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General Certificate of Education (A-level)
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Mathematics MFP4

(Specification 6360)

Further Pure 4

Final

Mark Scheme

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Key to mark scheme abbreviations

M	mark is for method
m or dM	mark is dependent on one or more M marks and is for method
A	mark is dependent on M or m marks and is for accuracy
B	mark is independent of M or m marks and is for method and accuracy
E	mark is for explanation
√or ft or F	follow through from previous incorrect result
CAO	correct answer only
CSO	correct solution only
AWFW	anything which falls within
AWRT	anything which rounds to
ACF	any correct form
AG	answer given
SC	special case
OE	or equivalent
A2,1	2 or 1 (or 0) accuracy marks
$-x$ EE	deduct x marks for each error
NMS	no method shown
PI	possibly implied
SCA	substantially correct approach
c	candidate
sf	significant figure(s)
dp	decimal place(s)

No Method Shown

Where the question specifically requires a particular method to be used, we must usually see evidence of use of this method for any marks to be awarded.

Where the answer can be reasonably obtained without showing working and it is very unlikely that the correct answer can be obtained by using an incorrect method, we must award **full marks**. However, the obvious penalty to candidates showing no working is that incorrect answers, however close, earn **no marks**.

Where a question asks the candidate to state or write down a result, no method need be shown for full marks.

Where the permitted calculator has functions which reasonably allow the solution of the question directly, the correct answer without working earns **full marks**, unless it is given to less than the degree of accuracy accepted in the mark scheme, when it gains **no marks**.

Otherwise we require evidence of a correct method for any marks to be awarded.

Q	Solution	Marks	Total	Comments
1	$\mathbf{n}_1 = \begin{bmatrix} 1 \\ 2 \\ 2 \end{bmatrix} \quad \mathbf{n}_2 = \begin{bmatrix} p \\ 3 \\ 0 \end{bmatrix}$			
	$\mathbf{n}_1 \cdot \mathbf{n}_2 = p+6$	B1		$\mathbf{n}_1 \cdot \mathbf{n}_2$ correct
	$\lvert \mathbf{n}_1 \rvert = \sqrt{1^2+2^2+2^2} = 3$			
	$\lvert \mathbf{n}_2 \rvert = \sqrt{p^2+9}$			
	Using $\mathbf{a}\cdot\mathbf{b} = \lvert\mathbf{a}\rvert\lvert\mathbf{b}\rvert\cos\theta$: $'their'\ p+6 = (3)\left(\sqrt{p^2+9}\right)\left(\frac{2}{3}\right)$	M1A1		forming an equation using scalar product
	$\Rightarrow (p+6)^2 = 4p^2+36$ $p^2+12p+36 = 4p^2+36$ $0 = 3p(p-4)$	m1		correctly forming and attempting to solve their quadratic equation
	$p \neq 0 \Rightarrow p = 4$	A1	5	$p = 4$ stated clearly (must reject p=0)
	Total		**5**	
2(a)	$\det \mathbf{A}^{-1} = -3 \Rightarrow \det \mathbf{A} = -\frac{1}{3}$	B1	1	
(b)	$\det(\mathbf{AB}) = 24 \Rightarrow \det \mathbf{B} = \frac{24}{\det \mathbf{A}} = -72$	M1 A1F		M1 for use of det($\mathbf{AB}$) = det $\mathbf{A}$ × det $\mathbf{B}$ A1F ft their det$\mathbf{A}$
	Volume = $20 \times 72 = 1440\,\text{cm}^3$	A1cso	3	Must be positive
	Total		**4**	
3(a)	$(\mathbf{a}-4\mathbf{b})\times(\mathbf{a}+3\mathbf{b}) = \mathbf{a}\times\mathbf{a} - 4\mathbf{b}\times\mathbf{a} + 3\mathbf{a}\times\mathbf{b} - 12\mathbf{b}\times\mathbf{b}$	M1		Three terms correct
	$= -4\mathbf{b}\times\mathbf{a} + 3\mathbf{a}\times\mathbf{b}$	A1		$\mathbf{b}\times\mathbf{b} = \mathbf{a}\times\mathbf{a} = \mathbf{0}$ — correct use
	$= 7\mathbf{a}\times\mathbf{b}$	A1cso	3	$7\,\mathbf{a}\times\mathbf{b}$ or $-7\,\mathbf{b}\times\mathbf{a}$
(b)	$\mathbf{a} \perp \mathbf{b} \Rightarrow \sin\theta = 1$ $\Rightarrow \lvert \mathbf{a}\times\mathbf{b} \rvert = \lvert\mathbf{a}\rvert\lvert\mathbf{b}\rvert$	M1		Use of sin θ = 1 to simplify
	$\Rightarrow \lvert(\mathbf{a}-4\mathbf{b})\times(\mathbf{a}+3\mathbf{b})\rvert = 7\lvert\mathbf{a}\rvert\lvert\mathbf{b}\rvert$ $\lambda = 7$	A1F	2	Should match 'their' 7
	Total		**5**	

