



(c) The plane  $\Pi_2$  has equation  $3x + 2y - z = 14$ .

Find a vector equation of the line of intersection of  $\Pi_1$  and  $\Pi_2$ .

[4]



(c) Find an equation for the common perpendicular to the lines  $OC$  and  $AB$ .

[8]

Handwriting practice lines (dotted lines) for the letter 'd'.

**4** The points  $A, B, C$  have position vectors

$$3\mathbf{i} + 5\mathbf{j} + 5\mathbf{k}, \quad 2\mathbf{i} + 2\mathbf{j} + 2\mathbf{k}, \quad 2\mathbf{i} + \mathbf{j} - \mathbf{k},$$

respectively, relative to the origin  $O$ .

(a) Find the equation of the plane  $ABC$ , giving your answer in the form  $ax + by + cz = d$ . [5]

Handwriting practice paper with 20 horizontal dotted lines for tracing and writing.

**(b)** The point  $D$  has position vector  $\mathbf{i} - \mathbf{j} + 3\mathbf{k}$ .

Find the shortest distance between the lines  $AB$  and  $CD$ .

[5]

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**6** The points  $A, B, C$  have position vectors

$$\mathbf{i} - 2\mathbf{k}, \quad \mathbf{i} + 2\mathbf{j} + 2\mathbf{k}, \quad 2\mathbf{i} - \mathbf{j} - \mathbf{k},$$

respectively.

- (a) Find the equation of the plane  $ABC$ , giving your answer in the form  $ax + by + cz = d$ . [5]

[illegible]

A point  $D$  has position vector  $\mathbf{i} + t\mathbf{k}$ , where  $t \neq -2$ .

- (b) Find the acute angle between the planes  $ABC$  and  $ABD$ . [4]

[illegible]

**(c)** Find the values of  $t$  such that the shortest distance between the lines  $AB$  and  $CD$  is  $\sqrt{2}$ .

[7]

[illegible]



Name:

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- (a) Find a Cartesian equation of  $\Pi$ , giving your answer in the form  $ax + by + cz = d$ . [4]

[illegible]

The point  $P$  has position vector  $4\mathbf{i} + 2\mathbf{j} + 9\mathbf{k}$ .

- (b) Find the position vector of the foot of the perpendicular from  $P$  to  $\Pi$ . [4]

[illegible]

(c) The line  $l$  is parallel to the vector  $3\mathbf{i} + 5\mathbf{j} - \mathbf{k}$ .  
Find the acute angle between  $l$  and  $\Pi$ . [3]