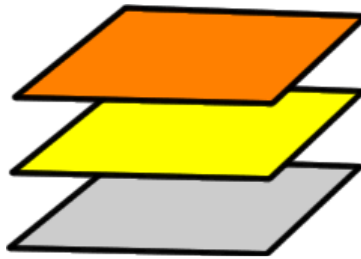


Drawings to accompany solutions to “More exercises for Section II.1”

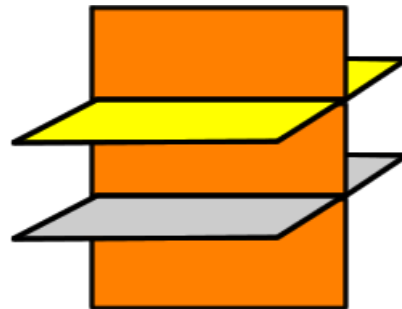
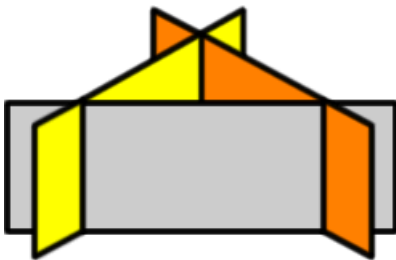
J4. Here are pictures of examples where the intersection of three planes is empty, a single point or a line. These are either identical or very close to the examples described in the file of solutions for the exercises.

Case 1. *The intersection is empty.*



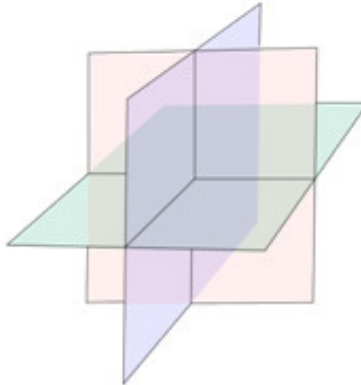
(Source: <http://www.coolmath.com/algebra/13-3x3-systems-of-equations/03-freaky-things-that-can-happen-01.htm>)

The examples in the given solution are three mutually parallel horizontal planes. However, as the next drawings indicate, it is also possible for the intersection of three planes to be empty even though each pair of planes in the family has a nonempty intersection, or for exactly one pair to be parallel.



(Same source as for the previous drawing)

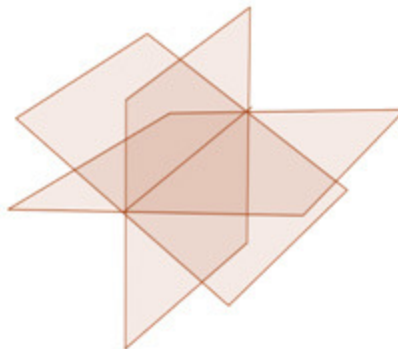
Case 2. *The intersection is a single point.*



(Source: <http://www.worthattention.com/Three-in-One-Page-8.html>)

One can think of the three planes in this drawing as being the xy -, yz - and xz - planes respectively, and for this example the intersection point is the origin.

Case 3. *The intersection is a single line.*



(Same source as for the previous drawing)

In this drawing one can think of the planes as being the xz - plane, the xz - plane, and the plane defined by the equation $x + z = 0$. The intersection will then be the y - axis, which is defined by the equations $x = z = 0$.