



General Mathematics 2025 v1.2

IA3: Sample assessment instrument

This sample has been compiled by the QCAA to assist and support teachers in planning and developing assessment instruments for individual school settings.

Student name	sample only
Student number	sample only
Teacher	sample only
Exam date	sample only

Marking summary

Criterion	Marks allocated	Provisional marks
Foundational knowledge and problem-solving	15	
Overall	15	

Conditions

Technique	Examination — short response
Unit	Unit 4: Investing and networking
Topic/s	Topic 1: Loans, investments and annuities 1 Topic 3: Graphs and networks Topic 4: Networks and decision mathematics 1
Time	90 minutes + 5 minutes perusal
Seen/Unseen	Unseen questions
Other	The teacher must provide the QCAA General Mathematics formula book. Students are required to use technology. Students must not bring notes into the examination.

Instructions

- Show all working in the space provided.
- Use a black or blue pen.
- Use of a scientific calculator is permitted.

Summative internal assessment 3 (IA3): Examination

Question 1 (4.5 marks)

Anna invests \$12 000 in an account where she earns 3.2% p.a. compounded quarterly.

- a) Develop a recurrence relation that models the value of her investment at the beginning of each quarter.

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- b) Use the recurrence relation to determine the value of the investment after one year.

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- c) Use the compound interest formula to calculate how much the investment will be worth six years from when it was first invested.

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Question 2 (3 marks)

Halim borrows \$50 000 from a bank at 6.6% p.a. compounded monthly. He is required to make a regular monthly repayment of \$750. Determine how much he still owes on the loan after three months.

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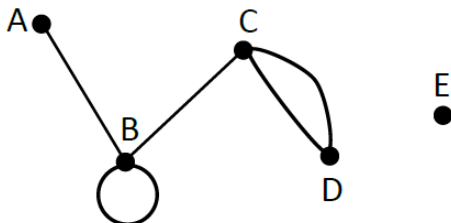
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Question 3 (1.5 marks)

Consider the graph below:



a) How many edges are shown in the graph?

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b) Which vertex has a loop edge?

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c) How many faces does the graph have?

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Question 4 (4 marks)

Pippa needs to borrow \$350 000 and has a choice of two reducing balance loans.

Loan option 1 requires fixed monthly repayments of \$2 000 for 18 years.

Loan option 2 requires fixed fortnightly repayments for seven years more than loan option 1 and has an interest rate of 3.38% p.a. compounding fortnightly.

The bank manager tells Pippa that she will save at least \$80 000 in repayments if she chooses loan option 1. Evaluate the reasonableness of the bank manager's claim.

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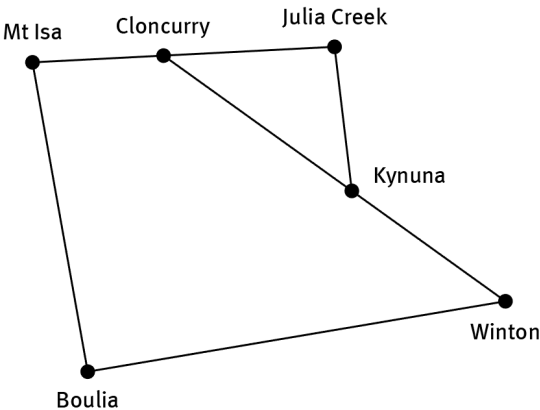
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Question 5 (2 marks)



Using the above map, determine:

a) the number of edges directly connected to Kynuna

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b) the town/s adjacent to Mt Isa

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c) the vertices with the highest degree and the degree of those vertices.

