Math 3592H   **Honors Mathematics I**   **Fall Semester 2012**

Assignment 3 - Due Thursday 9/27/2012

Read: Hubbard and Hubbard Section 1.5, probably only to page 92.

Exercises:
Hand in only the exercises which have stars by them.

Further questions on Section 1.4: 11, 16*, 17

Let P1 be the plane x + 2y + 3z = 4 and let P2 be the plane x - y + z = 6.

1. Find the angle between P1 and P2.
2*. Find a vector which has the same direction as the line of intersection of P1 and P2.
3*. Find the equations of the line of intersection of P1 and P2 in the form
(x-a)/u = (y-b)/v = (z-c)/w
4*. Find the shortest distance from the point (1,1,1) to the plane P1.
5*. Find the equation for the plane which passes through the point (2,3,5) and is perpendicular to
the vector (-1,4,1).
6. Find the shortest distance between the line x-1 = 2y-4 = z+1 and the line 3x+1 = y-1 = 2z-1.

Section 1.5: 1, 2, 3, 4*, 5, 6*.

Comments:
The extra questions numbered 1 - 6 above are of a kind which is not covered in the text book, but
this type of material does appear in other calculus texts; for example I happen to know there is a
book by Simmons which does this material and also the book on Multivariable Calculus by
Trotter and Williamson does it. They can all be done with dot and cross products and without
minimization techniques. It is also possible to do questions like 'Find the shortest distance ...' by
setting up a distance function and minimizing it by setting the derivative equal to zero. My
intention is that you should not do these problems this way here. I want you instead to get
practice in how the dot and cross products may be used. The questions also give you practice in
recognizing the various forms that equations of lines and planes can take.