1. Find an equation of the plane through $P_0(2, 4, 5)$ perpendicular to the line 

$$x = 5 + t, \quad y = 1 + 3t, \quad z = 4t$$

Here the line has direction vector $\hat{i} + 3\hat{j} + 4\hat{k}$ (from the coefficients of $t$) and that is perpendicular to the plane and so it can serve as a normal to the plane. The plane is therefore $(x - 2) + 3(y - 4) + 4(z - 5) = 0$ or $x + 3y + 4z = 34$

2. Sketch the surfaces in Parts (a) and (b)

(a) $x^2 + 4z^2 = 16$

There is no $y$ and so this is a cylinder surface. This is the equation of an ellipse in the plane $y = 0$ and so the surface is an elliptic cylinder centered on the $y$-axis.
(7) (b) $4y^2 + z^2 - 4x^2 = 4$

This is an elliptic hyperboloid of one sheet centered on the $x$ axis.

Note the axes are rotated from the usual but they still obey the right hand rule.