



Queensland Curriculum and Assessment Authority

Essential Mathematics 2019 v1.1

IA4: Sample assessment instrument

Examination

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

Student number

Teacher

Exam date

Marking summary

Criterion	Marks allocated	Provisional marks
Foundational knowledge and problem-solving	40	
Overall	40	

Conditions

Technique	Examination
Unit	Unit 4: Graphs, chance and loans
Topic/s	Fundamental topic: Calculations Topic 1: Bivariate graphs Topic 2: Probability and relative frequencies Topic 3: Loans and compound interest
Time	1 hour + 5 minutes perusal
Seen/Unseen	Unseen questions
Other	Only the QCAA formula sheet must be provided. Notes are not permitted.

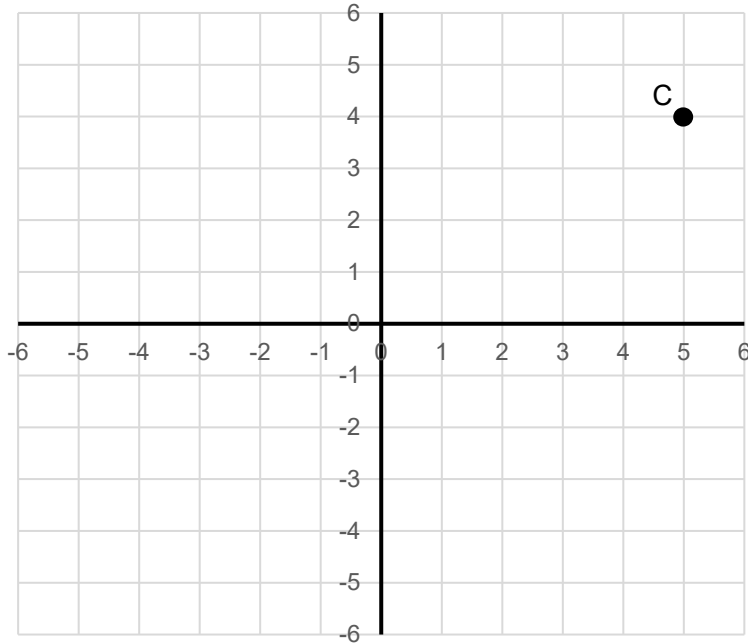
Instructions

- Show all working in the space provided.
- Use a black or blue pen.

Part A — simple (32 marks)

Question 1 (3 marks)

The Cartesian plane below shows Colin's position (C) on a sports field.



- a. Write down the coordinates of Colin's position.

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- b. Adam (A) is at position (2, -4) and Ben (B) is at position (-3, 0) on the sports field. Plot the positions of these players on the Cartesian plane.

Question 2 (2 marks)

The cost of a taxi ride can be represented by the equation $C = 4 + 2D$, where C is the total fare (in dollars) and D is the total distance travelled (in kilometres).

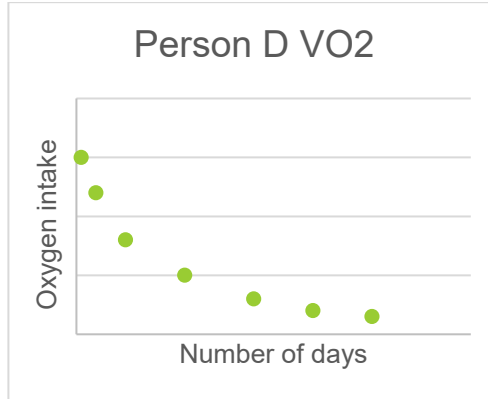
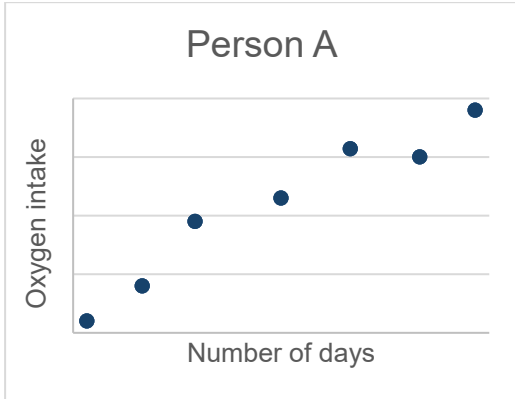
The table below shows the fare for different distances travelled. Use the equation above to calculate the missing fares and write them in the blank spaces.

total distance, D (km)	0	1	2	5
total fare, C (\$)		6	8	

Question 3 (3 marks)

Oxygen intake is a measure of cardiovascular fitness.