Q	Solution	Marks	Total	Comments
4(a)	$\mathbf{A}^2 = \begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{bmatrix}\begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{bmatrix}$			
	$= \begin{bmatrix} -1 & -2 & -4 \\ 5 & 6 & 4 \\ 10 & 10 & 9 \end{bmatrix}$ $p = -1$	B1		p-value
	$q = 10$	B1	2	q-value
(b)	$\mathbf{A}^3 - 6\mathbf{A}^2 + 11\mathbf{A} - 6\mathbf{I} = \mathbf{0}$ multiply by $\mathbf{A}^{-1}$	M1		Multiplication by $\mathbf{A}^{-1}$
	$\left(\mathbf{A}^3 - 6\mathbf{A}^2 + 11\mathbf{A} - 6\mathbf{I}\right)\mathbf{A}^{-1} = (\mathbf{0})\mathbf{A}^{-1}$			
	$\mathbf{A}^3\mathbf{A}^{-1} - 6\mathbf{A}^2\mathbf{A}^{-1} + 11\mathbf{A}\mathbf{A}^{-1} - 6\mathbf{I}\mathbf{A}^{-1} = \mathbf{0}$			
	$\mathbf{A}^2 - 6\mathbf{A} + 11\mathbf{I} - 6\mathbf{A}^{-1} = \mathbf{0}$			
	$6\mathbf{A}^{-1} = \mathbf{A}^2 - 6\mathbf{A} + 11\mathbf{I}$			
	$\mathbf{A}^{-1} = \frac{1}{6}\left(\mathbf{A}^2 - 6\mathbf{A} + 11\mathbf{I}\right)$	A1	2	**AG**
(c)	$\mathbf{A}^{-1} = \frac{1}{6}\begin{bmatrix} 4 & -2 & 2 \\ -1 & 5 & -2 \\ -2 & -2 & 2 \end{bmatrix}$ $r = 4$	B1		r-value
	$s = -2$	B1	2	s-value
(d)	$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \frac{1}{6}\begin{bmatrix} 4 & -2 & 2 \\ -1 & 5 & -2 \\ -2 & -2 & 2 \end{bmatrix}\begin{bmatrix} k \\ 5 \\ 7 \end{bmatrix}$			
	$= \frac{1}{6}\begin{bmatrix} 4k - 10 + 14 \\ -k + 25 - 14 \\ -2k - 10 + 14 \end{bmatrix} = \frac{1}{6}\begin{bmatrix} 4k + 4 \\ 11 - k \\ 4 - 2k \end{bmatrix}$	M1		use of $\mathbf{A}^{-1}\mathbf{v}$ – one row correct
	$x = \frac{2k+2}{3},\ y = \frac{11-k}{6},\ z = \frac{2-k}{3}$	A1		correct solution for one variable
		A1	3	all correct CAO
	Total		**9**	
(d)	**alternative** If solving equations by elimination, M1 A1 for correct solution for one variable, A1 all correct			

