

## **WARNING**

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Family Name					
Given Name/s					
Student Number					
Teaching Period	Semester 2, 2018				

EMA100 – Mathematics Education 1: Content Knowledge for Teaching	<b>DURATION</b>	
	Reading Time:	10 minutes
	Writing Time:	120 minutes
<b>INSTRUCTIONS TO CANDIDATES</b>		
1.1 The examination has <b>2</b> sections		
<b>Section A:</b>	<b>Multiple Choice Questions:</b> Answer ALL 25 questions.	
Suggested Time: 60 min	Section A is worth 50 marks. Each question is worth 2 marks.	
<b>Section B:</b>	<b>Short Answer Questions:</b> Answer ALL 5 questions.	
Suggested Time: 60 min	Section B is worth 50 marks. Each question is worth 10 marks.	
<p>Section A must be answered in the Answer Booklet provided and must be handed in with your Examination Paper. Please ensure that your Name and Student Number are clearly indicated on your Answer Booklet and at the top of this Examination Paper.</p> <p>Questions in Section B must be answered directly onto the Examination Question Paper. Please ensure that your Name and Student Number are written clearly in the space provided at the top of this page.</p> <p style="text-align: center;">Make sure you show all working in your answers in Section B.</p>		
1.2 Section A questions are each worth 2 marks and Section B questions are each worth a total of 10 marks. Note that sub-questions in section B <b>ARE NOT</b> of equal value.		
1.3 Read <b>ALL</b> questions carefully.		
1.4 Do not commence writing until instructed to do so.		

## EXAM CONDITIONS

**You may begin writing from the commencement of the examination session.** The reading time indicated above is provided as a guide only.

This is a CLOSED BOOK examination

No calculators are permitted

No handwritten notes are permitted

No dictionaries are permitted

### ADDITIONAL AUTHORISED MATERIALS

No additional printed material is permitted

### EXAMINATION MATERIALS TO BE SUPPLIED

1 x 4-Multiple Choice Answer Sheet  
2 x Scrap Paper  
Reference Information

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DOUBLE-SIDED.**

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LEFT BLANK.**

**Section B**  
**Short Answer Questions**  
**Total Number of Marks for this section: 50**

This section should be answered on the examination question paper. Please ensure that your name and student number have been written on the examination paper.

Answer all five questions.

Each question is worth 10 marks.

Suggested Time allocation for Section B: 60 minutes

**Make sure you show all working in your answers.**

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**Question 26**

All parts of Question 26 relate to the graphs and data at the end of Question 26.

(a) What are the biggest and smallest states in Australia by area?

Biggest state in Australia:

Smallest state in Australia:

(b) Calculate the difference between their areas.

(c) Calculate the total percentage of Australian people that live in Victoria and NSW combined.

(d) Use the given information to estimate the populations of Sydney and Darwin.  
Estimated population of Sydney:

Estimated population of Darwin:

(e) Use the given information to estimate the average monthly temperature in Darwin and the average yearly rainfall in Melbourne.

Estimated average monthly temperature in Darwin:

Estimated average yearly rainfall in Melbourne:

# Australia

## Statistics

### Land

Area (sq km)

