

Assessment Schedule – 2012**Mathematics with Statistics: Apply algebraic methods in solving problems (91261)****Evidence Statement**

Q	Expected Coverage			Achievement (u)			Merit (r)			Excellence (t)	
ONE (a)(i)	8			Complete correct solution found.							
(ii)	$x = 5^2$ $= 25$			Complete correct solution found.							
(b) (i)	Log equivalent formed $2250/2000 = 1.035^t$ $t = \log 1.125 / \log 1.035$ $= 3.42$ years			Establishing log equation. Problem solved using substitution (at least 2 iterations).			Accept 3.42 or 4 (years) or any other rounding. CRO of 3.42 allowed. Do not accept 3 unless accompanied by algebraic working.				
(ii)	$2000(1.035)^{21} - 2000(1.035)^{18}$ $= 4118.863 - 3714.978$ $= 403.8846$ $= \$403.88$			Value after 18 or 21 years found.			Correct solution. CRO				
(iii)	The additional amount in the account between Tara's m^{th} and $(m + n)^{\text{th}}$ birthday. OR The difference in the amount from the m^{th} year to the $(m + n)^{\text{th}}$.									Correct statement.	
(c)	$x^2 - 6x - 27 = 0$ $(x + 3)(x - 9) = 0$ $x = -3$ or $x = 9$ $3^n = -3$ no solution Only solution is $3^n = 9$ $\Rightarrow n = 2$			Quadratic equation in x formed and solved.			Expression given for 3^n .			Value of n found with algebraic evidence.	
NØ		N1	N2	A3	A4	M5	M6	E7	E8		
No response; no relevant evidence		Attempt at one question	1 of u	2 of u	3 of u	1 of r	2 of r	1 of t	2 of t		

Q	Expected Coverage			Achievement (u)			Merit (r)		Excellence (t)	
TWO (a)(i)	$(5x + 1)(x - 2)$ OR $5(x - 2)(x + 0.2)$			Factorise the expression.						
(ii)	$x = -\frac{1}{5}$ or 2 or equivalent.			Equation solved giving TWO solutions. Accept in fractional form. Consistent with 2a(i) but not trivial.						
(b)	$x^2 + 5x + 2 = 3x + 6$ $x^2 + 2x - 4 = 0$ $x = 1.236, -3.236$			Expanded and simplified to a quadratic equation = 0. CRO Truncate / rounding ok – min 1dp.			Equation solved giving TWO correct solutions. Truncate / rounding ok – min 1dp.			
(c)	$\frac{(x-3)(x-2)}{(x+3)(x-2)} = 4$ $\frac{(x-3)}{(x+3)} = 4$ $3x = -15$ $x = -5$			Two solutions $x = -5, x = 2$, with comments about incorrect factorisation (or the correct factorisation). OR An answer to the question with both values substituted showing these solutions do not =4.			Correct solution of $x = -5$ only with one of the two aspects of the incorrect solution discussed.		Correct solution and i) A comment about incorrect factorisation. ii) $x = 2$ gives an invalid solution as it results in dividing by 0 or back substitution shows $x = 2$ does not satisfy the equation. BOTH required.	
(d)	$\frac{(x+3)(x-2)}{6x^2 + 4x + c} = \frac{x+3}{2(3x+8)}$ Multiply numerator and denominator of RHS by $(x - 2)$ $\Rightarrow 2(x - 2)(3x + 8)$ $= 6x^2 + 4x - 32$ Therefore $c = -32$			Factorising, and recognising the need to multiply by $(x - 2)$ to equate denominators. Or cross multiplication and expanding and simplifying correctly.			Solving.			
(e)	Equation $d = a(x+8)(x-8)$ $d = a(x^2 - 64)$ $d = 0 \quad 64a = 16$ $a = \frac{1}{4}$ $d = \frac{1}{4}(x+8)(x-8)$ Width of 12, $x = \pm 6$ $\frac{1}{4} \times 14 \times 2 = 7 \text{ m}$			General equation formed in any correct format.			a calculated and equation formed. Depth = -7m		Problem solved.	
NØ	N1	N2	A3	A4	M5	M6	E7	E8		
No response; no relevant evidence	Attempt at one question	1 of u	2 of u	3 of u	1 of r	2 of r	1 of t	2 of t		

Q	Expected Coverage			Achievement (u)		Merit (r)		Excellence (t)	
THREE (a)(i)	$8x^{13}$			Correct.					
(ii)	$4x^{\frac{1}{3}}$			Correct (accept 0.3 as power).					
(iii)	$\sqrt[3]{\frac{4x^{\frac{1}{3}}}{x^{-\frac{1}{2}}}}$ $= 2x^{\frac{5}{12}}$			Consistent with 3a(ii) .		Correct. Or equivalent.			
(b)(i)	$2x^2 - 3x + 8x - 12 = 13$ $2x^2 + 5x - 25 = 0$ $a = 2, b = 5$ and $c = -25$ $x = 2.5$ or $x = -5$			Expanding and simplifying to $= 0$. Incorrect simplification, then correct use of quadratic formula giving two solutions. CRO.		Solution including values for a, b, c .			
(ii)	$2x^2 + 5x - 12 - k = 0$ For one solution $b^2 - 4ac = 0$ $25 + 8(12+k) = 0$ $k = -15.125$			Knowledge of statement $b^2 - 4ac = 0$. Incorrect substitution into $b^2 - 4ac$.		Correct substitution into $b^2 - 4ac$.		Value of k calculated.	
(c)	$x^2 + 5x - 1 - dx^2 - d = 0$ $x^2(1 - d) + 5x - (1 + d) = 0$ To have solutions $25 + 4(1 - d)(1 + d) > 0$ $25 + 4 - 4d^2 > 0$ $4d^2 < 29$ $-2.69 < d < 2.69$			Expansion and simplified equation –collecting coefficients (line 2) .		Correct substitution into the discriminant of $b^2 - 4ac > 0$. Including $>$ or $\geq$.		Range for d calculated. Do not penalise for using ≥ 0 .	
NØ	N1	N2	A3	A4	M5	M6	E7	E8	
No response; no relevant evidence	Attempt at one question	1 of u	2 of u	3 of u	1 of r	2 of r	1 of t	2 of t	

Judgement Statement

	Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
Score range	0 – 7	8 – 13	14 – 18	19 – 24