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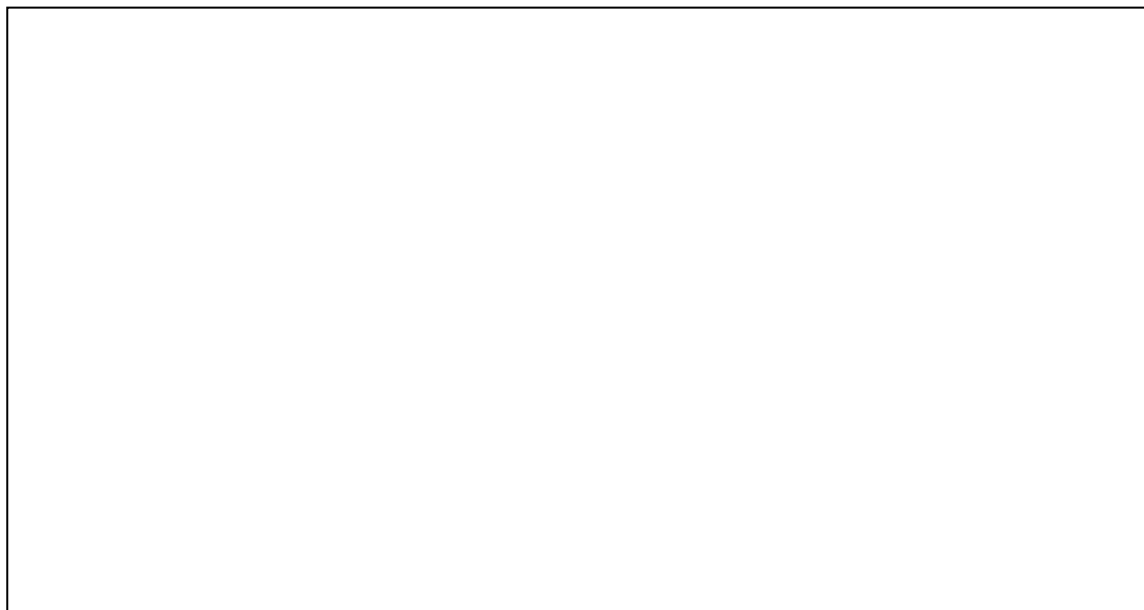
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Question 6 (3 marks)

Ms Nguyen is doing a major upgrade of her home computer network. The table below represents the length (metres) of cable that she will need to connect the rooms of her house (labelled A–E).

	B	C	D	E
A	14	8	15	10
B	–	12	13	6
C	–	–	11	9
D	–	–	–	7

a) Use a diagram to represent the home computer network.



b) Identify the minimum spanning tree and calculate its total length.

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Question 7 (4 marks)

Australia is divided into eight states and territories.



- a) Use an adjacency matrix to represent the number of land borders between the states and territories.

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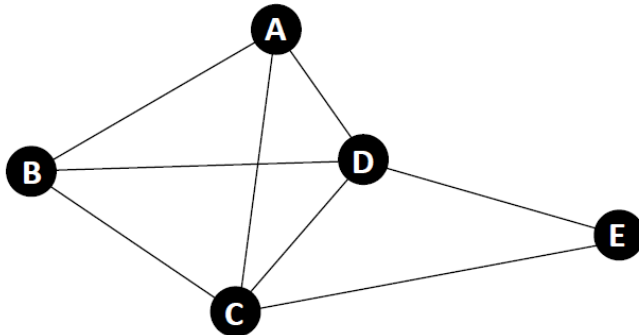
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- b) Create a graph to represent this situation, with the vertices representing the states and territories, and the edges representing the borders.



Question 8 (4, 4 marks)

The Edwards family is on holiday in England and wishes to complete a walking tour that could visit five castles. The map below represents the five castles and their connecting walking tracks. All track lengths are 2 kilometres.



- a) Determine an Euler trail that the family could follow and calculate its total walking distance. Explain your reasoning.

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- b) The family decides to complete a Hamiltonian cycle to complete their tour by 5:00 pm. Assuming the family can walk at a speed of 5 kilometres per hour and they spend only 20 minutes at any castle on the cycle, determine the latest time they can begin the tour.

