General Mathematics 2025 v1.2

IA2: Sample marking scheme

June 2025

This sample has been compiled by the QCAA to model one possible approach to allocating marks in an examination. It matches the examination mark allocations as specified in the syllabus (~ 60% simple familiar, ~ 20% complex familiar and ~ 20% complex unfamiliar) and ensures that a balance of the objectives are assessed.

Assessment objectives

This assessment instrument is used to determine student achievement in the following objectives:

1. Recall mathematical knowledge.
2. Use mathematical knowledge.
3. Communicate mathematical knowledge.
4. Evaluate the reasonableness of solutions.
5. Justify procedures and decisions.
6. Solve mathematical problems.

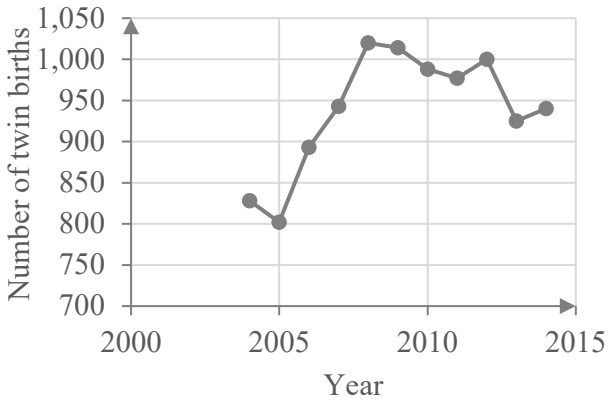
Queensland Government
QCAA Queensland Curriculum & Assessment Authority
For all Queensland schools
250720

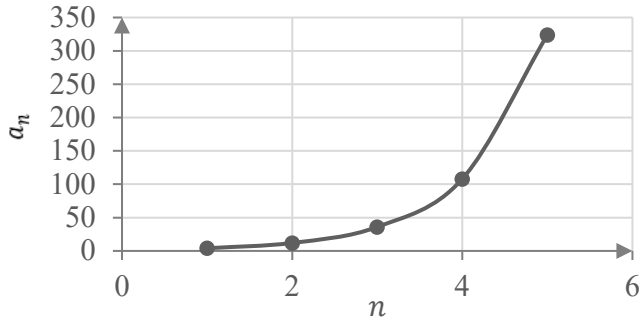
Marking scheme

<table>
<tr><th>Q</th><th>Sample response</th><th>The response</th><th>Notes</th></tr>
<tr><td>1</td><td>
<table>
<tr><th colspan="2" rowspan="2"></th><th colspan="3">Person</th></tr>
<tr><th>Adult</th><th>Teenager</th><th>Total</th></tr>
<tr><th rowspan="4">Provider</th><th>Provider X</th><td>12</td><td>6</td><td>18</td></tr>
<tr><th>Provider Y</th><td>19</td><td>13</td><td>32</td></tr>
<tr><th>Alternative</th><td>4</td><td>6</td><td>10</td></tr>
<tr><th>Total</th><td>35</td><td>25</td><td>60</td></tr>
</table>
</td><td>• enters six given values (bold) [1.5 marks]

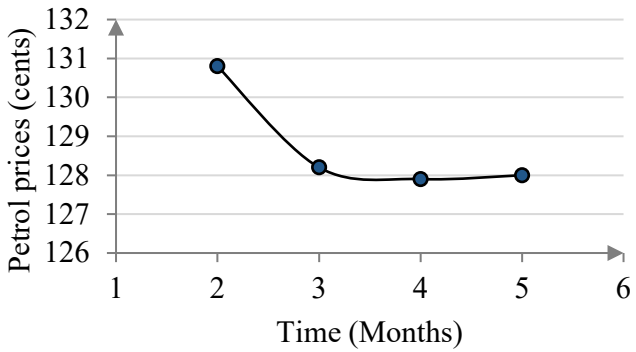
• calculates and enters other six values [1.5 marks]</td><td>Award 0.5 mark for each correct pair.

