

## REVIEW SET 16C

- 1 a**  $14x + 29y - 4z = 32$    **b**  $\approx 55.9^\circ$    **c**  $r = \frac{2 \pm \sqrt{10}}{2}$
- 2 a** They do not meet, the line is parallel to the plane.   **b**  $\frac{16}{\sqrt{14}}$  units
- 3 a**  $\mathbf{n} = \begin{pmatrix} 5 \\ -1 \\ 3 \end{pmatrix}$    **b**  $D(-1, -1, 2)$    **c**  $(\frac{1}{6}, \frac{5}{6}, \frac{2}{3})$
- 4**  $\frac{31}{\sqrt{110}}$  units   **5 a** intersecting   **b**  $\cos \theta = \frac{10}{3\sqrt{14}}$
- 6 a**  $\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 2 \\ -1 \\ 3 \end{pmatrix} + t \begin{pmatrix} -2 \\ 2 \\ -4 \end{pmatrix}, t \in \mathbb{R}$
- b**  $(2 - \frac{2}{\sqrt{6}}, -1 + \frac{2}{\sqrt{6}}, 3 - \frac{4}{\sqrt{6}})$  and  $(2 + \frac{2}{\sqrt{6}}, -1 - \frac{2}{\sqrt{6}}, 3 + \frac{4}{\sqrt{6}})$
- 7**  $4x + 2y + z = 3, \approx 64.1^\circ$
- 8 a**  $\begin{pmatrix} \sqrt{3} \\ -\sqrt{3} \\ \sqrt{3} \end{pmatrix}$  and  $\begin{pmatrix} -\sqrt{3} \\ \sqrt{3} \\ -\sqrt{3} \end{pmatrix}$
- b**  $\frac{1}{\sqrt{74}}\mathbf{i} + \frac{8}{\sqrt{74}}\mathbf{j} + \frac{3}{\sqrt{74}}\mathbf{k}$  or  $-\frac{1}{\sqrt{74}}\mathbf{i} - \frac{8}{\sqrt{74}}\mathbf{j} - \frac{3}{\sqrt{74}}\mathbf{k}$
- c**  $k = -7$  or  $11$
- 9**  $\approx 26.4^\circ$    **10 a**  $\overrightarrow{PQ} = \begin{pmatrix} 5 \\ -2 \\ -4 \end{pmatrix}$    **b**  $\approx 41.8^\circ$
- 11 a**  $\overrightarrow{OM} = \frac{1}{2}(\overrightarrow{OB} + \overrightarrow{OC})$    **d**  $2:1$
- 12 a**  $A(2, -1, 0)$    **c**  $\mathbf{r} = \begin{pmatrix} 0 \\ -3 \\ 2 \end{pmatrix} + u \begin{pmatrix} 3 \\ 1 \\ -4 \end{pmatrix}$    **d**  $3x - y + 2z = 7$
- e**  $\sqrt{14}$  units<sup>2</sup>   **f** normal is  $\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 3 \\ -2 \\ -2 \end{pmatrix} + \lambda \begin{pmatrix} 3 \\ -1 \\ 2 \end{pmatrix}$
- g**  $\frac{28}{3}$  units<sup>3</sup>