12.5, number 1: **Find parametric equations for the line through the point $P = (3, -4, 1)$ parallel to the vector $\vec{v} = \vec{i} + \vec{j} + \vec{k}$.**

Answer: There is a picture on the next page.

If (x, y, z) is on the line, then $\overrightarrow{(3, -4, 1)(x, y, z)} = t(\vec{i} + \vec{j} + \vec{k})$ for some t. So,

$$(x - 3)\,\vec{i} + (y + 4)\,\vec{j} + (z - 1)\,\vec{k} = t\,\vec{i} + t\,\vec{j} + t\,\vec{k}$$

and

$$\boxed{\begin{cases} x = t + 3 \\ y = t - 4 \\ z = t + 1 \end{cases}}$$

Picture 12.5 number 1