The graphs below represent the cardiovascular fitness of Person A and Person B over a number of days of training.



Describe the relationship between oxygen intake and the number of days in terms of direction, form and strength for:

- a. Person A

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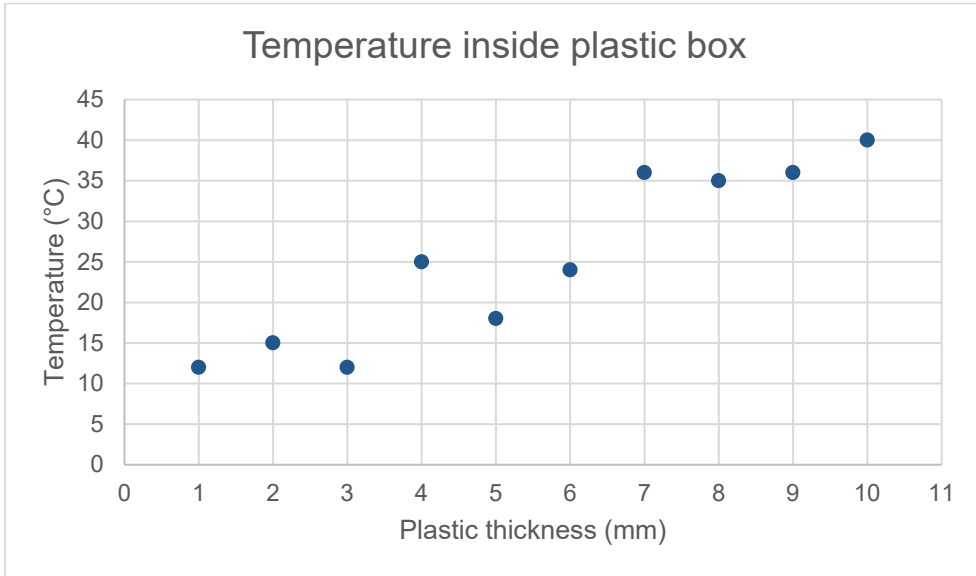
- b. Person B

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Question 4 (4 marks)

Consider the scatterplot below.



- a. Identify the dependent and independent variables.

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- b. Draw a line of best fit on the scatterplot.

Question 5 (5 marks)

A survey asked students how many pets they had. The table below shows the findings.

Number of pets	0	1	2	3	4 or more
Number of students	3790	784	70	316	40

If a student is selected at random:

- a. Calculate the probability that the student has one pet. Round your answer to two decimal places.

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- b. Calculate the probability that the student has fewer than two pets. Round your answer to two decimal places.

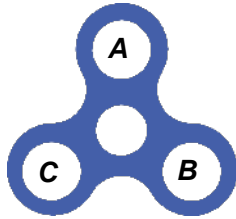
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Question 6 (6 marks)

A coin is tossed and a fidget spinner labelled A , B and C is spun.



- a. Write down the sample space for this event.

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- b. Using this information, calculate the probability of the following events:

- i. $\{\text{tails and } A\}$

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- ii. $\{\text{heads and } (B \text{ or } C)\}$

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Question 7 (4 marks)

Carrie deposits \$500 into her bank account. The account offers an interest rate of 7.5% p.a. simple interest. Carrie has five years to save for a formal dress.

- a. Calculate the total interest she would earn over five years.

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- b. If Carrie used all her savings, determine the most expensive dress she could afford after five years.

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Question 8 (5 marks)

Thad is going to conduct an experiment by rolling a standard die three times, noting each time whether the result is an odd number (O) or an even number (E).

- a. Draw a tree diagram showing all possible outcomes of the experiment.

- b. From your tree diagram, list all possible outcomes of the experiment.

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- c. Calculate the probability of Thad rolling exactly two odd numbers.