Q	Solution	Marks	Total	Comments
5(a)	$\begin{vmatrix} -2 & 1 & 2k \\ -1 & 1 & k+1 \\ 2 & k-1 & 1 \end{vmatrix} =$			
	$= -2\begin{vmatrix} 1 & k+1 \\ k-1 & 1 \end{vmatrix} + 1\begin{vmatrix} 1 & 2k \\ k-1 & 1 \end{vmatrix} + 2\begin{vmatrix} 1 & 2k \\ 1 & k+1 \end{vmatrix}$	M1		correctly expanding by any row or column
	$= -2\left[1-(k+1)(k-1)\right]+\left[1-2k(k-1)\right]+2\left[k+1-2k\right]$	A1		correct unsimplified expansion of 2×2 determinants
	$= -2\left[1-k^2+1\right]+\left[1-2k^2+2k\right]+2\left[1-k\right]$ $= -4+\cancel{2k^2}+1-\cancel{2k^2}+\cancel{2k}+2-\cancel{2k}$ $= -1$	A1cso		-1 obtained
	either all k's cancel *or* independent of k *etc*	E1	4	comment required (must score previous 3 marks
(b)	Identifying that $k = 2$ Value of determinant $\neq 0$ (or $= -1$ etc) therefore vectors are linearly independent	B1 E1F	2	$k = 2$ ft answer (a) if $0 \Rightarrow$ lin dep
(c)(i)	Identifying that $k = 3$ Value of determinant $\neq 0$ (or $= -1$ etc) therefore equations are consistent	B1 E1F	2	$k = 3$ ft answer (a) if $0 \Rightarrow$ inconsistent
(ii)	3 planes intersect in a unique point	B1	1	
	Total		**9**	
	Alternative for (a):			
	$\begin{vmatrix} -2 & 1 & 2k \\ -1 & 1 & k+1 \\ 2 & k-1 & 1 \end{vmatrix}$ $\begin{matrix} r_1 \to r_1 - 2r_2 \\ r_3 \to r_3 + 2r_2 \end{matrix}$			
	$= \begin{vmatrix} 0 & -1 & -2 \\ -1 & 1 & k+1 \\ 0 & k+1 & 2k+3 \end{vmatrix}$ $r_3 \to r_3 + (k+1)r_1$	(M1)		correctly expanding by any row or column after row operations
	$= \begin{vmatrix} 0 & -1 & -2 \\ -1 & 1 & k+1 \\ 0 & 0 & 1 \end{vmatrix} = -1$	(A1) (A1)		correct expansion unsimplified -1 obtained
	either all k's cancel *or* independent of k *etc*	(E1)	(4)	comment required

Q	Solution	Marks	Total	Comments
6(a)(i)	Reflection	M1		Reflection stated for M1
	In (the plane) $z=0$ (or in the x–y plane)	A1	2	Either version for A1
(ii)	Rotation	M1		Rotation stated.
	About the y-axis	A1		y-axis
	through $\frac{\pi}{3}$ radians	B1	3	(or 60°)
(b)	$T_2\,T_1 = \begin{bmatrix} \frac{1}{2} & 0 & \frac{\sqrt{3}}{2} \\ 0 & 1 & 0 \\ \frac{-\sqrt{3}}{2} & 0 & \frac{1}{2} \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & -1 \end{bmatrix} = \begin{bmatrix} \frac{1}{2} & 0 & \frac{-\sqrt{3}}{2} \\ 0 & 1 & 0 \\ \frac{-\sqrt{3}}{2} & 0 & -\frac{1}{2} \end{bmatrix}$	M1A1	2	M1 correct order of matrices A1 fully correct [N.B $\begin{bmatrix} \frac{1}{2} & 0 & \frac{\sqrt{3}}{2} \\ 0 & 1 & 0 \\ \frac{\sqrt{3}}{2} & 0 & -\frac{1}{2} \end{bmatrix}$ scores M0A0]
(c)(i)	For line of invariants points $\begin{bmatrix} k & 2 & -1 \\ 1 & 1 & 1 \\ 3 & 4 & 1 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$	M1		Set up equations – uses $\mathbf{M}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$
	$\Rightarrow\ kx+2y-z=x \Rightarrow (k-1)x+2y-z=0$ ①			
	$x+y+z=y \Rightarrow x+z=0$ ②	A1		Two equations correct
	$3x+4y+z=z \Rightarrow 3x+4y=0$ ③	A1		All three equations correct
	From ② $z=-x$ From ③ $y=\frac{-3x}{4}$	M1		Defines variables in terms of one letter *or* 2 components in $\begin{bmatrix} 4 \\ -3 \\ -4 \end{bmatrix}$ correct
	Substitute in ① $(k-1)x-\frac{3}{2}x+x=0$ $x\left[k-1-\frac{3}{2}+1\right]=0$ $x\left[k-\frac{3}{2}\right]=0$	A1		Substitution into other equations *or* $\begin{bmatrix} 4 \\ -3 \\ -4 \end{bmatrix}$ correct
	$x\neq 0 \Rightarrow k=\frac{3}{2}$	A1		k-value obtained.
(ii)	Line $x=\frac{-4}{3}y=-z$ $\frac{x}{4}=\frac{y}{-3}=\frac{z}{-4}$	B1cao	7	Or equivalent
	Total		**14**	