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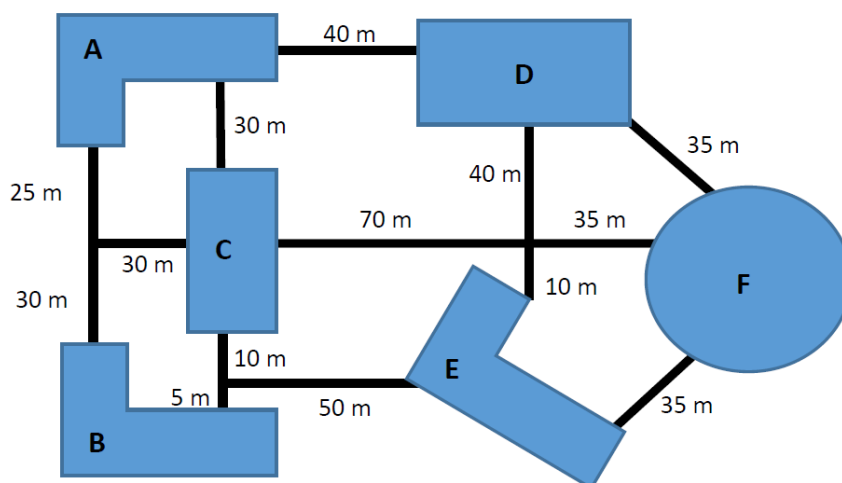
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Question 9 (4 marks)

The map below shows the possible locations of covered walkways to connect six buildings in a new school. The length of each section is shown. For the initial construction, only some of the walkways will be built, at a cost of \$180 per metre. This initial construction must allow students to walk to any building, using covered walkways and through other buildings. In addition, at each point that a walkway connects to a building, it will also be connected to the stormwater system at a cost of \$1 220 per connection (e.g. Building A has three possible connections to the stormwater system).



Develop the cheapest quote for the initial construction. Justify decisions made using mathematical reasoning.

This image shows a full page of white paper with horizontal dotted lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Question 10 (2, 4 marks)

The activity table for a project is shown.

Activity letter	Immediate predecessor	Duration (weeks)
A	–	4
B	–	5
C	A	3
D	A	3
E	B, C	2

a) Construct a project network diagram using this information.

This image shows a full page of white paper with horizontal dashed lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

- b) Determine any activities that could be delayed or extended, and by how long, without affecting the minimum project completion time. Justify all decisions made using mathematical reasoning.

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Examination marks summary

Question number	Simple familiar (SF)	Complex familiar (CF)	Complex unfamiliar (CU)
1	4.5		
2	3		
3	1.5		
4		4	
5	2		
6	3		
7	4		
8	4		4
9			4
10	2	4	
Totals	24	8	8

Instrument-specific marking guide (IA3): Examination — short response (15%)

Foundational knowledge and problem-solving	Cut-off	Marks
The student response has the following characteristics:		
consistently correct recall and use of mathematical knowledge; authoritative and accurate communication of mathematical knowledge; astute evaluation of the reasonableness of solutions; use of mathematical reasoning to correctly justify procedures and decisions; and fluent application of mathematical knowledge to solve problems in a comprehensive range of simple familiar, complex familiar and complex unfamiliar situations	>93%	15
	>87%	14
correct recall and use of mathematical knowledge; clear communication of mathematical knowledge; considered evaluation of the reasonableness of solutions; use of mathematical reasoning to justify procedures and decisions; and proficient application of mathematical knowledge to solve problems in simple familiar, complex familiar and complex unfamiliar situations	>80%	13
	>73%	12
thorough recall and use of mathematical knowledge; communication of mathematical knowledge; evaluation of the reasonableness of solutions; use of mathematical reasoning to justify procedures and decisions; and application of mathematical knowledge to solve problems in simple familiar and complex familiar situations	>67%	11
	>60%	10
recall and use of mathematical knowledge; communication of mathematical knowledge; evaluation of the reasonableness of some solutions; some use of mathematical reasoning; and some application of mathematical knowledge to make progress towards solving problems in simple familiar situations	>53%	9
	>47%	8
some recall and use of mathematical knowledge; and basic communication of mathematical knowledge	>40%	7
	>33%	6
infrequent recall and use of mathematical knowledge; and basic communication of some mathematical knowledge	>27%	5
	>20%	4
isolated recall and use of mathematical knowledge; and partial communication of rudimentary mathematical knowledge	>13%	3
	>7%	2
isolated and inaccurate recall and use of mathematical knowledge; and disjointed and unclear communication of mathematical knowledge.	>0%	1
The student response does not satisfy any of the descriptors above.		0

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