Q	Marking Instructions	Marks	Typical Solution
1.	Identifying y-intercept as -2. Attempt to find gradient using $m = \dfrac{y_2 - y_1}{x_2 - x_1}$. Correct final answer.	B1 M1 A1 3 marks	$c = -2$ $m = \dfrac{18-(-2)}{4-0} = 5$ $\therefore \quad y = 5x - 2$

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2.	Obtains $15x + 6y = 12$ and $8x - 6y = 34$ (allow one numerical slip) or Obtains $20x + 8y = 16$ and $20x - 15y = 85$ (allow one numerical slip) -- Attempt to eliminate one variable and solve for x or y. Obtains $x = 2$ or $y = 3$ (following correct working) Obtains fully correct answer (from fully correct working)	M1 M1 A1 A1 4 marks	$5x + 2y = 4 \quad (1)$ $4x - 3y = 17 \quad (2)$ $(1)\times 3 \quad 15x + 6y = 12 \quad (3)$ $(2)\times 2 \quad 8x - 6y = 34 \quad (4)$ $(3)+(4):$ $23x = 46$ $x = 2$ Substitute $x = 2$ into (1): $5(2) + 2y = 4$ $2y = -6$ $y = -3$

Q	Marking Instructions	Marks	Typical Solution
3.	Correct use of trigonometric ratios. Attempt to rearrange and solve for l. Correct final answer to at least 1 decimal place.	B1 M1 A1 3 marks	$\sin 74° = \frac{2.6}{l}$ $l = \frac{2.6}{\sin 74°}$ $l = 2.70\,\mathrm{m}$

Q	Marking Instructions	Marks	Typical Solution
4. (a)	Attempt to expand brackets on LHS. Collects like terms. Fully correct solution.	M1 M1 A1 3 marks	$4(p+r) = 7r+11$ $4p+4r = 7r+11$ $4p = 3r+11$ $p = \frac{3r+11}{4}$
4. (b)	Attempts to clear the fraction on RHS: $y(x-2) = m+x$. Expands brackets correctly $yx-2y = m+x$. Attempts to collect like terms and factorise. Correct final answer.	M1 A1 dM1 A1 4 marks	$y = \frac{m+x}{x-2}$ $y(x-2) = m+x$ $yx-2y = m+x$ $yx-x = m+2y$ $x(y-1) = m+2y$ $x = \frac{m+2y}{y-1}$

Q	Marking Instructions	Marks	Typical Solution
5.	Attempt to find gradient using $m = \dfrac{y_2 - y_1}{x_2 - x_1}$.	M1	$m = \dfrac{7-2}{8-(-2)} = \dfrac{1}{2}$
	Correctly finds perpendicular gradient from *their* gradient of AB.	M1	$m_\perp = -2$
	Correct final answer in correct form.	A1	$\therefore \quad y = -2x + 7$
		3 marks	$y + 2x - 7 = 0$

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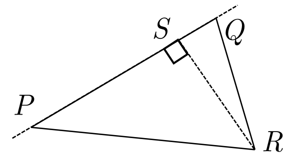
6.	Uses a valid method to combine LHS into a single fraction.	M1	$\dfrac{2}{y+1} + \dfrac{3}{2y-3} = 1$
	Obtains $4y - 6 + 3y + 3 = (y+1)(2y-3)$ (OE)	A1	$\dfrac{2(2y-3)+3(y+1)}{(y+1)(2y-3)} = 1$
	Rearranges their expression to obtain a quadratic equation with one side equal to zero.	dM1	$4y - 6 + 3y + 3 = (y+1)(2y-3)$
	Obtains both correct values.	A1	$7y - 3 = 2y^2 + 2y - 3y - 3$
		4 marks	$0 = 2y^2 - 8y$
			$\therefore \quad y = 0, 4$

Q	Marking Instructions	Marks	Typical Solution
7. (a)	Attempt to find gradient using $m = \dfrac{y_2 - y_1}{x_2 - x_1}$. Obtains $m = \dfrac{1}{2}$. Attempts to form a straight line equation using *their* 'm' and $(-1, 2)$. Correct equation in the correct form.	M1 A1 M1 A1 4 marks	$m_1 = \dfrac{8-2}{11-(-1)} = \dfrac{1}{2}$ Using, $(-1,2)$, $y - 2 = \dfrac{1}{2}(x+1)$ $y = \dfrac{1}{2}x + \dfrac{5}{2}$
7. (b)	Correctly finds perpendicular gradient from *their* gradient of l_1. Correct equation for l_2: $y = -2x + 20$ (OE) Attempt to equate l_1 with l_2 and rearrange to find x-coordinate of intersection. Obtains $x = 7$ Substitutes back in to either equation and obtains $y = 6$, and **explicitly states the coordinate of S**.	M1 A1 M1 A1 A1 5 marks	$m_{\perp} = -2$ For l_2, using $(10,0)$: $y = -2(x-10)$ $y = -2x + 20$ Intersection of l_1 and l_2: $\dfrac{1}{2}x + \dfrac{5}{2} = -2x + 20$ $\dfrac{5}{2}x = \dfrac{35}{2}$ $x = 7$ Using l_1,when $x = 7$, $y = \dfrac{1}{2} \times 7 + \dfrac{5}{2} = 6$. $\therefore \quad S(7,6)$