Q	Solution	Marks	Total	Comments
	Alternative to 6(c):			
	$\begin{bmatrix} k-1 & 2 & -1 & 0 \\ 1 & 0 & 1 & 0 \\ 3 & 4 & 0 & 0 \end{bmatrix}$	(M1)		Substitute and set up
	$r_1 \to r_1 + r_2$	(A1)		Row operation
	$\begin{bmatrix} k & 2 & 0 & 0 \\ 1 & 0 & 1 & 0 \\ 3 & 4 & 0 & 0 \end{bmatrix}$			
	$r_1 \to r_1 - \frac{1}{2} r_3$	(A1)		Row operation
	$\begin{bmatrix} k-\frac{3}{2} & 2 & 0 & 0 \\ 1 & 0 & 1 & 0 \\ 3 & 4 & 0 & 0 \end{bmatrix} \Rightarrow k = \frac{3}{2}$	(A1)		k-value obtained
	$v = \lambda \begin{pmatrix} 4 \\ -3 \\ -4 \end{pmatrix}$	(M1A1)		M1 obtains v in terms of single vector. A1 correct
	$\frac{x}{4} = \frac{y}{-3} = \frac{z}{-4}$	(B1cao)	(7)	Correct form

Q	Solution	Marks	Total	Comments
7(a)	$\begin{bmatrix} -a & 0 & a \\ 0 & 6 & 0 \\ a & 0 & 2 \end{bmatrix}\begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix} = \begin{bmatrix} 0 \\ 6 \\ 0 \end{bmatrix}$	M1		
	$\Rightarrow \lambda_1 = 6$	A1	2	
(b)	$\begin{bmatrix} -a & 0 & a \\ 0 & 6 & 0 \\ a & 0 & 2 \end{bmatrix}\begin{bmatrix} 1 \\ 0 \\ 2 \end{bmatrix} = \begin{bmatrix} a \\ 0 \\ a+4 \end{bmatrix}$	M1		
	$\begin{bmatrix} a \\ 0 \\ a+4 \end{bmatrix} = \begin{bmatrix} \lambda_2 \\ 0 \\ 2\lambda_2 \end{bmatrix}$ **i** component $\Rightarrow$ $a = \lambda_2$ $\otimes$ **k** component $\Rightarrow a + 4 = 2\lambda_2$			
	using $\otimes$, $a + 4 = 2a$	m1		Eliminating λ_2
	$4 = a$	A1	3	Value of a obtained
(c)	Let $\mathbf{v}_3 = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$			
	$\begin{bmatrix} -4 & 0 & 4 \\ 0 & 6 & 0 \\ 4 & 0 & 2 \end{bmatrix}\begin{bmatrix} x \\ y \\ x \end{bmatrix} = -6\begin{bmatrix} x \\ y \\ z \end{bmatrix}$	M1		Substitute 'their value of a' and attempt to get a system of equations.
	$\Rightarrow -4x + 4z = -6x \Rightarrow x + 2z = 0$ $6y = -6y \quad \Rightarrow y = 0$ $[4x + 2z = -6z \;\Rightarrow\; x + 2z = 0]$	A1F		Both equations "correct" FT their a
	$\mathbf{v}_3 = \begin{bmatrix} -2 \\ 0 \\ 1 \end{bmatrix}$ (or equivalent)	A1cao	3	
(d)	$\mathbf{D} = \begin{bmatrix} 6 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & -6 \end{bmatrix}$	B1F		Diagonal matrix using –6 and "their 4" and "their 6"
	$\mathbf{U} = \begin{bmatrix} 0 & 1 & -2 \\ 1 & 0 & 0 \\ 0 & 2 & 1 \end{bmatrix}$	M1		FT their non-zero $\mathbf{v}_3$ in **U**
		A1cao	3	**U** correct and corresponding to **D**
	Total		**11**	

