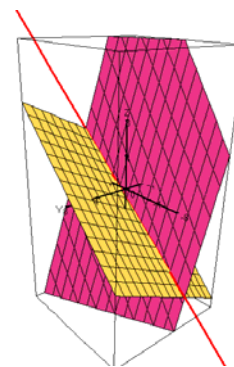


## 2. Line of Intersection of Two Planes

Visually verifying the line of intersection of two planes is another early topic where I get my students used to using the CalcPlot3D applet themselves. Below is an example of this type of problem:



### Exercise:

- a. Determine the line of intersection of the following two planes. Write the parametric equations for this line, showing all work.

$$2x + y - 2z = 5 \quad \& \quad 3x - 6y - 2z = 15$$

- b. Use the CalcPlot3D applet to display these two planes. To do this, solve each planar equation for  $z$ , and enter them in Functions 1 and 2 on the left side of the 3D plot window. Zoom out a couple times (if necessary) until you can see both planes along with their intersection. Now add the line of intersection. (To do this, choose **Add a Space Curve** from the **Graph** menu, and enter the parametric equations for the line.) Rotate the 3D view to verify that your line is indeed the intersection of the two planes. Rotate until you have a good view of the two planes and the line of intersection. Use the **Print Graph** menu option on the **File** menu at the top left corner of the applet to print out your resulting view and hand this printout in with this assignment.

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Answer             $x = 3 + 14t$             Here are the plane equations, solved for  $z$ :  
Line:             $y = -1 + 2t$                              $z = (2x + y - 5)/2$   
                     $z = 15t$                              $z = (3x - 6y - 15)/2$

## Intersections of Other Types of Surfaces

See my paper on this topic online in the Proceedings of AMATYC 2010:  
<http://www.amatyc.org/Events/conferences/2010Boston/proceedings.html>

The direct link to this paper is:

<http://www.amatyc.org/Events/conferences/2010Boston/proceedings/seeburger1.pdf>

It includes two examples of this type of problem along with steps to follow to visually verify the solutions using CalcPlot3D.