Assignment II Math 2010 Prof. Y. Kwong Date

1. Find the equation of the plane through the point $(3,2,-1)$ and $(1,-1,2)$ which is parallel to the line $\frac{x-1}{3} = \frac{y+1}{2} = \frac{z}{-2}$

2. Find the parametric form of the line through the point $P(3,-1,2)$ and is perpendicular to the line $\frac{x-1}{2} = \frac{y+1}{-1} = \frac{z}{3}$

3. Find the equation of the sphere centered at the point $P(-1,3,2)$ which touches the plane $2x-3y+4z-5=0$

4. If $A_1x+B_1y+C_1z+D_1=0$ and $A_2x+B_2y+C_2z+D_2=0$ are two distinct planes intersecting along a line, what is the graph of those points which satisfy the equation

$$A_1x+B_1y+C_1z+D_1+k(A_2x+B_2y+C_2z+D_2)=0$$ where k is a constant.

5. Find out the set of the points where the 3 planes $7x-2y-2z-5=0$, $3x+2y-3z-10=0$ and $7x+2y-5z-16=0$ intersect with each other, describe the set or show that they don't intersect at all.

6. At time $t=0$, a projectile is being launched from the point $(1,2,1)$ in the East direction making an angle of $60°$ with the horizontal. Under the influence of an air current, it causes the projectile to have an accelration in the NE direction of $40\ ft/sec^2$ apart from gravitational influence. If the launching speed of the projectile is $60\ ft/sec$, predict $\vec{r}(t)$, the trajectory of the projectile. We assume the convention that the x-axis is pointing in the East direction, the y-axis in the North direction and the z-axis points vertically up (you may also assume the gravitational acceleration to be $32\ ft/sec^2$).

7. Let A, B, C and D be any 4 points in space, give a condition for A, B, C and D to be coplanar (i.e. lying on the same plane).