Q	Solution	Marks	Total	Comments
	Alternative to 7(c) $\begin{bmatrix} -4 & 0 & 4 \\ 0 & 6 & 0 \\ 4 & 0 & 2 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = -6\begin{bmatrix} x \\ y \\ z \end{bmatrix}$ $\Rightarrow \begin{bmatrix} 2 & 0 & 4 \\ 0 & 12 & 0 \\ 4 & 0 & 8 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$			
	$r_3 \to r_3 - 2r_1 \quad \begin{bmatrix} 2 & 0 & 4 \\ 0 & 12 & 0 \\ 0 & 0 & 0 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$	(M1)		Row operations
	$\Rightarrow y = 0 \quad x = -2z$	(A1F)		"correct" FT their a
	$\mathbf{v_3} = \begin{bmatrix} -2 \\ 0 \\ 1 \end{bmatrix}$ (or equivalent)	(A1cao)		

Q	Solution	Marks	Total	Comments
8(a)(i)	$\overrightarrow{AB}=\begin{bmatrix}2\\-1\\3\end{bmatrix}$ $\overrightarrow{AD}=\begin{bmatrix}4\\3\\-1\end{bmatrix}$	B1		either $\overrightarrow{AB}$ or $\overrightarrow{AD}$
	$\begin{vmatrix}\mathbf{i} & 2 & 4\\ \mathbf{j} & -1 & 3\\ \mathbf{k} & 3 & -1\end{vmatrix}=\begin{pmatrix}-8\\14\\10\end{pmatrix}$	M1 A1cao	3	one component of $\overrightarrow{AB}\times\overrightarrow{AD}$ correct all correct
(ii)	Area $ABCD=\left\lvert\overrightarrow{AB}\times\overrightarrow{AD}\right\rvert$ $=\sqrt{8^2+14^2+10^2}$	M1		FT their $\left\lvert\overrightarrow{AB}\times\overrightarrow{AD}\right\rvert$
	$=\sqrt{64+196+100}$ $=\sqrt{360}$ $=\sqrt{36}\sqrt{10}$ $=6\sqrt{10}$	A1cso	2	or $p=6$
(b)	$\overrightarrow{AB}\times\overrightarrow{AD}$ is perpendicular to plane $ABCD$ Hence direction ratios of line $=-8:14:10$	M1		used for $\mathbf{v}$ in vector line equation
	$=-4:7:5$	A1		or any multiple of $\begin{bmatrix}-4\\7\\5\end{bmatrix}$
	M is mid-point of either diagonal $=\left(\frac{1+7}{2},\frac{0+2}{2},\frac{2+4}{2}\right)$ $=(4,1,3)$	B1		mid-point calculation
	Hence line is $\left(\mathbf{r}-\begin{bmatrix}4\\1\\3\end{bmatrix}\right)\times\begin{bmatrix}-4\\7\\5\end{bmatrix}=\begin{bmatrix}0\\0\\0\end{bmatrix}$	A1cso	4	All correct or equivalent multiple of $\begin{bmatrix}-4\\7\\5\end{bmatrix}$

