① Find the parametric equation of the line

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

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 $\vec{i} + \vec{j}$ and $\vec{j} + \vec{k}$

③ 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 $\mathbb{R}^3$ have two different parametric

equations? Give examples.