Calc 3 - Assignment 4

Note Title 9/14/2011

(1) Find the parametric equation of the lines

a) through $(6,-5,2)$ parallel to $3i+2j-\vec{k}$

b) through $(1,2,3)$ and $(-4,3,0)$

c) through $(1,9,6)$ parallel to the line

$\ell(t) = \langle 1+2t, 3+4t, 5+6t \rangle$

d) through $(2,1,0)$, perpendicular to both $i+j$ and $j+k$

(2) Find the parametric equation in $\mathbb{R}^2$ of a line through $(-2,4)$ and $(3,9)$. Then find the traditional slope-intercept equation of the same line. Then come up with a hypothesis relating the parametric equation $\ell(t) = P + t\vec{v}$ with the slope of $y = mx+b$. Find the slopes of $\ell_1(t) = \langle 2,3 \rangle + t\langle 2,6 \rangle$ and $\ell_2(t) = \langle 1+3t, 4+12t \rangle$.

(4) If $\ell(t) = \langle -1-2t, 3t, 1+4t \rangle$. Is $\langle -3, 3, 5 \rangle$ on that line? How about $\langle 1, -3, 1 \rangle$

(5) If two lines in $\mathbb{R}^2$ are not parallel, do they have to intersect? How about two non-parallel lines in $\mathbb{R}^3$?

(6) Can one line in $\mathbb{R}^2$ have <u>two different</u> parametric equations? Give examples.

7) Find the scalar equation for the following planes
a) Through $P(-1,0,1)$, $Q(2,3,1)$, $R(1,1,0)$
b) Through origin and parallel to $x+y+z=15$

Is $P(0,3,-2)$ on plane $5x+6y+9z=0$? How

8) Find the point of intersection of the lines
$l_1(t) = \langle 1,1,0\rangle + t\langle 1,-1,2\rangle$ and $l_2(s) = \langle 2,0,2\rangle + s\langle -4,4,0\rangle$

9) Which of these planes are parallel:
plane$_1$: $4x-2y+6z=3$ plane$_2$: $4x-2y-2z=6$
plane$_3$: $-6x+3y-9z=5$ plane$_4$: $z=2x-y-3$

10) Equation of line through $(1,0,6)$ and perpendicular to the plane $x+3y+z=5$