



MATHEMATICAL LITERACY: PAPER I

Time: 3 hours

150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 11 pages, 5 questions, an **Answer Booklet** of 3 pages (i – iii) and 2 Annexure Sheets: **Annexure A and Annexure B**.

Detach the Answer Booklet from the centre of the question paper. Hand it in with your Answer Book.

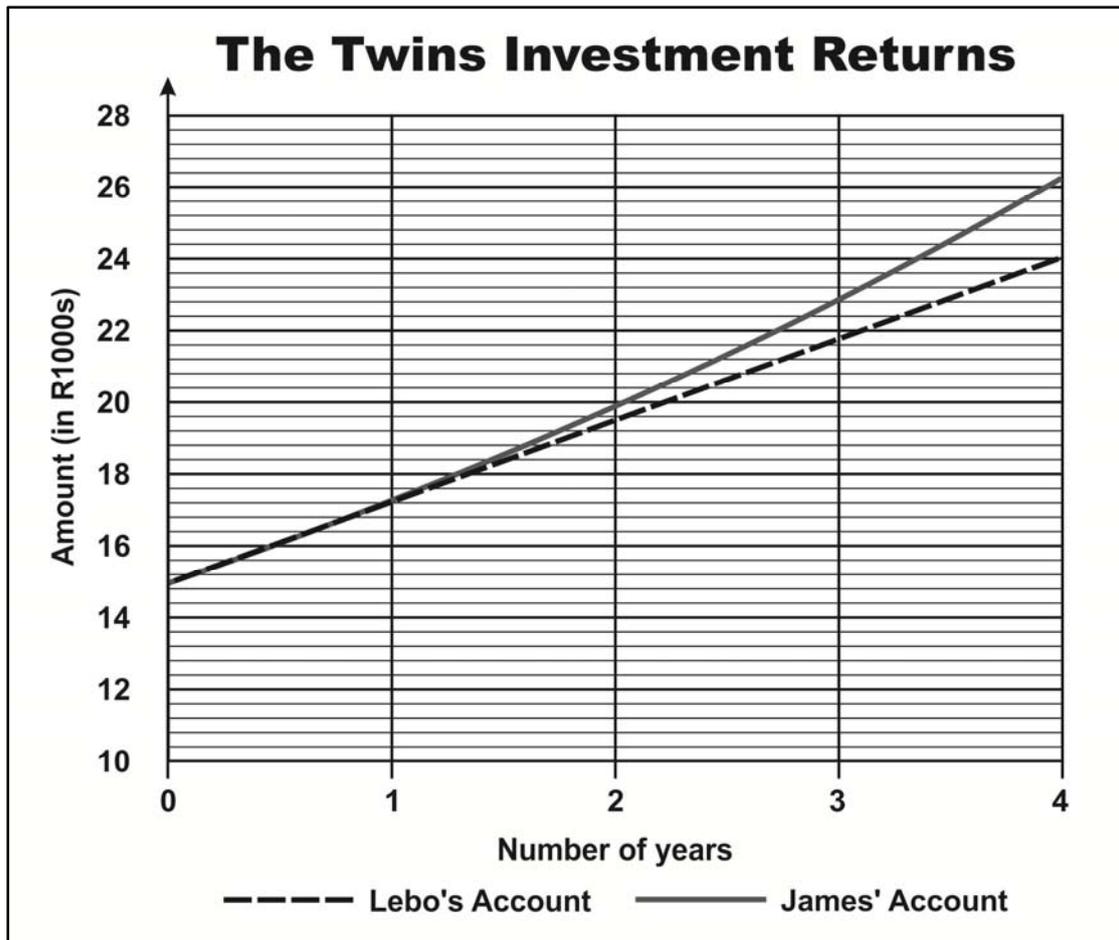
2. Ensure that your question paper is complete.
 3. Answer ALL the questions.
 4. Start each question on a new page.
 5. Number the answers exactly as the questions are numbered.
 6. An approved calculator (non-programmable, non-graphical) may be used.
 7. ALL necessary calculations must be clearly shown.
 8. Units of measurement must be included where applicable.
 9. Round off appropriately according to the context unless otherwise stated.
 10. It is in your own interest to write legibly and to present your work neatly.
 11. Maps and diagrams are not necessarily drawn to scale unless stated otherwise.
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QUESTION 1

Twin brothers, Lebo and James want to have a party to celebrate their 18th birthday.



- 1.1 Four years ago the twins each received the same amount of money from their parents. They invested the money into two different accounts which had two different types of interest. The graph below shows their investment returns for both accounts:



Use the above graph to answer the following questions:

- 1.1.1 Determine the amount of money each child received from their parents. (2)
- 1.1.2 Which type of interest increases by a constant amount, simple or compound interest? (2)
- 1.1.3 Determine how much money will be in Lebo's Account after the fourth year. (2)
- 1.1.4 Determine the amount of interest earned in Lebo's Account at the end of the fourth year. (3)
- 1.1.5 State which account offers a better return on investment after 4 years. (2)

1.2 The twins decide that they want a disk jockey (DJ) to play music at their party. They find two top DJs namely, DJ Amazing and DJ Brilliant available at the following rates:



- DJ Amazing – Flat rate of R2 300 from 19h00 to 22h00 and then R100 for every hour, or any part thereof, after 22h00.
- DJ Brilliant – R500 per hour or for any part thereof.

The party is scheduled to start at 19h00 and end at 02h00.

