Assessment Schedule – 2017

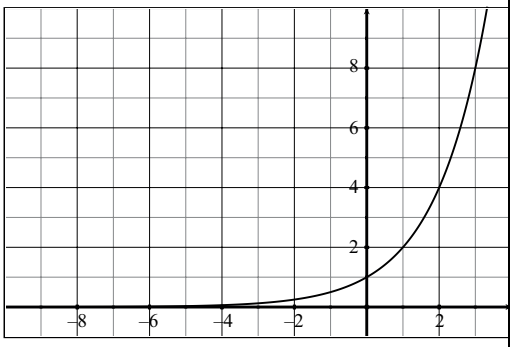
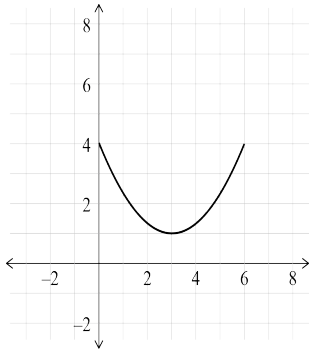
Mathematics and Statistics: Investigate relationships between tables, equations and graphs (91028)

Evidence Statement

<table>
<tr><th>Q</th><th>Expected coverage</th><th>Achievement</th><th>Merit</th><th>Excellence</th></tr>
<tr><td>ONE (a)(i)</td><td>$22</td><td>Correct value.</td><td></td><td></td></tr>
<tr><td rowspan="2">(ii)</td><td>(1) $C = 89$</td><td>Correct equation.</td><td></td><td rowspan="2"></td></tr>
<tr><td>(2) The first day $120, third $98
Gradient = $-\frac{22}{2} = -11$
$C = -11d + c$
Considering (1,120)
$120 = -11 + c$
$c = 131$
Equation $C = -11d + 131$</td><td>Gradient correct accept –11 without the C.
OR
Correct intercept.
OR
If a line has been drawn that does not accurately go through the points award u for consistent equation.</td><td>Correct equation for (2).
Accept with x and y instead of C and d.</td></tr>
<tr><td>(b)</td><td><table><tr><th>No of days</th><th>Daily charge</th></tr><tr><td>1</td><td>140.00</td></tr><tr><td>2</td><td>126.00</td></tr><tr><td>3</td><td>113.40</td></tr><tr><td>4</td><td>102.06</td></tr><tr><td>5</td><td>91.85</td></tr><tr><td>6</td><td>82.67</td></tr><tr><td>7</td><td>80.00</td></tr><tr><td>8</td><td>80.00</td></tr><tr><td></td><td>< 80</td></tr></table>OR graph of
$C = 140 \times 0.9^{x-1}$</td><td>Table or graph with at least 2 values.
OR
At least two consistent values calculated from incorrect first value.

Do not penalise rounding.</td><td>Correct graph with daily charge points plotted or table of daily charges completed.
This needs to extend correctly beyond 6 days.</td><td></td></tr>
<tr><td></td><td>The cost is more for the first 5 days, but from day 6 it is cheaper and stays cheaper from there to day 13. From day 14, the regular price is cheaper.</td><td>Identifies 6 as change point.
OR
Shows that it is cheaper or more expensive for a particular value of x.
OR
Correct consistent interpretation for a particular value of x from an incorrect graph.</td><td>Consistent conclusion from incorrect graph</td><td>Clear explanation including identifying the number of days until the cost is lower (1t).
Full explanation including a clear reference to the graph or table. Both the number of days until the cost is lower for the special price and when the cost again becomes cheaper at the regular price. (2t)</td></tr>
</table>

N1: One question attempted towards solution. **N2: 1u.** **OR two parts of a question attempted towards solution.**	**A3: 2u** **A4: 3u**	**M5: 1r** **M6: 2r**	**E7: 1t** **E8: 2t**

