Question Number	Scheme	Marks
8	Solves one of $\left(3x-y\right)=25$ and $\left(x+y\right)=1$ or $\left(3x-y\right)=5$ and $\left(x+y\right)=5$	M1
	Correct solution of one. Either $\left.\begin{matrix}3x-y=25\\x+y=1\end{matrix}\right\}\Rightarrow 4x=26\Rightarrow x=6.5,\left(y=-5.5\right)$	A1
	Or $\left.\begin{matrix}3x-y=5\\x+y=5\end{matrix}\right\}\Rightarrow 4x=10\Rightarrow x=2.5,\left(y=2.5\right)$	
	Solves both equations	dM1
	Both solved correctly with a minimal reason given for the contradiction e.g "not integers" with conclusion "hence there are no integers x and y such that $3x^2+2xy-y^2=25$"	A1
		(4)

Notes

M1: Attempts to solve one of the two possible cases.

Take as a minimum, one correct pair of equations followed by a value for x or a value for y

A1: Correctly solves one of the two possible cases.

To solve you need only find a value for x or y. Once a correct value is found you can ISW

dM1: Attempts to solve both possible cases

A1: Correctly solves the two possible cases and makes a concluding argument.

To score this mark (i) **all** calculations must be correct.

(ii) reason(s) for the contradiction must be written down. Allow "not integers", "×"

and (iii) gives a concluding statement must be given. Allow for example " hence proven"

Ignore any possible cases which would give rise to negative numbers but satisfy $\left(3x-y\right)\left(x+y\right)=25$

E.g $\left(3x-y\right)=-5,\left(x+y\right)=-5$

Withhold the final mark only if they include cases which do not satisfy $\left(3x-y\right)\left(x+y\right)=25$

E.g $\left(3x-y\right)=20,\left(x+y\right)=5$

Question Number	Scheme	Marks
9	$\begin{pmatrix} 2-\lambda \\ 8+2\lambda \\ 10+3\lambda \end{pmatrix} = \begin{pmatrix} -4+5\mu \\ -1+4\mu \\ 2+8\mu \end{pmatrix}$ Attempts to solve any two of the three equations Either (1) and (2) $\left.\begin{matrix} 2-\lambda=-4+5\mu \\ 8+2\lambda=-1+4\mu \end{matrix}\right\} \Rightarrow \lambda=-\frac{3}{2}, \mu=\frac{3}{2}$ (1) and (3) $\left.\begin{matrix} 2-\lambda=-4+5\mu \\ 10+3\lambda=2+8\mu \end{matrix}\right\} \Rightarrow \lambda=\frac{8}{23}, \mu=\frac{26}{23}$ (2) and (3) $\left.\begin{matrix} 8+2\lambda=-1+4\mu \\ 10+3\lambda=2+8\mu \end{matrix}\right\} \Rightarrow \lambda=-10, \mu=-\frac{11}{4}$	M1, A1
	Substitutes their values of λ and μ into both sides of the "third" equation E.g. $\lambda=-\frac{3}{2}$ into $10+3\lambda=\frac{11}{2}$ and $\mu=\frac{3}{2}$ into $2+8\mu=14$	dM1
	Concludes that lines don't intersect with correct calculations and minimal reason	A1
	Additionally states that $\begin{pmatrix} -1 \\ 2 \\ 3 \end{pmatrix}$ is not parallel to $\begin{pmatrix} 5 \\ 4 \\ 8 \end{pmatrix}$ with a minimal reason So lines are skew CSO *	A1*
		(5) **(5 marks)**

Notes:
Main method seen
M1: Attempts to solve two of the three equations.
Accept as an attempt, writing down two of the three equations (condoning slips) followed by values for
both λ and μ
A1: Solves two of the three equations to find correct values for both λ and μ, Allow equivalent fractions
dM1: Either: Substitutes their values of λ and μ into both sides of the third equation....or into the equations of both lines to find both coordinates
A1: Having achieved correct values for λ and μ, the values for the third equation are found to enable a comparison to be made. E.g. solving equations (1) and (2) and using equation (3) stating $10+3\times-\frac{3}{2} \neq 2+8\times\frac{3}{2}$ is sufficient. If the values are found they must be correct.
Important: Additionally, to score this mark, a minimal statement must be made that states that the lines do not intersect /cross. Condone statements such as $l_1 \neq l_2$
Stating that the lines are skew at this point is not sufficient to score this mark
In the alternative stating that "as the values are not the same, the lines cannot intersect" is sufficient.

A1*: CSO . Hence all previous marks must have been scored.
In addition to not intersecting there must be a statement, with a minimal reason, that the lines are not parallel and hence skew. Accept statements like, not intersecting, not parallel (with reason), hence proven.