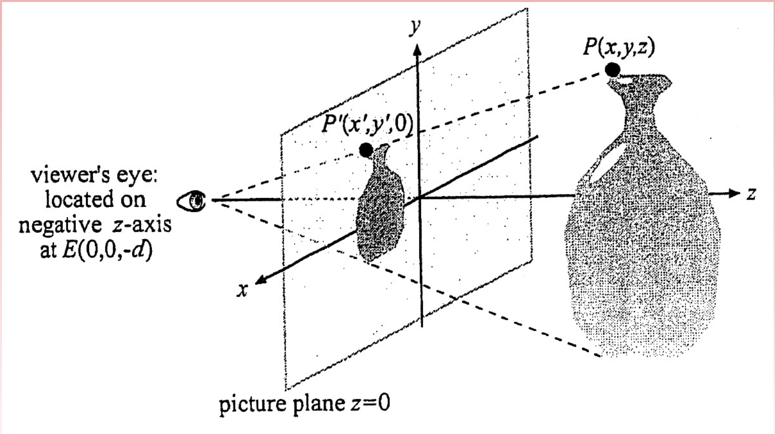
Perspective Theorem

Set-up:



Perspective Theorem

Set-up:

- Artist wants to represent object on canvas so that looking at canvas is like looking thru window at object.
- Canvas/window = **picture plane**. Lies between artist and object.
- Let the xy-plane= **picture plane**.
- Place origin so artist is located on **negative z-axis**.
- d = distance from artist's eye to origin. Artist's eye is at $(0, 0, -d)$.
- $P(x, y, z)$ = any point on object. $z > 0$
- Let P' = image of P on picture plane= where line of sight from artist's eye to P crosses picture plane.
- P' on the picture plane= xy-plane $\Rightarrow$ z-coordinate= 0. That is, P' has coordinates $(x', y', 0)$.

Perspective Theorem

Let the xy-plane represent the picture plane, and assume the artist's (or viewer's) eye is located at the point $(0, 0, -d)$ (so that d, a positive number, is the distance from the artist's or viewer's eye to the picture plane.)

Given a point $P(x, y, z)$ on an object, with $z > 0$ (that is, the object is beyond the picture plane), the coordinates x' and y' of its perspective image $P'(x', y', 0)$ on the picture plane are given by

$$x' = \frac{dx}{d+z} \qquad y' = \frac{dy}{d+z}$$

Results - Perspective Image of Classroom

Table 1:

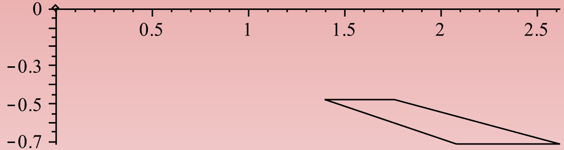
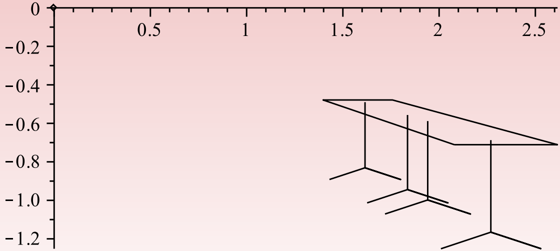


Table 1, with wheels



Results - Perspective Image of Classroom

Table 2:

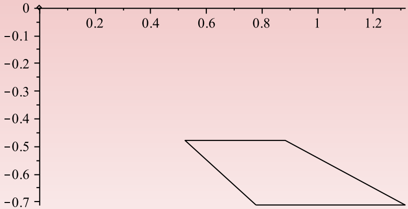
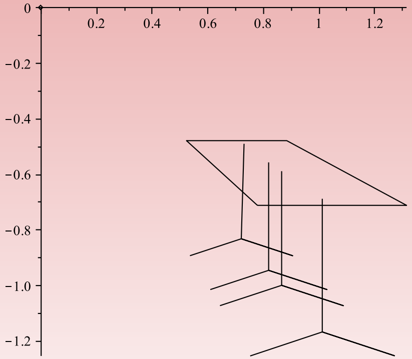


Table 2, with wheels



Results - Perspective Image of Classroom

Table 3:

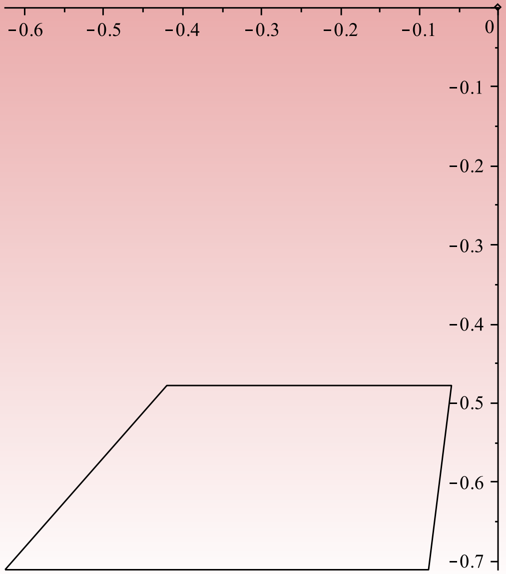
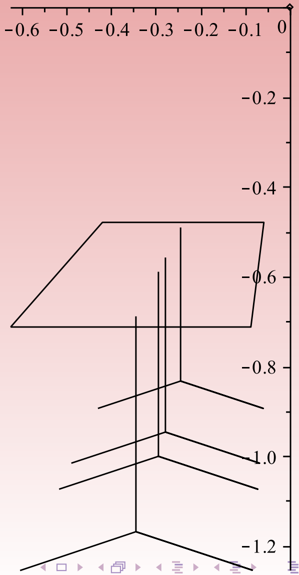


Table 3, with wheels



Results - Perspective Image of Classroom

Table 4:

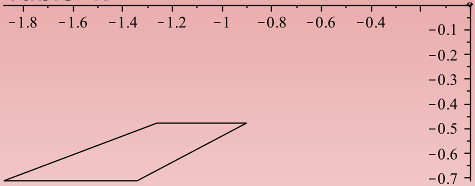
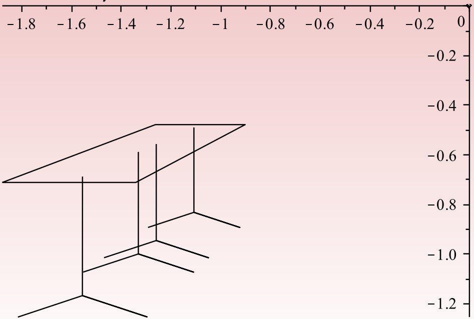


Table 4, with wheels



Results - Perspective Image of Classroom

Table 5:

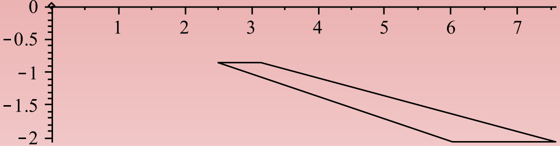
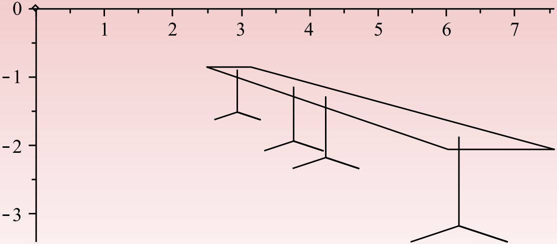


Table 5, with wheels



Results - Perspective Image of Classroom

Table 6:

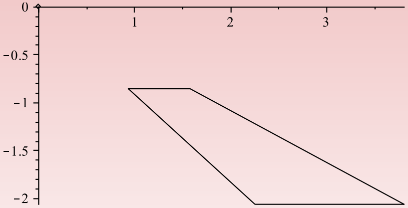
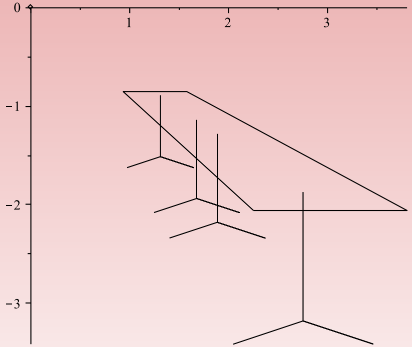


