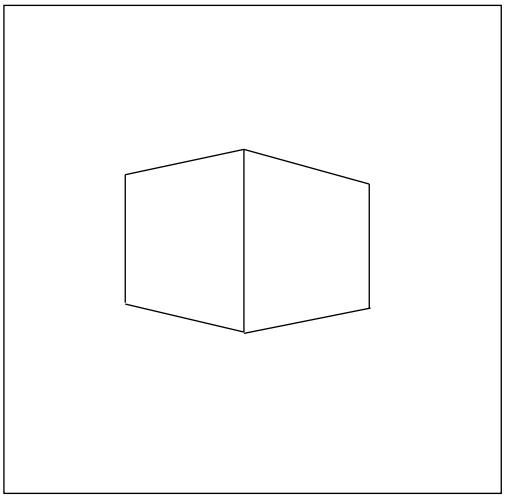
PART I:

1. Below is the perspective image of a box (it is not drawn in one-point perspective). There is something subtly wrong with this perspective drawing. Investigate where the edges of the box vanish to figure out what it is.



PART II:

For the next 3 problems, you will be investigating the use of perspective in 3 paintings by Renaissance masters. You will need print-outs of each of these paintings; because you may need several of each, I have put links to the paintings with the homework rather than include the pictures in this file.

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 of each painting in order for your work to be readable to me. Please organize your homework so that everything is in order, and clearly label all your work.

Note: There's no need for the print-outs to be in color, although you may enjoy the process more.

2. Consider Leonardo's *The Last Supper* (1495-1498), 460 cm × 880 cm. *(See link)*

   (a) **Finding the primary vanishing point**

      i. In an easily visible color, highlight two lines parallel to the picture plane **and** parallel to each other.

ii. In a different color, highlight three lines orthogonal to the picture plane. (Remember, in real-life, these would be perpendicular to lines you found in part (i) **and** be receding).

iii. Find the primary vanishing point by extending the lines you found in part (ii) until they intersect (you may need to tape extra paper to the print-out of the painting)

- This may take several tries, as it can be difficult to line your straight-edge up exactly with an orthogonal. Repeat on as many copies as necessary until you feel like your lines really line up with the painting. I will be taking into account the accuracy of your extensions.

iv. Is the 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?

(b) **Finding the ideal viewing position of your print-out**

i. Draw the horizon line through the primary vanishing point. Be careful – this should be truly horizontal.

ii. Locate a secondary vanishing point by finding a square lying parallel to the floor, drawing its diagonal, and extending that diagonal until it intersects the horizon line.

iii. Determine the intended viewing distance for your print-out by measuring the distance between the primary and secondary vanishing point.

iv. Determine the ideal viewing position for your copy, and describe it. (Your description should include both the point on the picture opposite which the viewer should put their eye **and** the distance back from that point the viewer's eye should be.)

v. 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.)

(c) **Estimating the ideal viewing position for the painting itself**

i. Measure the height and width of your print-out.

ii. Use the measurements, along with the dimensions of the original painting, the viewing distance you found in (b), and your knowledge of proportion to get a pretty good estimate of the ideal viewing position of the actual painting.

3. Next, consider Raphael's *School of Athens* (1509-1511), 500 cm $\times$ 770 cm.

(a) Find the primary vanishing point, by carefully following the steps above. (Again, accuracy will be taken into account.) Is the 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?

(b) Find the ideal viewing position of your print-out, by again carefully following the steps above. Again, try viewing your print-out from that position – does it improve the illusion of depth?

(c) As above, estimate of the ideal viewing position of the actual painting.

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

(a) Carefully find the primary vanishing point. (Once again, accuracy will be taken into account.) Is it used to draw the eye anywhere important?

(b) Carefully find the ideal viewing position of your print-out; does viewing your print-out from that position improve the illusion of depth?

Note: Finding a square to work with takes a bit more work in this painting. Look at the top of the columns – there is an unfinished square. Finish off the square using the primary vanishing point to draw in the missing orthogonal, and then draw in the missing back.

(c) Use your results and the dimensions of the painting to estimate the ideal viewing position of the actual painting.

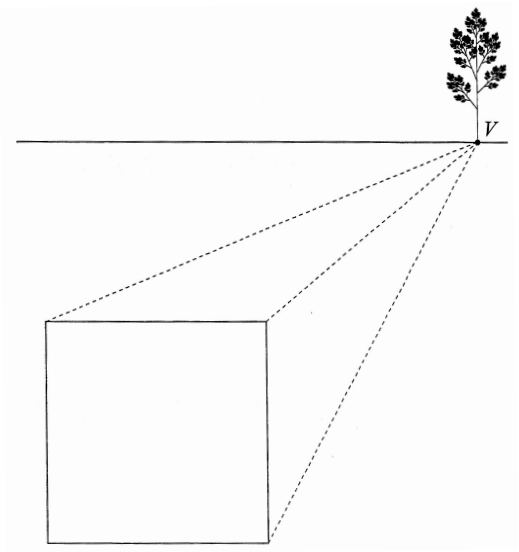
Part III:

The next exercises extend the technique for finding the ideal viewing position to allow us to deal with somewhat different situations:

5. *Drawing your own cube:*

In the figure below, we see the start of a one-point perspective drawing of a cube. The front face is a square, V is the vanishing point, and the dashed lines are guidelines for drawing receding edges of the cube. Finish drawing the cube **so that the viewing distance is 6 inches**.

Hint: Look at Figure 7 from Lesson 3; work backwards, in a sense.



6. If the box below represents a cube, then we can use the techniques from Part I to find the correct viewing distance; it would end up being the distance between the two trees, as illustrated.

   Suppose the box below is *not* a cube – while its front is still square, its top face is in reality twice as deep 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? (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.