

Written Assignment #1

This assignment below is to handed in at the BEGINNING OF CLASS, Monday, October 6, 2014. **Work separately on the assignment.**

1. Let l_1 be the line determined by $(2,1,3)$ and $(1,2,-1)$ and let l_2 be the line determined by $(0,2,3)$ and $(-1,1,2)$. Is l_1 parallel to l_2 ? Explain your answer.
2. Prove that for any two vectors $\mathbf{u}$ and $\mathbf{v}$ in $\mathbf{R}^2$ or $\mathbf{R}^3$, $\|\mathbf{u} + \mathbf{v}\|^2 + \|\mathbf{u} - \mathbf{v}\|^2 = 2\|\mathbf{u}\|^2 + 2\|\mathbf{v}\|^2$.
3. Find the parametric equations of the line through the origin that is perpendicular to both $\mathbf{u} = (-1,2,3)$ and $\mathbf{v} = (2,0,1/2)$.
4. Find the distance from the point $P(1,-1,1)$ to the line $\mathbf{x}(t) = (0,2,1) + t(1,1,1)$, and the closest point on the line to point P .
5. Show that the three planes $x + y + z = 2$, $-x - y + 4z = 3$ and $x + y + 2z = 3$ intersect in a line, and find the equation of that line.