ACT 2385

Tasmania  
68 401

South Australia  
983 482

Northern Territory  
1 349 129

New South Wales  
800 642

Victoria  
227 416

Western Australia  
2 529 875

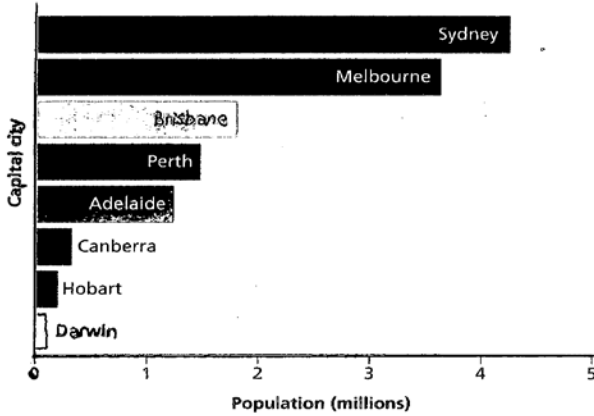
Queensland  
1 730 648

### People

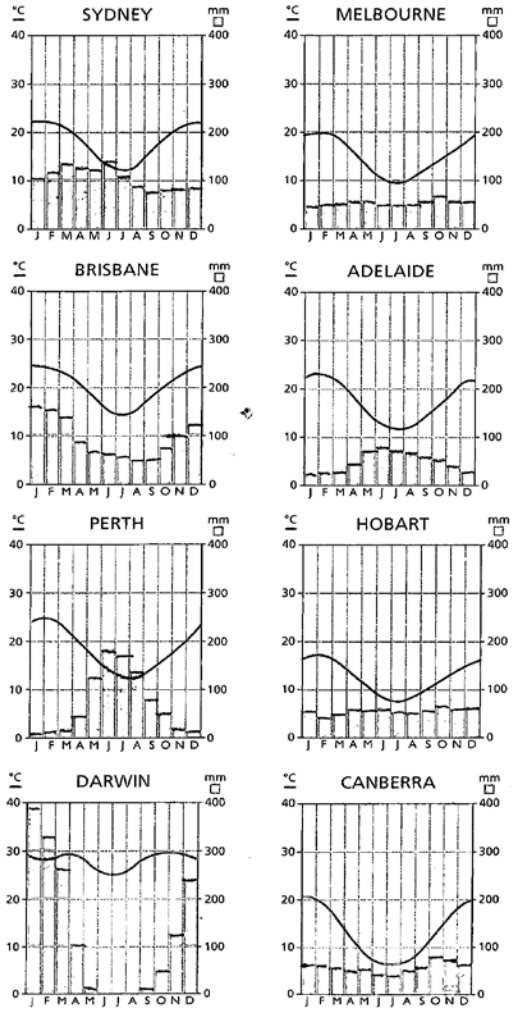
State/Territory	Total population	Proportion of Australia's total (%)	Aboriginal and Torres Strait Islander population	Proportion of Australian indigenous people (%)
New South Wales	6 827 700	33.1	119 870	29.3
Victoria	5 091 700	24.7	25 080	6.1
Queensland	4 053 400	19.7	112 770	27.5
South Australia	1 554 700	7.5	23 425	5.7
Western Australia	2 050 900	10.0	58 500	14.3
Tasmania	488 900	2.4	15 773	3.8
Northern Territory	206 700	1.0	50 790	12.4
Australian Capital Territory	328 800	1.6	3 576	0.9

