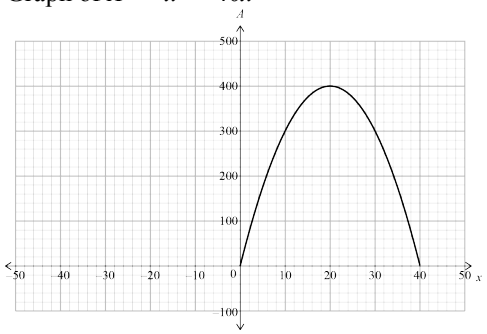
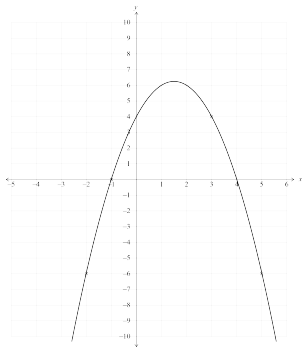
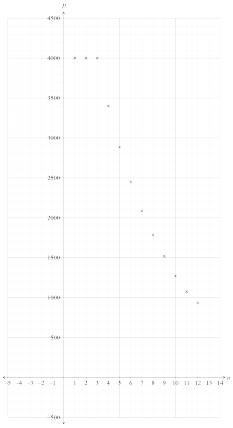
Assessment Schedule – 2016

Mathematics and Statistics: Investigate relationships between tables, equations and graphs (91028)

Evidence Statement

One	Expected coverage	Achievement (u)	Merit (r)	Excellence (t)
(a)(i)	\$50	Correct value.		
(ii)	Lines joining (5,65) to (6,65) – open circle and (6,80) to (7,80) – open circle.	Correct step functions without open circle or one correct step.		Correct step functions with open circles.
(iii)	Gradient (slope) of the graph of line joining (0,0) to (6,80). $\frac{80}{6}$ = \$13.33	Accept $\frac{65}{6}$.	Correct solution calculated.	
(iv)	$y = 10x$ OR ($P = 10t$)	Correct equation.		
(v)	Let t be time for baby sitting If • $t < 5.5$ hours, Talia is the cheapest • $t > 5.5$, Sasha is the cheapest • $t < 3$, Talia is cheapest • $3 < t < 5.5$ Talia is the cheapest • Matt is never the cheapest.	1 region correct.	2 regions correct.	3 correct descriptions.
(b)(i)	$y = 2x^2 + 5x - 3$ OR $y = 2(x - 0.5)(x + 3)$ OR $y = 2(x + 1.25)^2 - 6.125$ OR $y = (2x - 1)(x + 3)$	1 term incorrect. OR equivalent.	Correct equation.	
(ii)	$y = 2(x - a)^2 + 5(x - a) - 3 + b$ $y = 2(x^2 - 2ax + a^2) + 5x - 5a - 3 + b$ $y = 2x^2 - 4ax + 2a^2 + 5x - 5a - 3 + b$ $y = 2x^2 + (5 - 4a)x + 2a^2 - 5a - 3 + b$ $y = 2(x - (-1.25 + a)^2 - 6.125 + b$ $y = 2(x + 1.25 - a)^2 - 6.125 + b$ x value of turning point is $-1.25 + a$ turning point is $(-1.25 + a, -6.125 + b)$	Just a or just b.	Initial equation.	x value of turning point or coordinates of turning point.
	N1: one question attempted **N2: 1u**	**A3: 2 of u or 1 of r** **A4: 3 of u or 1 of r and 1 of u**	**M5: 2 of r** **M6: 3 of r**	**E7: 1 of t** **E8: 2 of t**