Q	Expected coverage	Achievement	Merit	Excellence
TWO (a)(i)		Correct shape and at least two points correct. OR Table of values constructed must be at least 3 correct values calculated.	Correct graph. Graph needs y intercept and (1, 2). AND Graph needs to be extended in both directions.	
(ii)	$y = 2^x - 3$ $y = 2^{-x} - 3$ $y = (\frac{1}{2})^x - 3$	Equation for one transformation $y = 2^x - 3$ OR $y = 2^{-x}$		Correct equation.
(b)(i)	$y = \frac{x}{3}(x - p) + 4$ At A, $x = 0$ height $(y) = \frac{0}{3}(0 - p) + 4$ height $(y) = 4$	Finds the value of y.		
(ii)	At rope's lowest point $x = 3,\ y = 1$ $y = \frac{x}{3}(x - p) + 4$ $1 = \frac{3}{3}(3 - p) + 4$ $1 = 3 - p + 4$ $p = 6$ OR At B, $x = 6, y = 4$ $4 = 2(6 - p) + 4$ $6 - p = 0$ $p = 6$	Substitutes (3,1) in equation. OR Substitute (6,4).	Calculates p.	
(iii)		y intercept correct OR consistent with their answers in b) i and ii. OR Turning point. Must be parabola shape	Correct graph.	

(iv)	$1.2=\frac{1}{3}x(x-6)+4$ $\frac{1}{3}x^2-2x+4=1.2$ $\frac{1}{3}x^2-2x+2.8=0$ $x=3.78$ or $x=2.23$ Distance between holes = 1.55 m OR Read from graph.	Established relationship. OR One solution found from equation. OR One value read off graph. Accept 3.5 to 4, and 2 to 2.5. OR One solution found from equation.	Solved equation. Both values from the graph.	Distance calculated.

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Q	Expected coverage	Achievement	Merit	Excellence
THREE (a)(i)	$y = (x + 2)(x – 6)$ or $y = x^2 – 4x – 12$ or y = (x—2)2 -16	Correct equation.		
(ii)	$y = x\,(x – 8)$ or $y = x^2 – 8x$ or $y = (x – 4)^2 – 16$	Consistent with sketch or translated in the wrong direction. OR Consistent with answer in (a)(i). OR Sketch of correct graph.	Translated equation correct (must also have (a)(i) for award of r).	
(b)(i)	Correct table, graph, and equation. $y = -\frac{1}{2}x(x-12)$ $y = -\frac{1}{2}x^2 + 6x$ $y = \frac{1}{2}x(12-x)$	Begins table with at least 2 areas correct. OR Graph with at least 2 areas correct. OR A table of values with incorrectly calculated areas that allow for he symmetrical nature of the relationship to be established (ie areas of rectangles).	Correct table. OR graph that has a range of values that allows for the maximum area to be found AND Allows for the symmetrical nature of the relationship to be established. OR Correct graph or table and equation from areas of rectangles.	Student uses a table or graph to establish the relationship AND has the correct equation for parabola.
(ii)	• The maximum area is 18 cm^2. • Graph of area is symmetrical. • The maximum area occurs when the plastic is cut in half. • As the length and height get closer to each other in length the area increases.	ONE correct statement about the area or graph.	TWO or more different correct statements about the areas or graphs.	

(iii)	• x intercepts 0 and $12 + n$ • The graph is wider by n units at the x-axis. • Area is symmetrical • Maximum area = $0.5(6 + \frac{n}{2})^2$ • Coordinate of vertex is $\left(6+\frac{n}{2}, 0.5\left(6+\frac{n}{2}\right)^2\right)$ OR $\left(\frac{12+n}{2}, \frac{0.5(12+n)^2}{4}\right)$ OR $\left(\frac{12+n}{2}, \frac{(12+n)^2}{8}\right)$ OR equivalent.	Correct comment. OR x co-ordinate of the turning point found correctly.	Two correct statements. OR Consistent description for their graph of a parabola. OR Co-ordinates of the vertex of the parabola correct without supporting comments.	Co-ordinates of the vertex found correctly AND at least one correct comment.

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Cut Scores

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