General Mathematics 2025 v1.2

IA3: Sample marking scheme

October 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
251434
For all Queensland schools

Marking scheme

Note: ✓ = $\frac{1}{2}$ mark

<table>
<tr><td>Q 1a</td><td>$A_0 = 12\,000$
$A_{n+1} = 1.008A_n$</td><td>✓✓ develops recurrence relation</td></tr>
<tr><td>Q 1b</td><td><table><tr><th>n</th><th>A_n</th></tr><tr><td>0</td><td>12 000</td></tr><tr><td>1</td><td>12 096</td></tr><tr><td>2</td><td>12 192.77</td></tr><tr><td>3</td><td>12 290.31</td></tr><tr><td>4</td><td>12 388.63</td></tr></table>After one year, Anna will have $12 388.63.</td><td>✓✓ applies iterative procedure identified in part a
✓ determines value after 1 year</td></tr>
<tr><td>Q 1c</td><td>$A = ?$
$P = 12\,000$
$i = \frac{3.2}{400}$
$= 0.008$
$n = 24$

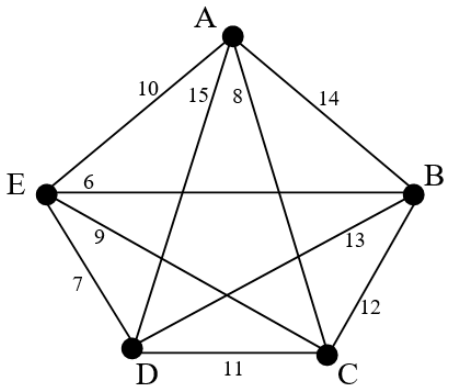
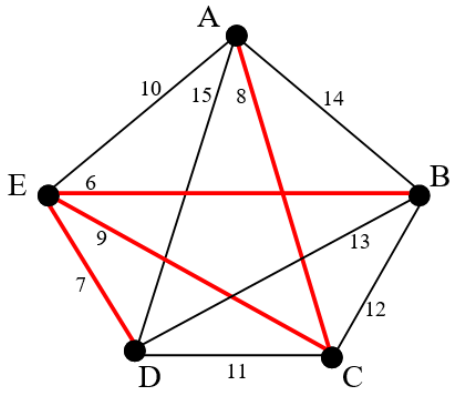
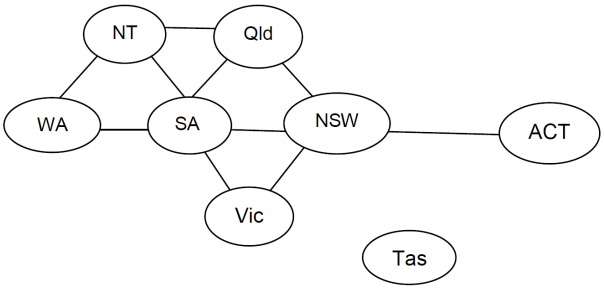
$A = P(1+i)^n$
$= 12\,000(1.008)^{24}$
$= 14\,528.94$
The investment would be worth $14 528.94.</td><td>✓ determines i and n

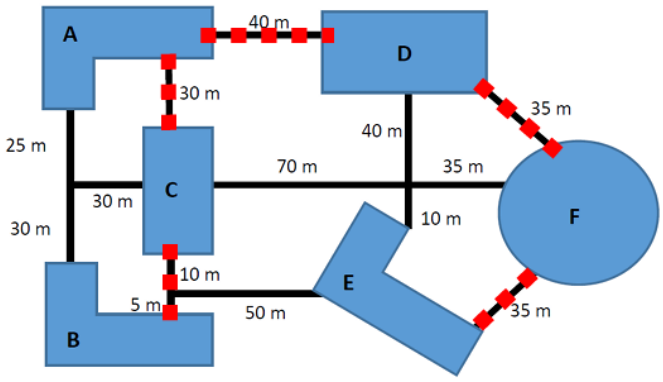
✓ identifies compound interest formula
✓ substitutes values into formula
✓ determines value after 6 years</td></tr>
<tr><td>Q 2</td><td>$A_{n+1} = rA_n - d$
$r = 1 + \frac{6.6}{1200}$
$= 1.0055$
$d = 750$
<table><tr><th>n</th><th>A_n</th></tr><tr><td>0</td><td>50 000</td></tr><tr><td>1</td><td>$1.0055 \times 50\,000 - 750 = 49\,525$</td></tr><tr><td>2</td><td>$1.0055 \times 49\,525 - 750 = 49\,047.39$</td></tr><tr><td>3</td><td>$1.0055 \times 49\,047.3875 - 750 = 48\,567.15$</td></tr></table>After three months Halim still owes $48 567.15.</td><td>✓ identifies recurrence relation for reducing balance loan

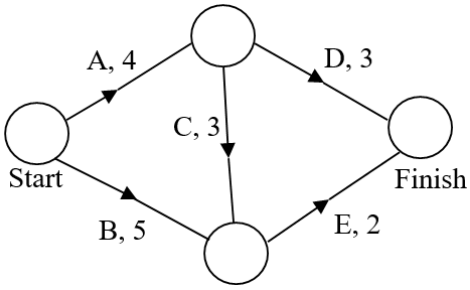
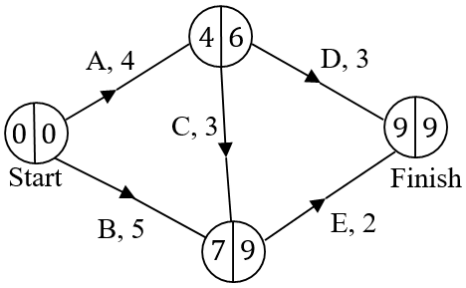
✓ determines r

