

### Quiz 3, section A03 solutions

Find a vector  $\vec{v}$  parallel to the line of intersection of the planes given by the equations:

$$\begin{aligned}2y - 2x - 4z &= 1 \\ 3x - 2y + 2z &= 4\end{aligned}$$

Solution: The normal vectors to these planes are  $\langle -2, 2, -4 \rangle$  and  $\langle 3, -2, 2 \rangle$ . The line of intersection is perpendicular to both normals, so it is parallel to the cross product. So the direction vector is:

$$\begin{aligned}\vec{v} &= \begin{vmatrix} i & j & k \\ -2 & 2 & -4 \\ 3 & -2 & 2 \end{vmatrix} = i(4-8) - j(-4+12) + k(4-6) \\ &= -4i - 8j - 2k \\ &= \langle -4, -8, -2 \rangle\end{aligned}$$