Q	Solution	Marks	Total	Comments
8(c)(i)	Perpendicular vector to $\Pi = \begin{bmatrix} -4 \\ 7 \\ 5 \end{bmatrix}$			
	$\Rightarrow \Pi$ has equation $-4x+7y+5z=c$	M1		ft their perpendicular vector
	Through (6, 5, 17) $\Rightarrow c = -4(6)+7(5)+5(17)$	m1		using (6, 5, 17)
	$= -24+35+85$ $= 96$	A1		
	Equation is $-4x+7y+5z=96$			ACF
	$x=4-4t;\quad y=1+7t;\quad z=3+5t$	B1F		parametric form of line
	Line meets plane when $-4(4-4t)+7(1+7t)+5(3+5t)=96$ $-16+16t+7+49t+15+25t=96$ $90t = 90$ $t = 1$	M1		substitution of parametric form and attempt to solve for t
	$\Rightarrow$ point of intersection = (0, 8, 8)	A1cao	6	correct point of intersection
(ii)	Volume $= \left(\overrightarrow{AB} \times \overrightarrow{AD}\right) \cdot \overrightarrow{AQ}$	M1		Attempt to use formula
	$\overrightarrow{AQ} = \begin{bmatrix} 5 \\ 5 \\ 15 \end{bmatrix}$			
	$\Rightarrow \begin{bmatrix} -8 \\ 14 \\ 10 \end{bmatrix} \cdot \begin{bmatrix} 5 \\ 5 \\ 15 \end{bmatrix} = -40+70+150$	A1F		Follow through $\overrightarrow{AB} \times \overrightarrow{AD}$ from (a)(i). May use $\overrightarrow{BQ}$ etc instead of $\overrightarrow{AQ}$
	$= 180$ (cubic units)	A1cso	3	
	Alternative Vol = Area of base × perp dist	(M1)		Volume formula used
	Perp distance $= \sqrt{(0-4)^2+(8-1)^2+(8-3)^2}$ $= \sqrt{16+49+25}$ $= \sqrt{90}$	(A1F)		Perp distance calculated FT their points or the equation of their plane *or* $\dfrac{\lvert -4\times1+7\times0+5\times2-96\rvert}{\sqrt{(-4)^2+7^2+5^2}} = \sqrt{90}$ etc
	Volume $= 6\sqrt{10}\times\sqrt{90}$ $= 6 \times 30$ $= 180$ (cubic units)	(A1cso)	(3)	
	Total		**18**	
	TOTAL		**75**	

Q	Solution	Marks	Total	Comments
	Alternative to 8(c)(i)			
	$\mathbf{r}=\begin{bmatrix}6\\5\\17\end{bmatrix}+s\begin{bmatrix}2\\-1\\3\end{bmatrix}+t\begin{bmatrix}4\\3\\-1\end{bmatrix}$	(M1)		$\mathbf{r}=\mathbf{a}+s\mathbf{d}_1+t\mathbf{d}_2$ fully correct
	$\begin{vmatrix}i & 2+2s+4t & -4\\ j & 4-s+3t & 7\\ k & 14+3s-t & 5\end{vmatrix}=\begin{bmatrix}0\\0\\0\end{bmatrix}$	(m1) (B1F)		Substitute in $(\mathbf{r}-\mathbf{a})\times\mathbf{b}=\mathbf{0}$ Use of $\mathbf{r}-\mathbf{a}$ in parametric form-simplified
	$-26s+22t=78$ $22s+16t=-66$ $10s+40t=-30$	(A1)		Three correct equations obtained from vector product-terms collected
	$s=-3$, $t=0$	(M1)		Correctly solving equations to get both parameters
	$\begin{bmatrix}0\\8\\8\end{bmatrix}$	(A1)		Correct point of intersection
	Alternative 2 to 8(c)(i)			
	$\mathbf{r}=\begin{bmatrix}6\\5\\17\end{bmatrix}+s\begin{bmatrix}2\\-1\\3\end{bmatrix}+t\begin{bmatrix}4\\3\\-1\end{bmatrix}$	(M1)		$\mathbf{r}=\mathbf{a}+s\mathbf{d}_1+t\mathbf{d}_2$ fully correct
	$\mathbf{r}=\begin{pmatrix}4-4p\\1+7p\\3+5p\end{pmatrix}$	(B1F)		Parametric form of line
	$2s+4t+4p=-2$ $-s+3t-7p=-4$ $3s-t-5p=-14$	(m1)		Equating components, simplifying and attempting to solve-must at least reduce to 2 equations in two unknowns
	$p=2$ $t=0$ and $s=-3$	(M1) (A1)		Solving equations-one parameter correct All values correct
	$\begin{bmatrix}0\\8\\8\end{bmatrix}$	(A1)		Correct point of intersection