Advanced Higher Maths
SQA 2019 Paper
Question 15

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Maths.scot

The equations of two planes are given below.

$$\pi_1 : \ 2x - 3y - z = 9$$
$$\pi_2 : \ x + y - 3z = 2$$

(a) Verify that the line of intersection, L_1, of these two planes has parametric equations

$$x = 2\lambda + 3$$
$$y = \lambda - 1$$
$$z = \lambda$$

2

(b) Let π_3 be the plane with equation $-2x + 4y + 3z = 4$.

Calculate the acute angle between the line L_1 and the plane π_3. 3

(c) L_2 is the line perpendicular to π_3 passing through P(1, 3, −2).

Determine whether or not L_1 and L_2 intersect. 4

Answers:

(a) $x = 2\lambda + 3;\ y = \lambda - 1;\ z = \lambda$

(b) any answer which rounds to 0·229 or 13°

(c) The lines do not intersect. See marking instructions for details.