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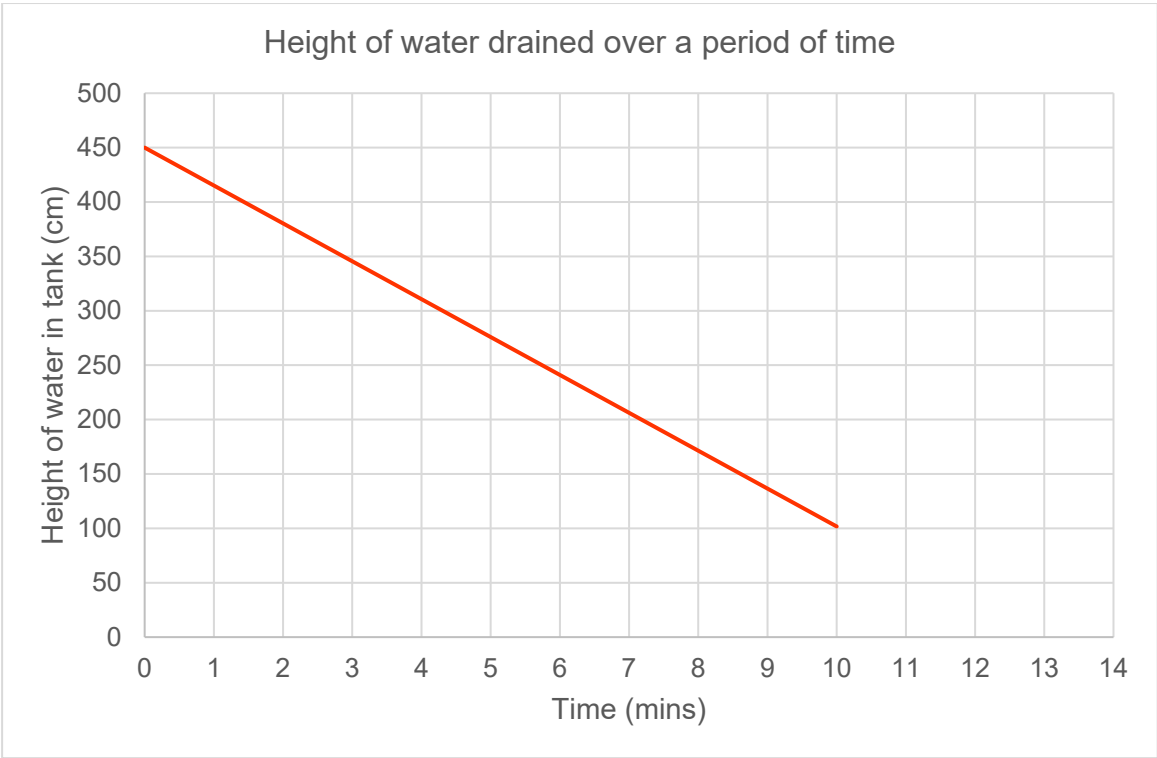
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Part B — complex (8 marks)

Question 9 (4 marks)

The graph below shows the rate at which water drains out of a rainwater tank.



- a. Use the graph to determine:
 - i. the height of water in the tank after draining for three minutes

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- ii. how long it would take for water in the tank to drain to a height of 225 cm.

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- b. Evaluate the reasonableness of the prediction that the tank will be empty after draining for approximately 13 minutes.

