Assessment Schedule – 2025

Mathematics and Statistics: Apply algebraic methods in solving problems (91261)

Evidence

Q	Evidence	Achievement	Achievement with Merit	Achievement with Excellence
ONE (a)	$5y \times \dfrac{y^3}{8} = \dfrac{5}{8}y^4$	• Correctly simplified.		
(b)	$(2y)^3 = 7x - 5$ $x = \dfrac{(2y)^3 + 5}{7} = \dfrac{8y^3 + 5}{7}$ Accept either form	• Correct rearrangement for x.		
(c)	Substitute (1.5,0) and (–1,–5) into the equation: $2(1.5)^2 + 1.5a + b = 0$ $4.5 + 1.5a + b = 0$ (1) $2(-1)^2 + -a + b = -5$ $2 - a + b = -5$ (2) Subtract (1) from (2) gives $2.5a - 2.5 = 0$ $a = 1$ Substitute into (1) $7 - 1 + b = 0$ $b = -6$	• Sets up one equation involving a and b, with coefficients of all terms evaluated as in (1) and (2).	• Solves to find values of a and b.	
(d)	Using the top right corner: $x^2 + y^2 = r^2$ $y = \dfrac{x}{2}$ $x^2 + \left(\dfrac{x}{2}\right)^2 = r^2$ $x^2 = \dfrac{4r^2}{5}$ $x = \dfrac{2r}{\sqrt{5}}$ Area $= 2x^2 = \dfrac{8r^2}{5}$ OR Using the rectangle as a whole: $(2r)^2 = L^2 + W^2$ $L = 2W$ $(2r)^2 = (2W)^2 + W^2$ $4r^2 = 5W^2$ $W = \dfrac{2r}{\sqrt{5}}$ Area $= LW = \dfrac{4r}{\sqrt{5}} \times \dfrac{2r}{\sqrt{5}} = \dfrac{8r^2}{5}$	• Sets up Pythagoras and attempts to substitute the 1:2 relationship (line 3, or equivalent, possibly without brackets).	• Derives a correct, collated expression for one variable in terms of r (line 4 or 5).	• Finds fully simplified expression for area in terms of r.

| (e) | $5(5^{2x}) - 5^2(5^x) - 120 = 0$
Let $n = 5^x$
$5n^2 - 25n - 120 = 0$
$n^2 - 5n - 24 = 0$
$(n - 8)(n + 3) = 0$
$n = 8 \text{ or} - 3$
$5^x = -3$ is not possible
Only solution is $5^x = 8$
$\log 5^x = \log 8$
$x \log 5 = \log 8$
$x = \dfrac{\log 8}{\log 5}$
$x = 1.29$ | Rewrites one of the exponential terms as a function of n. | Solves to find both values of n. | Excludes negative value and solves to find value of x. |

NØ	N1	N2	A3	A4	M5	M6	E7	E8
No response; no relevant evidence.	A valid attempt at one question.	1u	2u	3u	1r	2r	1t	2t