✓✓ applies iterative procedure for reducing balance loan
✓✓ determines value after 3 months</td></tr>
</table>

Q 3a	5 edges	✓ identifies number of edges
Q 3b	Vertex B	✓ identifies vertex
Q 3c	3 faces	✓ identifies number of faces
Q 4	Loan option 1: Total repayment $= 18 \times 12 \times 2000$ $= 432\,000$ Loan option 2: $A = 350\,000$ $d = ?$ $i = \frac{3.38}{2600}$ $n = 25 \times 26$ Fortnightly repayment $A = d\left(\frac{1-(1+i)^{-n}}{i}\right)$ $350\,000 = d\left(\frac{1-(1+0.0013)^{-650}}{0.0013}\right)$ $350\,000 = d \times 438.62$ $d = 797.96$ Total repayment $= 25 \times 26 \times 797.96$ $= 518\,674$ Difference $= 518\,674 - 432\,000$ $= 86\,674$ The bank manager is correct. More than \$80 000 in repayments is saved.	✓ calculates total repayment for loan option 1 ✓ determines i and n for loan option 2 ✓ identifies present value annuity formula ✓ substitutes values into formula ✓ calculates fortnightly repayment ✓ calculates total repayment for loan option 2 ✓ determines difference in total repayments between loan options ✓ provides justified decision about reasonableness of claim
Q 5a	3 edges	✓ identifies number of edges
Q 5b	Boulia and Cloncurry	✓ identifies adjacent towns
Q 5c	Cloncurry and Kynuna Highest degree is 3	✓ identifies vertices ✓ identifies highest degree

Q 6a		✓✓ uses a diagram to represent all connections ✓ shows all cable lengths
Q 6b	 Minimum spanning tree edges are AC, BE, CE and DE. Minimum spanning tree length = 8 + 6 + 9 + 7 = 30 m	✓✓ identifies minimum spanning tree ✓ calculates total length of minimum spanning tree
Q 7a	$\begin{array}{c} \\ WA \\ NT \\ SA \\ Qld \\ NSW \\ Vic \\ ACT \\ Tas \end{array} \begin{array}{c} \begin{array}{cccccccc} WA & NT & SA & Qld & NSW & Vic & ACT & Tas \end{array} \\ \begin{bmatrix} 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 1 & 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} \end{array}$	✓ labels rows and columns ✓ enters values for one row or one column ✓✓ enters values to complete adjacency matrix
Q 7b		✓ shows 8 labelled vertices to represent states and territories ✓ shows an isolated vertex for Tasmania ✓✓ shows 10 edges to connect other vertices

Q 8a	An Euler trail uses every edge once only (may visit a vertex more than once). Degree of each vertex: A(3), B(3), C(4), D(4), E(2) For an Euler trail, begin with an odd-numbered vertex and end with the other odd-numbered vertex. Therefore, beginning with vertex A, one possible trail is: A – B – C – A – D – C – E – D – B. Total walking distance $= 8 \times 2 = 16$ km	✓✓ demonstrates understanding of an Euler trail (may be implied if trail is identified) ✓✓ explains reasoning ✓✓ identifies an Euler trail ✓✓ calculates total walking distance
Q 8b	A Hamiltonian cycle returns to the starting vertex and visits every other vertex once only. Beginning with vertex A, one possible cycle is: A – D – E – C – B – A. Total distance to walk is $= 5 \times 2 = 10$ km Time to walk $= 10 \div 5 = 2$ h Time spent at 5 castles $= 5 \times 20$ min $= 100$ min $= 1$ h 40 min Total time = 2 h + 1 h 40 min = 3 hours 40 minutes. 5:00 pm − 3 h 40 min = 1:20 pm The family must leave at 1:20 pm to complete their tour by 5:00 pm.	✓✓ identifies a Hamiltonian cycle ✓✓ uses speed to calculate walking time ✓✓ calculates total tour time ✓✓ determines latest time to begin tour
Q 9	Using a spanning tree will allow students to walk to any building under cover, while minimising the construction cost.  Total length of walkway = 5 + 10 + 30 + 40 + 35 + 35 = 155 m Number of stormwater connections = 10 Total cost $= 155 \times 180 + 10 \times 1220$ $= 40\ 100$ The total cost to build the walkway will be $40 100.	✓✓ identifies a spanning tree ✓✓ calculates total walkway length ✓✓ determines number of stormwater connections ✓✓ calculates total cost

Q 10a		✓✓ constructs a project network diagram with 5 directed arcs representing interdependencies of activities ✓✓ labels start and finish, activities and durations
Q 10b	 Critical path (longest path) is Start, A, C, E, Finish Minimum project completion time = 9 weeks Non-critical activities are B and D. Float time for B = 2 weeks Float time for D = 2 weeks Activities B and D could be delayed or extended by a total of up to two weeks without affecting the minimum project completion time.	✓✓ determines critical path ✓✓ determines minimum project completion time ✓✓ identifies all non-critical activities ✓✓ identifies float time for all non-critical activities