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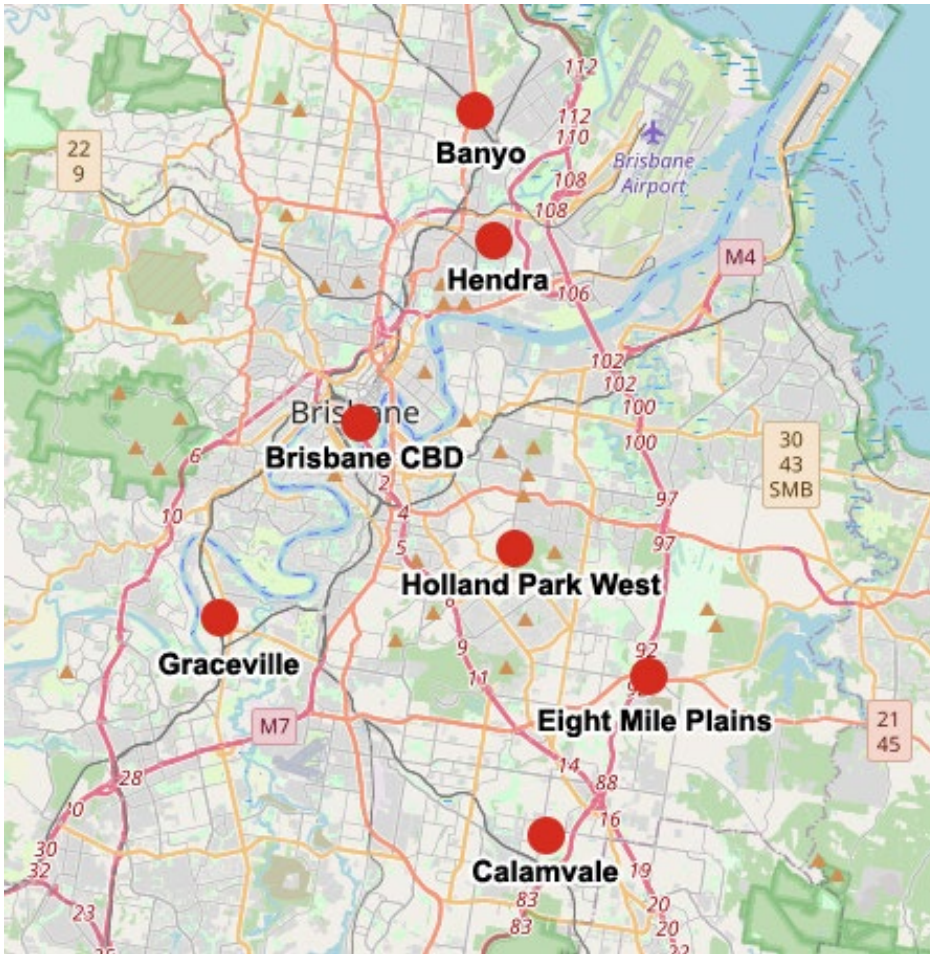
- c. Explain one of the dangers of extrapolating a trend in the graph's data.

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Question 10 (4 marks)

Below is a map of Brisbane and its surrounding suburbs.



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The table below lists the median house prices for the six suburbs indicated on the map.