Q	Marking Instructions	Marks	Typical Solution
7. (c)	Attempt to use Pythagoras' Theorem with *their* R and S. (may be seen as $RS^2 = (10-7)^2 + (0-6)^2$) ***Note: Check working carefully as answer given in question.*** Correct simplified answer (sight of $\sqrt{45}$ not explicitly required)	M1 A1 2 marks	$R(10,0), \quad S(7,6)$ $RS = \sqrt{(10-7)^2 + (0-6)^2}$ $= \sqrt{45}$ $= 3\sqrt{5}$
7. (d)	Identifies that base of triangle is PQ and height is RS (may be in the form of a diagram). Attempts to calculate the length of PQ using Pythagoras' Theorem. Correct value for PQ. Correct value for area.	B1 M1 A1 A1 4 marks	 Height $= RS = 3\sqrt{5}$ Base $= PQ = \sqrt{\left(11-(-1)\right)^2 + \left(8-2\right)^2} = 6\sqrt{5}$ Area $= \frac{1}{2} \times 6\sqrt{5} \times 3\sqrt{5}$ $= 45$

Q	Marking Instructions	Marks	Typical Solution
8	Attempt to find the equation of l using $m=-2$ and $(3,5)$. Attempt to write an expression for the length of AB using A and *their* equation for l. Obtains $AB^2=(x_1-3)^2+(6-2x)^2$ OE ***Note:*** AB^2 ***may be unsimplified, but*** y ***must be eliminated for A1.*** Equates *their* expression for AB^2 with $(6\sqrt{5})^2$ and attempts to solve the resulting quadratic. Both correct x-values found. Both correct coordinates of B found.	M1 M1 A1 dM1 A1 A1 6 marks	$l: \quad y-5=-2(x-3)$ $y=-2x+11$ Define B as (x_1,y_1). $\therefore \quad y_1=-2x_1+11$ $AB^2=(x_1-3)^2+(y_1-5)^2$ $AB^2=(x_1-3)^2+(-2x_1+11-5)^2$ $AB^2=(x_1-3)^2+(6-2x)^2$ $AB^2=x_1^{\ 2}-6x_1+9+36-24x_1+4x_1^{\ 2}$ $AB^2=5x_1^{\ 2}-30x_1+45$ Since $AB^2=\left(6\sqrt{5}\right)^2=180$, $180=5x_1^{\ 2}-30x_1+45$ $0=5x_1^{\ 2}-30x_1-135$ $0=x_1^{\ 2}-6x_1-27$ $\therefore \quad x_1=-3,9$ Using $y=-2x+11$, When $x=-3, \quad y=-2(-3)+11=17$ When $x=9, \quad y=-2(9)+11=-7$ $\therefore$ Possible coordinates of B are $(-3,17)$ and $(9,-7)$

Q	Marking Instructions	Marks	Typical Solution
9. (a)	Attempt to calculate the length of AB using Pythagoras' Theorem. Obtains $AC = \sqrt{10}$ (OE) Attempts to formulate an expression for the length of AB using Pythagoras' Theorem. Equates their AB with their AC. ***Note: Marks are not awarded for simply stating that $AB = 2AC$.*** Simplifies to obtain $p^2 - 10p + 21 = 0$ (OE) Valid attempt to solve *their* quadratic. Obtains $p = 3$ and $p = 7$	M1 A1 M1 dM1 A1 dM1 A1 7 marks	$AC = \sqrt{(8-5)^2 + (2-1)^2}$ $= \sqrt{10}$ $AB = \sqrt{(p-5)^2 + (7-1)^2}$ $= \sqrt{p^2 - 10p + 25 + 36}$ $= \sqrt{p^2 - 10p + 61}$ $AB = 2AC$ $\therefore \sqrt{p^2 - 10p + 61} = 2\sqrt{10}$ $p^2 - 10p + 61 = 4 \times 10$ $p^2 - 10p + 21 = 0$ $p = 3, 7$
B2. (b)	Attempt to find x by substituting $y = 7$ into equation of the line. ***Alternative: Verify that $p = 7$ gives $y = 7$ and that $p = 3$ does not.*** Obtain $x = 7$ Uses midpoint formula with their value for B: $\left(\frac{x_1 + x_1}{2}, \frac{y_1 + y_2}{2}\right)$. Obtains $(6, 4)$ as final answer.	M1 A1 M1 A1 4 marks	Given that $y = 7$, , $7 = 3x - 14$ $x = 7$ B is at $(7, 7)$. Midpoint of $AB = \left(\frac{7+5}{2}, \frac{7+1}{2}\right) = (6, 4)$