Quiz 2 **Calculus 3** **9/15/2006**

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

1. Find parametric equations for the line through the points (6,1,-3) and (2,4,5).

parametric: $x = x_0 + at$
$y = y_0 + bt$
$z = z_0 + ct$

For line that is described by vector $\langle a, b, c\rangle$ and passes through point (x_0, y_0, z_0).

$(x_0, y_0, z_0) = (6,1,-3)$ or $(2,4,5)$.

$\langle a, b, c\rangle = (6,1,-3) - (2,4,5) = \langle 4, -3, -8\rangle$

So, parametric equations are: $\boxed{\begin{aligned} x &= 6 + 4t \\ y &= 1 - 3t \\ z &= -3 - 8t \end{aligned}}$

Great

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

pt (0,0,0)

$$\begin{vmatrix} i & j & k \\ 1 & -2 & 3 \\ 5 & 1 & 3 \end{vmatrix} = [i(-2)(3) + j(3)(5) + k(1)(1)] - [5(-2)(k) + (1)(3)(i) + (3)(1)(j)]$$

$$[-6i + 15j + k] - [-10k + 3i + 3j]$$

$$-6i + 15j + k + 10k - 3i - 3j$$

$$-9i + 12j + 11k = \langle -9, 12, 11\rangle \leftarrow \text{vector normal to plane}$$

$$\langle -9, 12, 11\rangle \cdot (\langle x, y, z\rangle - \langle 0, 0, 0\rangle) = 0$$

$$\langle -9, 12, 11\rangle \cdot \langle x, y, z\rangle = 0$$

Great!

$$-9x + 12y + 11z = 0$$