**Self-assessment: 14 Lines and planes in space**

**1.** Line l1 passes through points with coordinates (4, 0, 3) and (5, −1, 1). Line l2 has equation 

(a) Find the equation of l1.

(b) Determine whether l1 and l2 intersect, and if so, at what point.

*(accessible to students on the path to grade 3 or 4) [8 marks]*

**2.** (a) Find the angle between the planes with Cartesian equations 4*x* + *y* – 2*z* = 6 and *x* – *y* = 2.

(b) Find the vector equation of the line of intersection of the two planes.

*(accessible to students on the path to grade 5 or 6) [8 marks]*

**3.** The line l has equation . Point D has coordinates (5, 3, 4).

(a) Show that the point A(5, −1, −3) lies on line l.

*(accessible to students on the path to grade 3 or 4)*

(b) Evaluate .

(c) Hence, or otherwise, find the Cartesian equation of the plane containing the line l and point D.

(d) Find the coordinates of point P on l such that DP is perpendicular to l.

*(accessible to students on the path to grade 5 or 6)*

*[14 marks]*