LUI			Test venue code
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First names			Attach your
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Thursday 1 June 2017

Question and response book

# **Mathematics B**

### Time allowed

Perusal time — 5 minutes Working time — 60 minutes

#### **General instructions**

- Fill in the multiple-choice answer bubbles using 2B pencil.
- Write Section D responses using black or blue pen.
- Answer all questions in this question and response book.
- A formulae sheet is provided with this paper.

Paper 2 — technology active

**Section C** Ten multiple-choice questions

Section D Six short-response questions



#### DO NOT WRITE ON THIS PAGE

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# **SECTION C**

## Instructions

Choose the best answer for Questions 1–10. Use a 2B pencil to fill in the A, B, C, or D answer bubble completely.

If you change your mind or make a mistake, use an eraser to remove your response and fill in the new answer bubble completely.

Example:	A ●	B 🔾	С 🔾	D 🔾
1.	A ()	B ()	C ()	D 🔿
2.	A ()	B 🔾	C ()	D 🔾
3.	A 🔾	B 🔾	С 🔾	D ()
4.	A ()	B ()	с 🔾	D 🔾
5.	A 🔿	B ()	С 🔾	D ()
6.	A 🔿	B ()	С 🔾	D 🔾
7.	A 🔿	B ()	С 🔾	D 🔾
8.	A ()	B ()	с 🔾	D 🔾
9.	A 🔾	B 🔾	С 🔾	D ()
10	). A 🔿	B 🔾	C 🔾	D 🔾

# **SECTION D**

#### Instructions

- Write your responses using black or blue pen.
- There is no need to fill all the space provided when responding.
- Include units in final answers, where appropriate.
- Questions worth more than one mark require working to be shown to support answers.
- Set the angle mode on your calculator to degrees. Change to radian measure only if instructed in the question.
- Apart from whole numbers, state all final answers to **two decimal places**.
- If you need more space for your response, use the additional pages at the back of the book:
  - To cancel your incorrect response, rule a single, diagonal line through your work. If you fail to
    do this, your original response will be marked.
  - Note the page number of your additional response, i.e. See page ...

Any additional planning required to complete the questions in Section D may be completed on the planning paper supplied. This planning paper will not be marked.

A research student measured the tip-to-tip length between the arms of a starfish to be 10 cm, as shown in the diagram.

- All angles between the arms were equal.
- All arms were equal in length.



Use the sine rule to calculate the length of one arm, *a*, from the centre of the starfish to the tip.

[5 marks]

The histogram shows the results of a class test. No fractional marks were awarded.



		[5 mar

A line and parabola are sketched below. A and B are the points of intersection.

The line has the equation  $y = \frac{1}{4}x + 22$ The parabola has the equation  $y = -\frac{1}{60}x^2 + 4x - 160$ 

Calculate the straight-line distance between the points *A* and *B*. No units are required in your answer.



#### Set the angle mode on your calculator to radians for this question.

The sea temperature around a certain tropical island can be modelled by the equation

$$S = 3\cos\left(\frac{2\pi t}{365}\right) + 25$$

where S = sea temperature (in degrees Celsius) and t = number of days from the start of the year.

Using this model, how many days from the start of the year will the water temperature first become 23 °C?

	[4 marks]
Return the angle mode on your calculator to degrees.	

Arnold and Brenda are walking in different locations in a flat area of land. They are both able to see the top of a 25-metre high tower.

Arnold is north-west (N45°W) of the tower and he measures the angle of elevation to the top of the tower as 10°.

Brenda is east of the tower and she measures the angle of elevation to the top of the tower as 15°.



Not to scale

Calculate the straight-line distance between Arnold and Brenda at this moment.

	[6 marks]
	_

There are many costs involved in the maintenance of Australian forests, particularly near housing and residential areas. One of these maintenance costs is controlled burning.

The data in the table shows the maintenance cost per hectare (\$/ha) including controlled burning in forest areas.

Area burnt, <i>x</i> (ha)	190	170	380	q
Maintenance cost per hectare including burning, y (\$/ha)	5880	р	3505	4505

#### a) Form a linear mathematical model describing the data in the table above.

	-
Use your model to determine the missing data values, <i>p</i> and <i>q</i> , in the table above.	[4 marks]
	-
	[4 marks]

c) In its forest maintenance program, a council is planning to burn 250 ha of forest.

The council needs to cut costs and save at least \$100 000 in its forest maintenance spending. A suggestion has been made to burn 200 ha of forest instead of 250 ha.

Determine whether this suggestion would save the council the required amount of money.

[7 marks]

#### END OF PAPER 2

#### ADDITIONAL PAGE FOR STUDENT RESPONSES

Note the question number you are responding to.

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