Worked example	Your turn
Find the perpendicular distance from the point with coordinates $(1, -2, 3)$ to the plane with equation $3x - 2y - z = 5$.	Find the perpendicular distance from the point with coordinates $(3, 2, -1)$ to the plane with equation $2x - 3y + z = 5$.
	$$\frac{6}{\sqrt{14}}$$

Worked example	Your turn
The plane Π has vector equation $$\boldsymbol{r} \cdot (2\boldsymbol{i} - 3\boldsymbol{j} - \boldsymbol{k}) = 5$$ Find the perpendicular distance from the point $(2, -12, -23)$ to the plane	The plane Π has vector equation $$\boldsymbol{r} \cdot (3\boldsymbol{i} - 4\boldsymbol{j} + 2\boldsymbol{k}) = 5$$ Find the perpendicular distance from the point $(6, 2, 12)$ to the plane $$\sqrt{29}$$

Worked example	Your turn
The plane Π has equation $r \cdot (2i + 2j + 1k) = 5$. The point P has coordinates $(-2,3,1)$. (a) Find the shortest distance between P and Π.	The plane Π has equation $r \cdot (i + 2j + 2k) = 5$. The point P has coordinates $(1,3,-2)$. (a) Find the shortest distance between P and Π. $$\dfrac{2}{3}$$

Worked example

The plane Π has equation $r \cdot (2i + 2j + 1k) = 5$.
The point P has coordinates $(-2, 3, 1)$.
The point Q is the reflection of the point P in Π.
Find the coordinates of point Q.

Your turn

The plane Π has equation $r \cdot (i + 2j + 2k) = 5$.
The point P has coordinates $(1, 3, -2)$.
The point Q is the reflection of the point P in Π.
Find the coordinates of point Q.

$$\left(\frac{12}{9}, \frac{35}{9}, -\frac{10}{9} \right)$$

Worked example	Your turn
The line l_1 has equation $\frac{x-2}{-2} = \frac{y-4}{2} = \frac{z+6}{-1}$.	The line l_1 has equation $\frac{x-2}{2} = \frac{y-4}{-2} = \frac{z+6}{1}$.
The plane Π has equation $x - 3y + 2z = 8$.	The plane Π has equation $2x - 3y + z = 8$.
The line l_2 is the reflection of line l_1 in the plane Π.	The line l_2 is the reflection of line l_1 in the plane Π.
Find a vector equation of the line l_2.	Find a vector equation of the line l_2.
	$$\begin{pmatrix} 6 \\ 0 \\ -4 \end{pmatrix} + t \begin{pmatrix} 8 \\ -19 \\ 4 \end{pmatrix}$$