Quiz 2   Calculus 3   9/9/2011

Each problem is worth 5 points. Clear and complete justification is required for full credit.

1. Find an equation for the line passing through the points (3,–2,0) and (7,1,–5).

$v = t \langle 7 + t \quad 7$

To go from $(3,-2,0)$ to $(7,1,-5)$ the vector is $\langle 4, 3, -5 \rangle$

so the equation is,

$\langle x, y, z \rangle = t \langle 4, 3, -5 \rangle + \langle 3, -2, 0 \rangle$

parametric equations:

$x(t) = 4t + 3$
$y(t) = 3t - 2$
$z(t) = -5t$

Excellent!

2. Find an equation for the plane passing through the points (1,0,0), (0,5,0), and (1,5,3).

from $(1, 0, 0)$ to $(0, 5, 0) = \langle -1, 5, 0 \rangle$
from $(1, 0, 0)$ to $(1, 5, 3) = \langle 0, 5, 3 \rangle$
in order to find equation, we must find normal vector by doing cross product of these:

$\langle -1, 5, 0 \rangle \times \langle 0, 5, 3 \rangle = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ -1 & 5 & 0 \\ 0 & 5 & 3 \end{vmatrix} = \langle 15, +3, -5 \rangle = $ normal vector

Using the formula for equation of a plane we get:

$0 = \langle 15, 3, -5 \rangle \cdot (\langle x, y, z \rangle - \langle 1, 0, 0 \rangle)$

$= 15(x-1) + 3(y) - 5z$

$15 = 15x + 3y - 5z$

Great!