

$\mathbf{r}(u, v) = (u + v)\mathbf{i} + (3 - v)\mathbf{j} + (2 + 2u + 4v)\mathbf{k}$
 $= \langle 0, 3, 2 \rangle + u\langle 1, 0, 2 \rangle + v\langle 1, -1, 4 \rangle$. From Example 3, we recognize this is a vector equation of a plane through the point $(0, 3, 2)$ and containing vectors $\mathbf{a} = \langle 1, 0, 2 \rangle$ and $\mathbf{b} = \langle 1, -1, 4 \rangle$. If we wish to find a more conventional equation for the plane, a normal vector to the plane is $\mathbf{a} \times \mathbf{b} =$

$$\begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ 1 & 0 & 2 \\ 1 & -1 & 4 \end{vmatrix} =$$

$$2\mathbf{i} - 2\mathbf{j} - \mathbf{k}$$

and an equation of the plane is $2(x - 0) - 2(y - 3) - (z - 2) = 0$ or $2x - 2y - z = -8$.