Award 0.5 mark for each correct pair.</td></tr>
<tr><td>2a</td><td>negative
moderate
−0.3</td><td>• states direction [0.5 mark]
• states strength [0.5 mark]
• states coefficient value in the range $-0.2 \leq r \leq -0.6$ [0.5 mark]</td><td>Accept alternative descriptions, e.g. falling, weak.</td></tr>
<tr><td>2b</td><td>positive
strong
0.8</td><td>• states direction [0.5 mark]
• states strength [0.5 mark]
• states coefficient value in the range $0.7 \leq r \leq 0.9$ [0.5 mark]</td><td>Accept alternative descriptions, e.g. rising.</td></tr>
</table>

Q	Sample response	The response	Notes
3a		• axes labelled **[1 mark]** • scale **[0.5 mark]** • points plotted **[1 mark]** • connected line graph **[1 mark]**	
3b	Steady increase initially then levels out and decreases slightly.	• describes two features of the trend **[1 mark]**	Award 0.5 mark for each feature. Accept alternative description, e.g. steep rise at first, then irregular decline.
4a	Common difference, d $d = 8.5 - 6 = 2.5$, $d = 11 - 8.5 = 2.5$, $d = 13.5 - 11 = 2.5$ Since there is a common difference of \$2.50 between successive terms, then the total fares form an arithmetic sequence.	• demonstrates there is a common difference **[1 mark]** • links common difference to an arithmetic sequence **[1 mark]**	
4b	$t_n = 6 + 2.5(n-1)$ $t_{35} = 6 + 2.5(35-1)$ $t_{35} = 91$ The predicted fare for a 35-kilometre taxi ride is \$91.	• substitutes 35 for n **[0.5 mark]** • determines t_{35} **[1 mark]** • states prediction **[0.5 mark]**	

Q	Sample response	The response	Notes
5a	$a_2 = 3a_1$ $a_2 = 3 \times 4 = 12$ $a_3 = 3a_2$ $a_3 = 3 \times 12 = 36$	• determines a_2 **[0.5 mark]** • determines a_3 **[0.5 mark]**	
5b		• axes labelled **[1 mark]** • scale **[0.5 mark]** • points plotted **[1 mark]** • smooth line graph **[0.5 mark]**	
5c	Geometric model showing increasing bacterial population.	• states type of model as – geometric **[0.5 mark]** – increasing **[0.5 mark]**	Accept alternative terms, e.g. exponential, positive.

<table>
<tr><th>Q</th><th>Sample response</th><th>The response</th><th>Notes</th></tr>
<tr>
<td>6a</td>
<td>
<table>
<tr><th>Time (months)</th><th>Price (cents)</th><th>3-point moving average (rounded to 1dp)</th></tr>
<tr><td>1</td><td>132.4</td><td>—</td></tr>
<tr><td>2</td><td>129.5</td><td>$\frac{132.4 + 129.5 + 130.}{3}$
130.8</td></tr>
<tr><td>3</td><td>130.4</td><td>$\frac{129.5 + 130.4 + 124.}{3}$
128.2</td></tr>
<tr><td>4</td><td>124.6</td><td>$\frac{130.4 + 124.6 + 128.}{3}$
127.9</td></tr>
<tr><td>5</td><td>128.7</td><td>$\frac{124.6 + 128.7 + 130.}{3}$
128.0</td></tr>
<tr><td>6</td><td>130.7</td><td>—</td></tr>
</table>
</td>
<td>• correct procedure [1 mark]
• calculates 3-point moving averages [2 marks]</td>
<td>Award 0.5 mark for each correct value.</td>
</tr>
</table>

Q	Sample response	The response	Notes
6b		• axes labelled **[1 mark]** • scale **[0.5 mark]** • points plotted **[1 mark]**	Smooth line graph is unnecessary but no penalty if included.
6c	Initially decreasing then levels off.	• describes two features of the trend **[1 mark]**	Award 0.5 mark for each feature. Accept alternative description, e.g. Decline at first, then no change.
7a	$\frac{21}{45} \times 100\%$ $\approx 47\%$	• determines required values **[1 mark]** • calculates percentage **[1 mark]**	
7b	$\frac{12}{36} \times 100\%$ $\approx 33\%$	• determines required values **[1 mark]** • calculates percentage **[1 mark]**	

