LUI

Venue code $\square$
$\square$
$\square$


Sample assessment 2020

## General Mathematics

## Paper 2

## Time allowed

- Perusal time - 5 minutes
- Working time - 90 minutes


## General instructions

- Answer all questions in this question and response book.
- Write using black or blue pen.
- QCAA-approved calculator permitted.
- QCAA formula sheet provided.
- Planning paper will not be marked.


## Section 1 (40 marks)

- 9 short response questions

DO NOT WRITE ON THIS PAGE

THIS PAGE WILL NOT BE MARKED

## Public use

## Section 1

## Instructions

- Questions worth more than one mark require mathematical reasoning and/or working to be shown to support answers.
- If you need more space for a response, use the additional pages at the back of this book.
- On the additional pages, write the question number you are responding to.
- Cancel any incorrect response by ruling a single diagonal line through your work.
- Write the page number of your alternative/additional response, i.e. See page ...
- If you do not do this, your original response will be marked.


## DO NOT WRITE ON THIS PAGE

THIS PAGE WILL NOT BE MARKED

## Public use

## QUESTION 1 (4 marks)

Sara departs from Sydney, Australia, on Saturday at 6:15 am on a flight to Johannesburg, South Africa. The flight takes 14 hours and 18 minutes.
Her friend Marcus arrives in Johannesburg from Lima, Peru, at the same time, on a flight that took 18 hours and 15 minutes.

The time zones are shown in the following table.

| City | Country | UTC |
| :---: | :---: | :---: |
| Sydney | Australia | +10 |
| Lima | Peru | -5 |
| Johannesburg | South Africa | +2 |

Determine the local time and day that Marcus left Lima.

## Public use

## QUESTION 2 (4 marks)

A cable company is calculating the cost of laying cable between five houses ( $\mathrm{A}, \mathrm{B}, \mathrm{C}, \mathrm{D}$ and E ). The unit cost of laying the cable is $\$ 2.50$ per metre.
The shortest distances (in metres) between the houses are shown below.

|  | $\mathbf{A}$ | $\mathbf{B}$ | $\mathbf{C}$ | $\mathbf{D}$ | $\mathbf{E}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{A}$ | 0 | 20 | 400 | 35 | 8000 |
| $\mathbf{B}$ | 20 | 0 | 800 | 70 | 3000 |
| $\mathbf{C}$ | 400 | 800 | 0 | 500 | 2000 |
| $\mathbf{D}$ | 35 | 70 | 500 | 0 | 8000 |

a) Construct a network diagram to represent the distances between the houses in the space provided below.
b) Determine the minimum cost to connect all of the houses.
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## QUESTION 3 (4 marks)

Music students in a school were asked how many hours they practised their musical instrument each week.

Seventy-two Year 7 music students were surveyed. The results are shown below.

- 15 students practised for 2 hours or less.
- 53 students practised for more than 2 hours and up to 4 hours.
- 4 students practised for more than 4 hours per week.

Seventeen Year 12 music students were surveyed. The results are shown below.

- 2 students practised for 2 hours or less.
- 11 students practised for more than 2 hours and up to 4 hours.
- 4 students practised for more than 4 hours per week.

Determine any patterns that suggest the presence of an association, providing reasons for your conclusion.

## Public use

## QUESTION 4 (3 marks)

You have a savings account with an interest rate of $2.4 \%$ per annum paid quarterly. Your bank makes you a new offer. You are entitled to either an increase in the interest rate of $0.5 \%$ per annum, or to your current interest paid monthly.

Determine which option is the most profitable.

## Public use

## QUESTION 5 (8 marks)

Kate, Luca and Marcel are carpenters. Each carpenter needs to build one piece of furniture: a bookcase, a chair or a desk.

As each carpenter works at a different rate, the table below shows the total cost for each carpenter to build each piece of furniture.

|  | Bookcase | Chair | Desk |
| :---: | :---: | :---: | :---: |
| Kate | $\$ 196$ | $\$ 62$ | $\$ 203$ |
| Luca | $\$ 150$ | $\$ 60$ | $\$ 147$ |
| Marcel | $\$ 127$ | $\$ 77$ | $\$ 111$ |

a) Use the Hungarian algorithm to determine who should build each piece of furniture to minimise the total cost.
b) Evaluate the reasonableness of your solution to 5a).

## Public use

## QUESTION 6 (3 marks)

At midnight on 29 December 2011, the International Date Line was moved. This resulted in Samoa and Tokelau changing from the eastern side of the date line to the western side (see map below).


Determine what time, date and year it was in Samoa one minute after this change.

## Public use

## QUESTION 7 (7 marks)

In 2011, Chris was earning a salary of $\$ 67500$. Chris receives the same pay increase each year and in 2018 was earning a salary of $\$ 84300$.

In 2015, Sam was earning a salary of $\$ 79$ 500. Sam receives the same pay increase each year and in 2019 was earning a salary of \$87900.

Determine when Chris will earn more than Sam.

## Public use

## QUESTION 8 (3 marks)

A teacher wants to know the best way for their students to improve their marks. They surveyed a sample of students who graduated last year and asked them three questions:

- What was the overall mark you achieved on the final assessment?
- On a typical night, how many hours sleep would you get?
- During a typical school term, how many classes did you miss?

They obtained the following data:

| Overall percentage mark (\%) | Hours of sleep | Classes missed |
| :---: | :---: | :---: |
| 96 | 10 | 0 |
| 85 | 9 | 2 |
| 76 | 8 | 8 |
| 65 | 7 | 5 |
| 42 | 5 | 6 |

Construct a mathematical argument to determine which explanatory variable is the better predictor for the overall mark.

## Public use

## QUESTION 9 (4 marks)

The table below shows the seasonally adjusted rainfall data (in mm) for a town in Australia.

|  | $\mathbf{2 0 1 5}$ | $\mathbf{2 0 1 6}$ |
| :--- | :---: | :---: |
| Summer | 96.77 | 101.61 |
| Autumn | 98.04 | 101.96 |
| Winter | 100.00 | 101.39 |
| Spring | 100.97 | 102.91 |

The seasonal indices are shown in the table below.

| Summer | 1.24 |
| :--- | :--- |
| Autumn | 1.02 |
| Winter | 0.72 |
| Spring | 1.03 |

In 2017, the actual rainfall in summer was 127 mm , autumn was 106 mm , winter was 75 mm and spring was 107 mm .

Analyse the data to predict the total rainfall for each season in 2025.

END OF PAPER

## Public use

ADDITIONAL PAGE FOR STUDENT RESPONSES
Write the question number you are responding to.

## Public use

ADDITIONAL PAGE FOR STUDENT RESPONSES
Write the question number you are responding to.