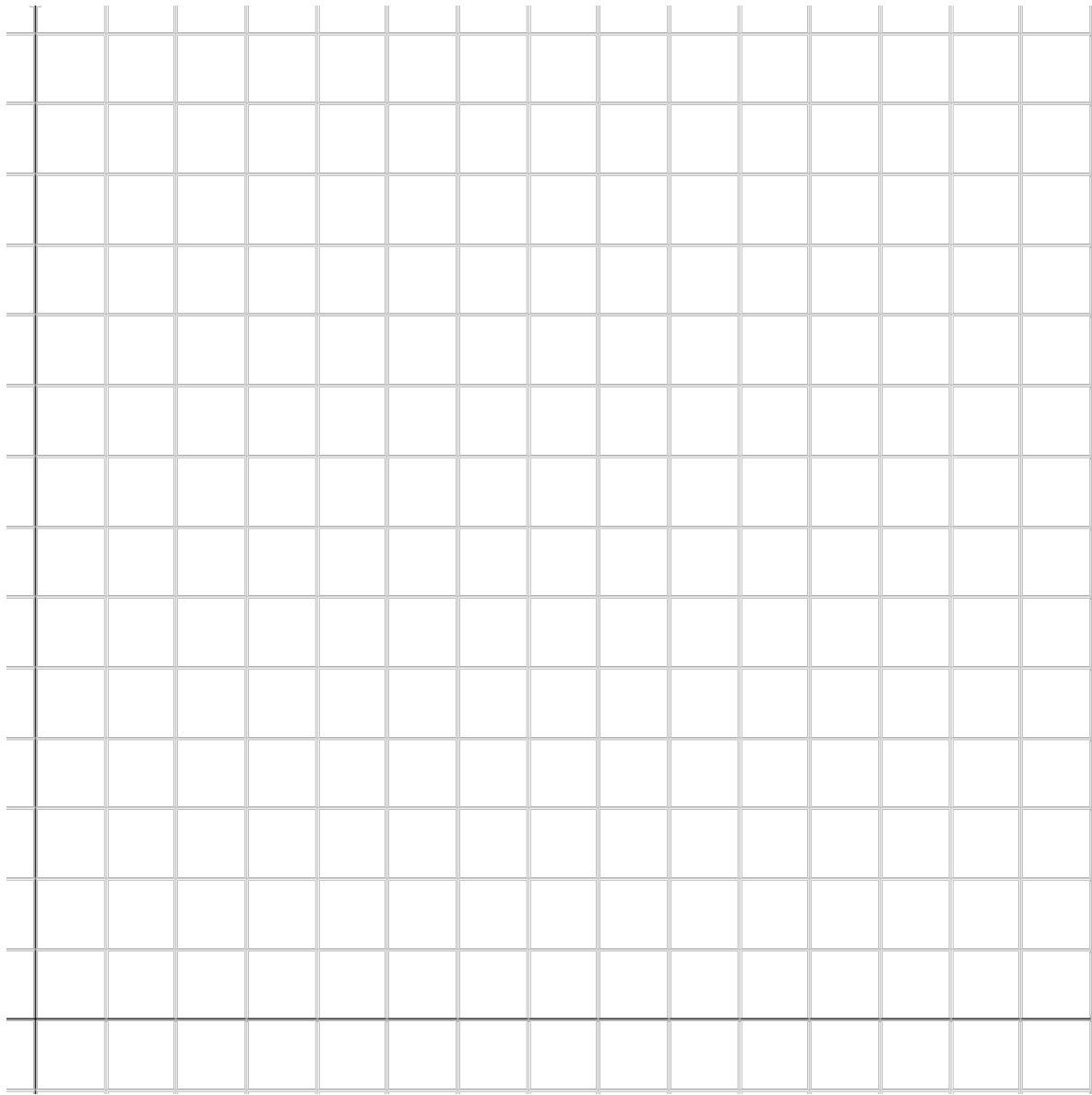
Suburb	Median price (in million dollars)
Graceville	1.3475
Banyo	0.8155
Holland Park West	1.1625
Eight Mile Plains	1.065
Calamvale	0.871
Hendra	1.5235

Data from realestate.com.au

A real estate agent states that ‘there is a strong correlation between distance from the Brisbane CBD and house prices — the closer a house is to the CBD, the more it costs’.

Develop a model to explain if this is a reasonable statement. If needed, use the graph paper on the following page.

A large area of graph paper with horizontal dotted lines for writing, intended for developing a model to explain the statement about house prices and distance from the CBD.



Instrument-specific standards: (IA4): Examination

Foundational knowledge and problem-solving	Cut-off	Grade
The student work has the following characteristics:		
<ul style="list-style-type: none"> comprehensive selection, recall and use of simple and complex facts, rules, definitions and procedures; comprehension and clear communication of simple and complex mathematical concepts and techniques; evaluation of the reasonableness of solutions and use of mathematical reasoning to justify procedures and decisions; and proficient application of simple and complex mathematical concepts and techniques to solve problems. 	> 80%	A
<ul style="list-style-type: none"> selection, recall and use of simple and some complex facts, rules, definitions and procedures; comprehension and communication of simple and some complex mathematical concepts and techniques; evaluation of the reasonableness of some solutions using mathematical reasoning; and application of simple and some complex mathematical concepts and techniques to solve problems. 	> 60%	B
<ul style="list-style-type: none"> selection, recall and use of simple facts, rules, definitions and procedures; comprehension and communication of simple mathematical concepts and techniques; discussion of the reasonableness of solutions using mathematical reasoning; and application of simple mathematical concepts and techniques to solve problems. 	> 40%	C*
<ul style="list-style-type: none"> some selection, recall and use of facts, rules, definitions and procedures; basic comprehension and communication of mathematical concepts and techniques; some discussion of the reasonableness of solutions; and inconsistent application of mathematical concepts and techniques. 	> 20%	D
<ul style="list-style-type: none"> isolated and inaccurate selection, recall and use of facts, rules, definitions and procedures; disjointed and unclear communication of mathematical concepts and techniques; superficial discussion of the reasonableness of solutions. 	≥ 0%	E

* Equivalent to > 50% for Part A simple questions only.



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