Q	Sample response	The response	Notes
7c	<table><tr><td colspan="2"></td><td colspan="2">Preferred sport</td></tr><tr><td colspan="2"></td><td>Cricket</td><td>Volleyball</td></tr><tr><td rowspan="2">School section</td><td>Junior school</td><td>67%</td><td>43%</td></tr><tr><td>Senior school</td><td>33%</td><td>57%</td></tr><tr><td colspan="2"></td><td>100%</td><td>100%</td></tr></table> The data suggests that students who prefer volleyball are more likely to be Senior school students (57% > 43%) and students who prefer cricket are twice as likely to be Junior school students (67% is approximately double 33%). A comparison of the percentages for preferred sport in the Junior and Senior schools suggests there is an association between the variables.	• clearly labelled two-way table **[0.5 mark]** • for a particular variable, calculates percentages totalling 100% – for one category **[1 mark]** – for other category **[1 mark]** • compares percentages across categories **[1 mark]** • provides decision for whether there is an association between the variables **[0.5 mark]**	Accept calculated percentages totalling 100% for each category of the school section variable. Accept comparison of school section percentages across preferred sport categories.
8	A quarter of 20 000 L is removed every 15 minutes. $t_1 = 20000$ at 0 minutes $t_2 = 20\,000 \times \frac{3}{4}$ $= 15\,000$ after one 5-minute interval $r = 0.75$	• identifies t_1 value **[0.5 mark]** • identifies r value **[0.5 mark]** • models situation as a geometric sequence **[1 mark]**	Accept equivalent model.

Q	Sample response	The response	Notes
	$t_n = t_1 r^{(n-1)}$ $t_n = 20000 \times 0.75^{(n-1)}$ Let $t_n = 500$ $500 = 20000 \times 0.75^{(n-1)}$ $t_{10} = 20000 \times 0.75^9 = 1501.7$ need to lose more, so try $t_{15} = 20000 \times 0.75^{14} = 356.4$ lost too much, so try $n =$ $t_{14} = 20000 \times 0.75^{13} = 475.1$ slightly too low, so try $n =$ $t_{13} = 20000 \times 0.75^{12} = 633.5$ too high Therefore, 14 terms would be too long and 13 terms would be too short. Term 14 occurs after thirteen 15-minute intervals — after 3 hours and 15 minutes. Term 13 occurs after twelve 15-minute intervals — after 3 hours. The pump can only run for a little over 3 hours to reduce the water in the tank to 500 litres.	• identifies t_n value **[0.5 mark]** • method to determine n **[1 mark]** • determines n **[1 mark]** • converts a number of 15-minute intervals to a total time **[1 mark]** • provides decision for how long the pump needs to run **[0.5 mark]**	Accept alternative method. Accept $n = 13$ or $n = 14$.
9	Let s = the seasonal index for the 4th quarter $0.86 + 0.79 + 1.21 + s = 4$ $s = 1.14$ Deseasonalised values for 2024:	• determines seasonal index for 4th quarter **[0.5 mark]** • determines deasonalised value for 1st quarter **[0.5 mark]** • determines deasonalised value for 2nd quarter **[0.5 mark]**	

Q	Sample response	The response	Notes
	$1\text{st quarter} = \frac{2245}{0.86} = 2610.47$ $2\text{nd quarter} = \frac{2038}{0.79} = 2579.75$ $3\text{rd quarter} = \frac{3110}{1.21} = 2570.25$ $4\text{th quarter} = \frac{2907}{1.14} = 2550$ Enter time series data into calculator: x = 1, 2, 3 and 4 (quarters) y = deseasonalised values for 2024 Equation of least squares line to model long-term trend: $y = mx + c$ y-intercept, $c = 2625.345$ slope, $m = -19.091$ $y = -19.091x + 2625.345$ Substitute $x = 8$ for 4th quarter of 2025: $y = -19.091 \times 8 + 2625.345$ $y = 2472.617$ Predicted sales of newspapers for the 4th quarter of 2025: $2472.617 \times 1.14 = 2818.78$ $= 2819$ newspapers	• determines deasonalised value for 3rd quarter **[0.5 mark]** • determines deasonalised value for 4th quarter **[0.5 mark]** • determines least-squares line equation **[1 mark]** • determines y value **[1 mark]** • predicts actual newspaper sales **[0.5 mark]**	

Q	Sample response	The response	Notes
10	$t_1 = 186$ (collected from school) $t_{11} = 546$ (collected from school and 10 houses) $t_n = t_1 + (n-1)d$ $546 = 186 + (11-1)d$ $360 = 10d$ $d = 36$ To collect garbage from school and 35 houses, n = 36 $t_{36} = 186 + (36-1)36$ $= 186 + 35 \times 36$ $= 1446$ 1446 < 1500, so does not exceed truck's maximum carrying capacity So, the truck will be able to collect the garbage at the 35th house.	• identifies t_1 value **[0.5 mark]** • identifies t_{11} value **[0.5 mark]** • method to determine d **[0.5 mark]** • determines d **[1 mark]** • determines t_{36} value **[1 mark]** • evaluates reasonableness **[1 mark]** • provides decision **[0.5 mark]**	Accept alternative method.