Source: ABS

Population of Australia's capital cities



### Climate



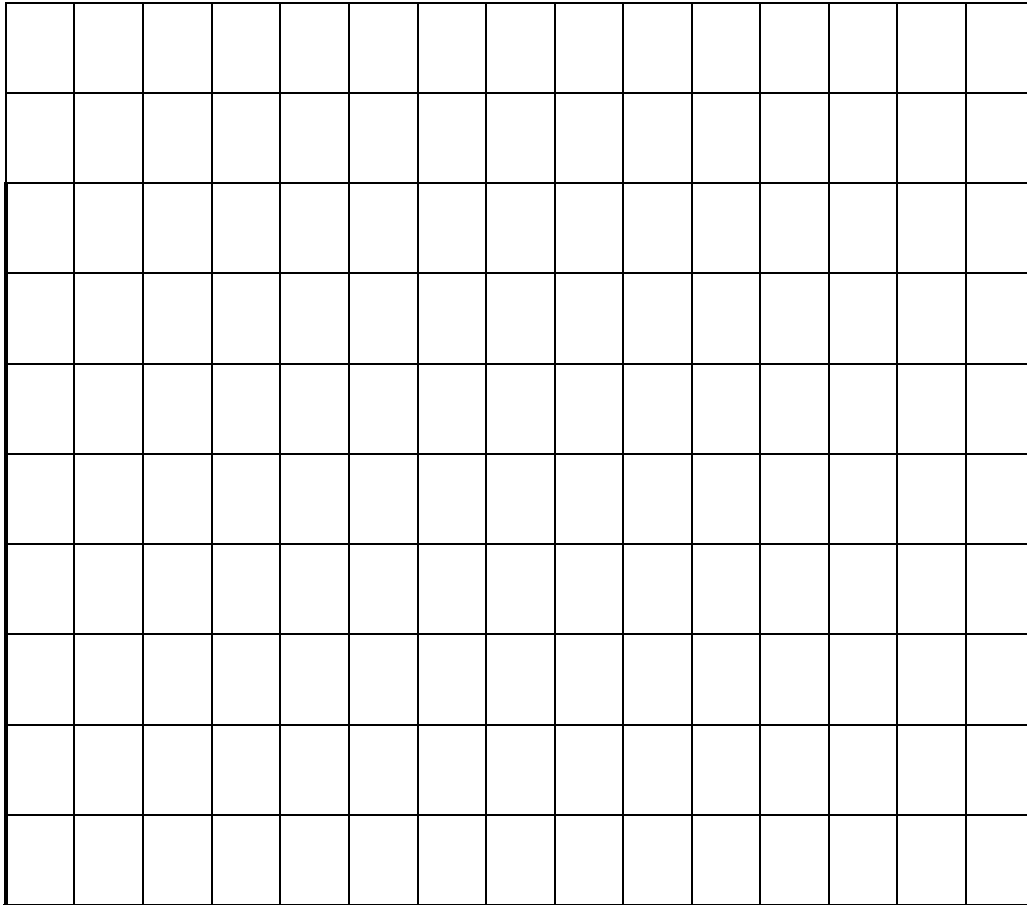
## Question 27

All parts of Question 27 relate to the graphs and data at the end of Question 26, (also provided on the extra handout).

- (a) Write a few sentences in which you compare the temperatures and rainfall in Darwin and Perth.



- (b) Plot a graph to depict the proportion of Australia's total population that live in the different Australian states and territories. Use an appropriate scale on your graph.



- (c) Write two sentences about the meaning of your graph?

## Question 28

- (a) **Draw a diagram to illustrate the problem below**, the purpose of the diagram being to aid readers to understand the given situation.

Then solve the problem by **two different mental methods**, explaining how you may carry out the calculation in your head. **Explain fully your steps and reasoning.**

Patrick walked 3.9 km to the shops then 2.8 km to visit a friend. How far did he walk in total?

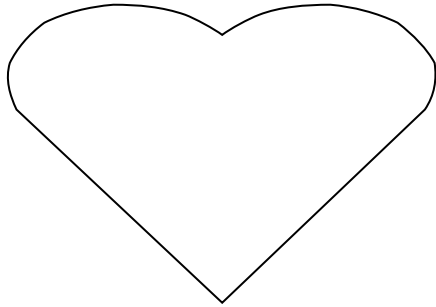
- (b) Fermi problem: Estimate the volume of building material that would be needed to build a double lane road of length 1 km.

## Question 29

(a) Explain fully your understanding of the difference between the following words: circle and sphere

(b) **Calculate** the perimeter and area of a triangle with perpendicular sides of length 4 cm and 3 cm. Show fully all working. Start by drawing and labelling the shape.

- (c) Explain fully how you could **estimate** the perimeter and area of the shape drawn to correct size in the diagram below. Explain as though you were showing a child how to **estimate** the answers.



- (d) Why do we have to **estimate** the perimeter and area of the shape in c whereas we can **calculate** the perimeter and area of the shape in b?

### Question 30

Two players Tim and Gina were playing a game in which 2 dice were thrown and the difference calculated. Tim won if the difference was 0, 1, 2 and Gina won if the difference was 3, 4, 5.

(a) Make a prediction about the fairness of the game. Explain your answer.

(b) The following results were obtained:

	Frequency	Experimental probability of winning expressed as a fraction and decimal
Tim won	34	
Gina won	16	

Complete the table. Do the results alter your views about the fairness of the game?

(c) Use a grid, table, or organised list to record the sample space of all possible outcomes and find the theoretical probability of each player winning. Use your answer in c to make comments about the fairness of the game.

(d) Compare the experimental and theoretical probabilities explaining the differences.

(e) Identify 2 possible ways of making the game fair.

\*\*\*END OF EXAMINATION PAPER\*\*\*