TWO	Expected coverage	Achievement (u)	Merit (r)	Excellence (t)
(a)(i)	Graph of $A = -x^2 + 40x$  	Correct graph without restriction to the first quadrant.	Accurate graph in the first quarter.	
(ii)	Maximum area is 400 (when $x = 20$).	Correct response.		
(iii)	$0 < x < 10$ and $30 < x < 40$.	$30 < x < 10$ OR $10 > x > 30$	Indicates $x < 10$ AND $x > 30$.	$0 < x < 10$ AND $30 < x < 40$
(iv)	x value = $\frac{m}{2}$ Area = $-\left(\left(\frac{m}{2}\right)^2 - m\left(\frac{m}{2}\right)\right) = \frac{m^2}{4}$	$x = \frac{m}{2}$	Correct simplified solution.	
(b)(i)	 • x-intercepts (–1,0) and (4,0) • y-intercept (0,4) • Max coordinates (1.5, 6.25) accept y between $6 < x \leq 7$ (on graph).	Any TWO of intercepts or vertex and ONE feature of graph correct. Symmetrical parabola.	Any THREE of intercepts and vertex and one error on graph. (Does not have to be coordinates.) Symmetrical parabola.	Totally correct, giving coordinates of intercepts and vertex and correct graph. Symmetrical parabola.
(ii)	$y = -x^2 + 3x + 4$ OR $y = -(x + 1)(x - 4)$		Correct equation.	
	N1: one question attempted **N2: 1u**	**A3: 2 of u or 1 of r** **A4: 3 of u or 1 of r and 1 of u**	**M5: 2 of r** **M6: 3 of r**	**E7: 1 of t** **E8: 2 of t**

<table>
<tr><th>THREE</th><th>Expected coverage</th><th>Achievement (u)</th><th>Merit (r)</th><th>Excellence (t)</th></tr>
<tr><td>(a)(i)</td><td>$y = 2^{x-1}$ or equivalent.</td><td>One minor error</td><td>Correct equation.</td><td></td></tr>
<tr><td>(ii)</td><td>$y = 2^{-x-1}$</td><td>One minor error.</td><td></td><td>Correct equation.</td></tr>
<tr><td>(b)(i)</td><td>
<table>
<tr><th>Month (n)</th><th>Approximate number of people visiting park this month (P)</th></tr>
<tr><td>1</td><td>4000</td></tr>
<tr><td>2</td><td>4000</td></tr>
<tr><td>3</td><td>4000</td></tr>
<tr><td>4</td><td>3400</td></tr>
<tr><td>5</td><td>2890</td></tr>
<tr><td>6</td><td>2457</td></tr>
<tr><td>7</td><td>2088</td></tr>
<tr><td>8</td><td>1775</td></tr>
<tr><td>9</td><td>1509</td></tr>
<tr><td>10</td><td>1282</td></tr>
<tr><td>11</td><td>1090</td></tr>
<tr><td>12</td><td>926</td></tr>
</table>
</td><td>At least two months correct.</td><td>Table correctly completed.</td><td></td></tr>
<tr><td>(ii)</td><td> 
4000 for first 3 months and then from table.</td><td>At least 5 points consistent.</td><td>Consistent graph drawn as discrete or continuous.
Allow one point incorrect.</td><td></td></tr>
<tr><td>(iii)</td><td>Solution found by finding the x-coordinate of where the graph of $P = 2000$ intersects the graph of
$P = 4000 \times 0.85^n$
OR from table
OR by calculation
$2000 = 4000 \times 0.85^x$
$x = 4.26$
Number of months = 7.26
At the end of the 8th month, there will be fewer than 2000 visitors.</td><td>Partial description and 7th month.
OR
Closed for 5 months.

4 only (CAO)</td><td>Stated closed for 4 months with correct</td><td></td></tr>
<tr><td>(iv)</td><td>$2000 = A \times 0.85^{(10-3)}$
$A = 6238.7$
The required number is at least 6239.</td><td></td><td>Demonstrated use of 0.85 and consistent with graph.</td><td>Required number of people found.</td></tr>
<tr><td></td><td>N1: table in b correct
N2: 1u</td><td>A3: 2 of u or 1 of r
A4: 3 of u or 1 of r and 1 of u</td><td>M5: 2 of r
M6: 3 of r</td><td>E7: 1 of t
E8: 2 of t</td></tr>
</table>

Cut Scores

Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
0 – 6	7 – 13	14 – 18	19 – 24