make appropriate adjustments.