Table 6, with wheels



Results - Perspective Image of Classroom

Table 7:

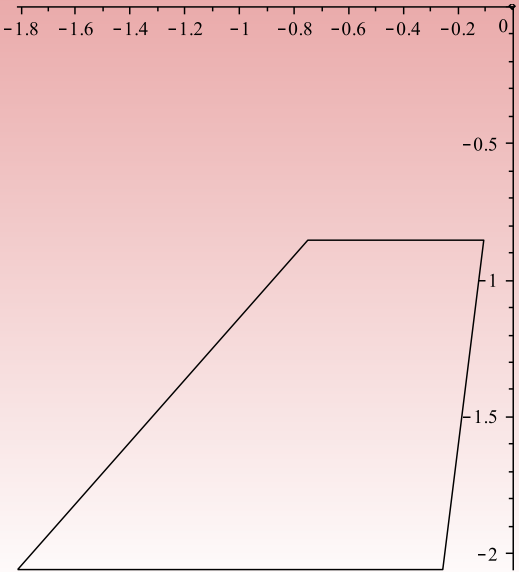
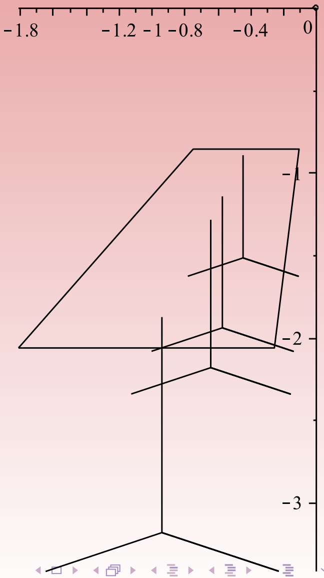


Table 7, with wheels



Results - Perspective Image of Classroom

Table 8:

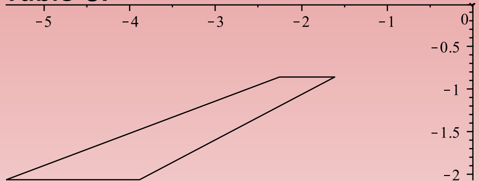
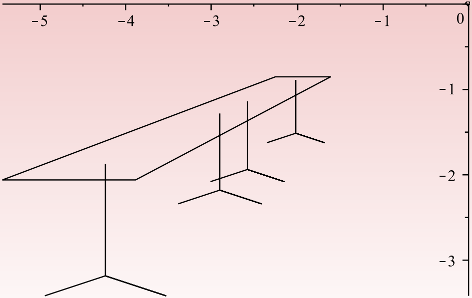
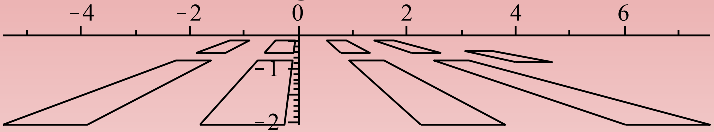