Q	Evidence	Achievement	Achievement with Merit	Achievement with Excellence
TWO (a)	$9x^2 - 30x + k = (3x - 5)^2$ So $k = 25$	• Value of k found.		
(b)	$\dfrac{2x(3x^2 + 13x - 10)}{(5x - 2)(x + 5)}$ $= \dfrac{2x(3x - 2)(x + 5)}{(5x - 2)(x + 5)}$ $= \dfrac{2x(3x - 2)}{(5x - 2)} = \dfrac{6x^2 - 4x}{5x - 2}$	• Factorises the numerator or denominator (as on line 2).	• Correct simplification.	
(c)	$(3x - 1)^2 = 5$ $3x - 1 = \pm\sqrt{5}$ $3x = \pm\sqrt{5} + 1$ $x = \dfrac{1 + \sqrt{5}}{3}$ or $\dfrac{1 - \sqrt{5}}{3}$ So $a = 5$ and $b = 3$ $\qquad$ $(3x - 1)^2 = 5$ $9x^2 - 6x + 1 = 5$ $9x^2 - 6x - 4 = 0$ $x = \dfrac{6 \pm \sqrt{36 - 4(9)(-4)}}{18}$ $x = \dfrac{6 \pm \sqrt{36 \times 5}}{18}$ $x = \dfrac{6 \pm 6\sqrt{5}}{18}$ $x = \dfrac{1 \pm \sqrt{5}}{3}$	• Writes as linear equation (2nd line). OR Expands and collates quadratic into 3 terms.	• Both values found.	
(d)	$\log_5(x + 6)^2 - \log_5 x = 2$ $\log_5\left(\dfrac{(x + 6)^2}{x}\right) = 2$ $\dfrac{(x + 6)^2}{x} = 25$ $x^2 - 13x + 36 = 0$ $(x - 9)(x - 4) = 0$ $x = 9$ or $x = 4$	• Simplifies log terms by incorporating the power and subtracting logs to divide. • Accept division by $x - 2$ as *mei.*	• Inverts log (line 3) to allow formation of quadratic. • Accept consistent use of $x - 2$ as *mei.*	• Solves to find both values of x.
(e)	$x^2 + 2k(2x + 23) = 6k$ $x^2 + 4kx + 20k = 0$ Only one solution, so discriminant $= 0$ $(4k)^2 - 4(1)(20k) = 0$ $16k(k - 5) = 0$ $k = 0$ or $k = 5$ k is non-zero, so therefore $k = 5$ Substitue in $k = 5$ $x^2 + 20x + 100 = 0$ $(x + 10)^2 = 0$ $x = -10$ $y - 2(-10) + 13 = -7$ Solution is $(-10, -7)$	• Forms simplified equation (2nd line).	• Finds value of $k = 5$ (does not need to explicitly exclude zero value).	• Finds the coordinates.

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No response; no relevant evidence.	A valid attempt at one question.	1u	2u	3u	1r	2r	1t	2t

Q	Evidence	Achievement	Merit	Excellence
THREE (a)	$(\sqrt{x})^6 = 8$ $x^3 = 8$ $x = 2$	• Finds value of x.		
(b)	$\left(x - \dfrac{1}{5}\right)\left(x + \dfrac{2}{3}\right) = 0$ $x^2 + \dfrac{7}{15}x - \dfrac{2}{15} = 0$ $\left[a = 1, b = \dfrac{7}{15}, c = \dfrac{2}{15}\right]$ OR $(5x - 1)(3x - 2) = 0$ $15x^2 + 7x - 2 = 0$ $[a = 15, b = 7, c = -2]$	• Correct values of a, b, and c. • Accept rational equivalents.		
(c)	$\log_a 75 = \log_a(3 \times 25)$ $\log_a(3 \times 25) = \log_a 3 + \log_a 25$ $= \log_a 3 + \log_a 5^2$ $= \log_a 3 + 2\log_a 5$ So $\log_a 75 = p + 2q$	• Splits up $\log_a 75$ into 2 log terms. OR CAO.	• Finds expression in terms of p and q.	
(d)	If a and b are two roots, then $(x - a)(x - b) = x^2 - mx + n$ $x^2 - bx - ax + ab = x^2 - mx + n$ $x^2 - (a + b)x + ab = x^2 - mx + n$ So $m = (a + b)$ and $n = ab$ $a^2 + b^2 = m^2 - 2n$ OR if $x^2 - mx + n = 0$ $a = \dfrac{m + \sqrt{m^2 - 4n}}{2}, b = \dfrac{m - \sqrt{m^2 - 4n}}{2}$ $a^2 + b^2 = \dfrac{1}{4}(2m^2 + 0 + 2m^2 - 8n)$ $= m^2 - 2n$	• Sets up LHS of line 1, recognising roots in either form.	• Writes roots and expands (LHS on second line). OR Writes roots, substitutes, and expands one term correctly.	• Correct expression with working.
(e)	Using vertex form: $y = a(x - h)^2 + k$ $y = a(x - 110)^2 + 18$ At $(0,0)$ $0 = a(0 - 110)^2 + 18$ $a = -0.001488 = \dfrac{-9}{6050}$ $y = -0.001488(x - 110)^2 + 18$ At the tree, $x = 200$ $y = -0.001488(200 - 110)^2 + 18$ $y = 5.95$ So height of ball is 7.95 m above the ground, so it will clear the tree. Taking x-axis at ground level is also valid.	• General equation formed in any valid format with 2 constants.	• Value of a found.	• Height of ball above ground at 200 m (7.95 m) calculated and statement that it will clear the tree or similar comment.

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Cut Scores

Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
0–7	8–13	14–19	20–24