Fake Quiz 1 Calculus 3 9/2/2009

Each problem is worth 0 points. In the event of an actual quiz, you would have received warning.

1. Write an equation for the plane parallel to the plane $-3x + 2y - 5k = 14$ and passing through the point (2,7,0).

The given plane has normal vector $\vec{n} = \langle -3, 2, -5 \rangle$, so a plane with this normal through (2,7,0) is

$$-3(x-2) + 2(y-7) - 5(z-0) = 0$$

or

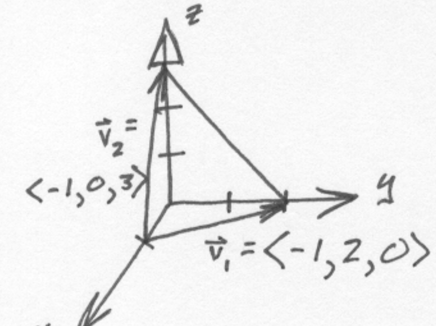
$$-3x + 6 + 2y - 14 - 5z = 0$$
$$-3x + 2y - 5z = 8$$

2. Write a vector equation for the line perpendicular to the plane $-3x + 2y - 5k = 14$ and passing through the point (2,7,0).

The given plane has normal vector $\vec{n} = \langle -3, 2, -5 \rangle$, so this will be a direction vector for the desired line. Then a vector equation for the line is

$$\langle x, y, z \rangle = \langle -3, 2, -5 \rangle t + \langle 2, 7, 0 \rangle$$

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



The cross product of the two vectors shown (both in the plane) will be normal to the plane.

$$\vec{n} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ -1 & 2 & 0 \\ -1 & 0 & 3 \end{vmatrix} = (6\vec{i} + 0\vec{j} + 0\vec{k}) - (0\vec{i} + -3\vec{j} + -2\vec{k})$$
$$= \langle 6, 3, 2 \rangle$$

So we want a plane with normal $\langle 6,3,2 \rangle$ passing through points like (1,0,0), so the equation

$$6(x-1) + 3(y-0) + 2(z-0) = 0$$

should do.