Table 8, with wheels

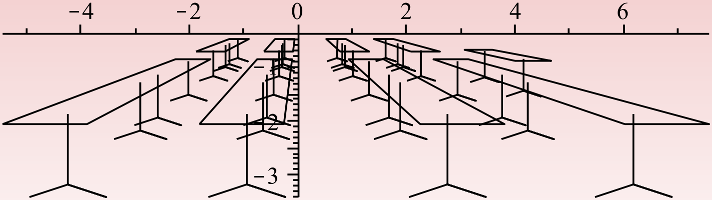


Results - Perspective Image of Classroom

All the Table Tops Together

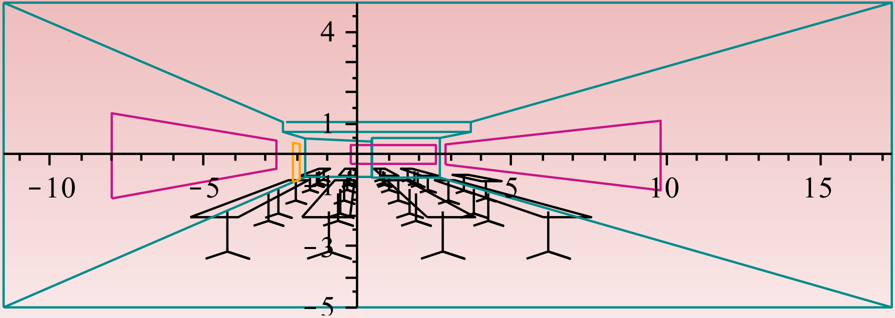


All the Tables



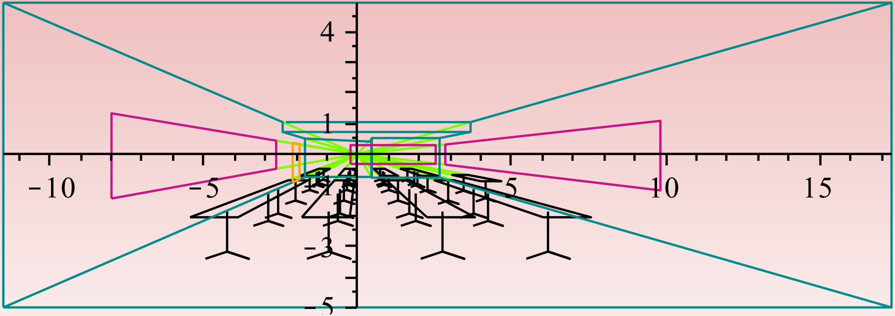
Results - Perspective Image of Classroom

The Whole Room



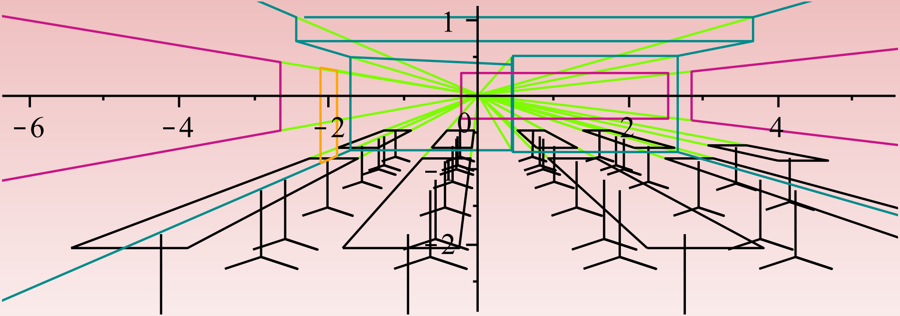
Results - Perspective Image of Classroom

If we extend all lines representing lines in the actual classroom perpendicular (orthogonal) to the picture-plane, what happens?



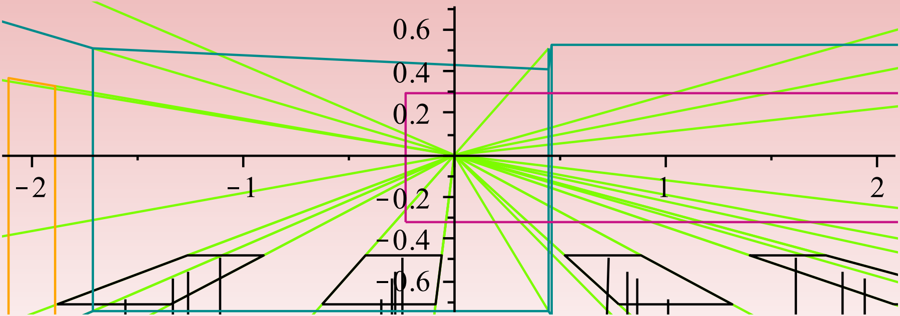
Results - Perspective Image of Classroom

If we extend all lines representing lines in the actual classroom perpendicular (orthogonal) to the picture-plane, what happens?



Results - Perspective Image of Classroom

If we extend all lines representing lines in the actual classroom perpendicular (orthogonal) to the picture-plane, what happens?



Results - Perspective Image of Classroom

If we extend all lines representing lines in the actual classroom perpendicular (orthogonal) to the picture-plane, what happens?