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

EMA100 – Mathematics Education 1: Content Knowledge for Teaching	DURATION	
	Reading Time:	10 minutes
	Writing Time:	120 minutes
INSTRUCTIONS TO CANDIDATES		
1.1 The examination has 2 sections		
Section A: Suggested Time: 60 min	Multiple Choice Questions: Answer ALL 25 questions. Section A is worth 50 marks. Each question is worth 2 marks.	
Section B: Suggested Time: 60 min	Short Answer Questions: Answer ALL 5 questions. 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 ARE NOT of equal value.		
1.3 Read ALL questions carefully.		
1.4 Do not commence writing until instructed to do so.		

EXAM CONDITIONS	
<u>You may begin writing from the commencement of the examination session.</u> 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	EXAMINATION MATERIALS TO BE SUPPLIED
No additional printed material is permitted	1 x 4-Multiple Choice Answer Sheet 2 x Scrap Paper Reference Information

**THIS EXAMINATION IS PRINTED
DOUBLE-SIDED.**

Question 27

- (a) Present two different possible mental strategies that can be used to solve the problem below. **The answers need to be done in your head by simple mental methods. Explain fully your steps and reasoning.**

Johnny had 5 plants with an average height of 10.4 cm. What was the sum of their heights?

(b) Fermi problem: Calculate based on estimations the volume of water in an Olympic swimming pool. Give your answer in litres.

Question 28

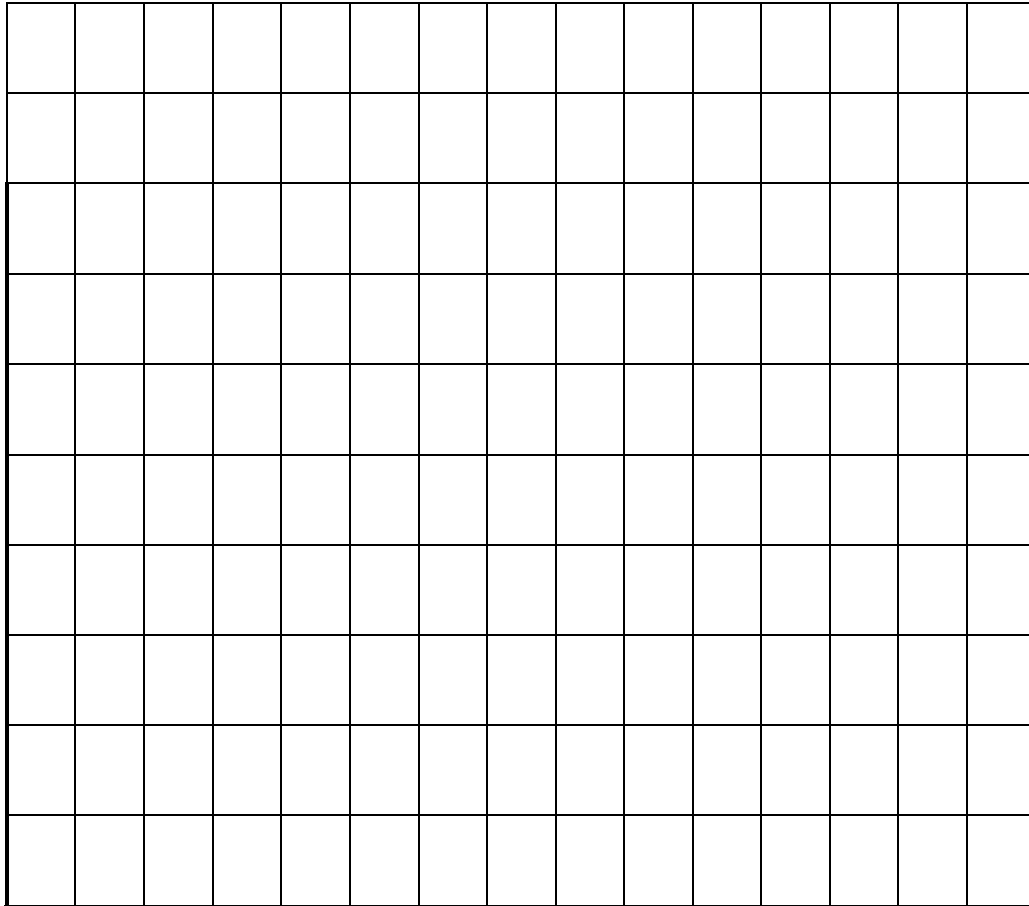
Help our cities to be clean! Much of your waste including cardboard boxes, glass bottles, aluminium cans, paper, and garden waste can be kept out of the general waste bin.



(Diagram sourced in Brisbane politician's circular (Councillor Fiona King)).

- (a) Refer to the diagram above. What percentage of waste consists of garden waste and recyclables? Answer as a percentage and decimal. Estimate this as a fraction.
- (b) Explain the statement: 69% of the material in the average general waste bin can be kept out of landfill.

- (c) Plot a graph to depict the information in the diagram
Use an appropriate scale on your graph.



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

Question 29

(a) Explain fully your understanding of the difference between the following words: cube and cuboid

(b) Suppose kettles are packed in boxes with dimensions 20 cm, 15 cm, and 15 cm (cuboids). Calculate the volume and the outside surface area of the closed boxes. Start by drawing and labelling a box. Show fully all working.

Diagram:

Volume =

Outside surface area =

- (c) The kettles are placed in cartons with dimensions 1.6 m by 1.6 m by 1.1 m. Calculate the maximum number of boxes of kettles that can be placed in each carton.

Question 30

Two players Tim and Gina were playing a game in which 2 dice were thrown and the **sum** calculated. Tim won if the sum was 1 to 6 and Gina won if the sum was 7 to 12.

(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 in simplest form
Tim won	24	
Gina won	36	

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