1.2.1 In the Answer Booklet provided, complete the table showing the cost of DJ Amazing for the duration of the party. (4)

1.2.2 (a) On page ii of iii in the Answer Booklet write in the title of the graph and the necessary horizontal and vertical labels. (3)

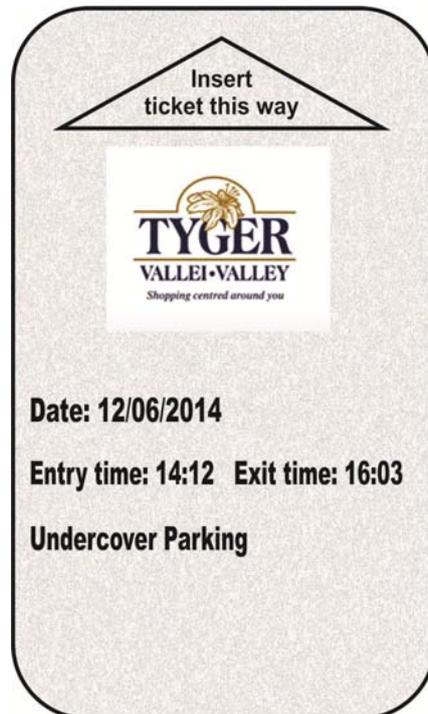
(b) Draw a line graph of DJ Amazing on the axes provided. The graph of DJ Brilliant has already been drawn on the set of axes. (5)

1.2.3 On your graph clearly indicate by means of the letter 'A' the point where the two DJs cost the same. (2)

1.2.4 Using your graphs or table, determine which DJ would suit the twins financially if they intend to party from 19h00 until 02h00. (2)

1.3 The twins decide to buy necessities that they need for the party. They go to Tyger Valley Mall and park in the paid parking.

Below is a copy of the automated parking ticket that they received.



1.3.1 On what date did they go to the mall? (2)

1.3.2 How much time did they spend at the mall? (3)

1.3.3 The paid parking information board reads as follows:

0 – 15 min	Free
Up to 1 hour	R5,00
Every 30 min thereafter (or part thereof)	R3,00 (maximum R30,00)

Determine how much the twins paid for the parking while they were at the mall. Show all working. (3)

1.4 The twins have their birthday party and receive gifts from their friends. Most of their friends gave the twins money as a gift. Together the twins collected R12 000. They decide to invest the money so they can put down a deposit for a car in 3 years' time.

The twins have a choice of two accounts with two different types of interest:

- Account A – 13% compounded annually
- Account B – 15% simple interest

1.4.1 The table below shows the investments for Account A over the 3 years.

Year	Amount in Account A at beginning of year	Interest earned at end of year in Account A
1	R12 000	R1 560
2	R13 560	(a)
3	(b)	(c)

Calculate the missing values (a – c). (6)

1.4.2 Determine the interest gained after one year if the twins deposited the R12 000 in Account B. (2)

1.4.3 Calculate the accumulated value of Account B after the 3 years. (4)

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QUESTION 2

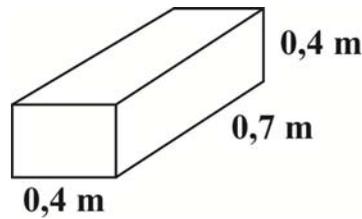
In New Zealand the Department of Housing is trying to modernise the house plans for all new houses being built.

Use the example of such a house plan drawn on **Annexure A** to answer the questions that follow:

- 2.1 Determine the number of bedrooms represented in the plan. (2)
- 2.2 Determine the number of windows there are in all of the bedrooms. (2)
- 2.3 2.3.1 Measure (in cm) the length and breadth of the interior floor of the parking garage. (2)
- 2.3.2 Calculate, in m^2 , the area of the parking garage floor, if the breadth is 5,04 m. (3)
- 2.3.3 A layer of concrete 0,1 m high, needs to be poured on the parking garage floor. Determine, to the nearest m^3 , the volume of concrete required for the parking garage floor.
- You may use the following formula:
- $$\text{Volume} = \text{length} \times \text{breadth} \times \text{height} \quad (3)$$
- 2.3.4 The ratio of concrete mix to water is 1 g : 6 ml. Convert this ratio in grams : litres. (2)

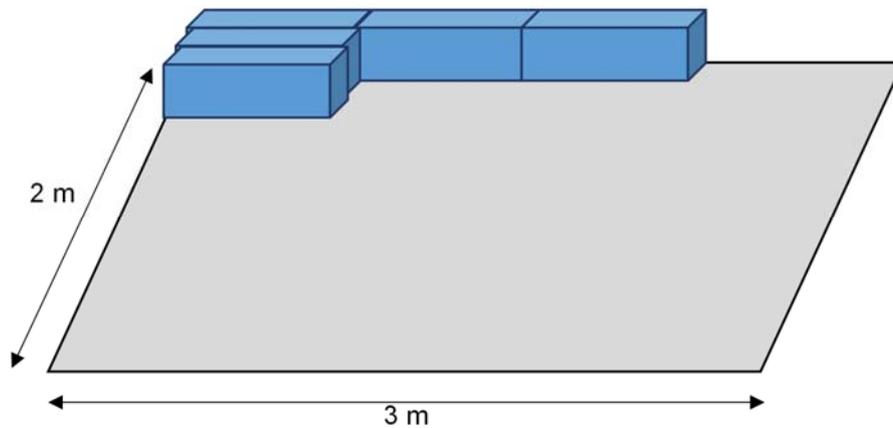
- 2.4 The owner of a house decides to use a part of the garage as a storage area for boxes. The storage boxes have the following dimensions.

Diagram of box:



Each of the boxes has similar dimensions ($0,4\text{ m} \times 0,7\text{ m} \times 0,4\text{ m}$) occupying a rectangular area of the garage with dimensions $3\text{ m} \times 2\text{ m}$ as shown by the sketches below:

Diagram of storage area with some of the boxes (diagram not drawn to scale):



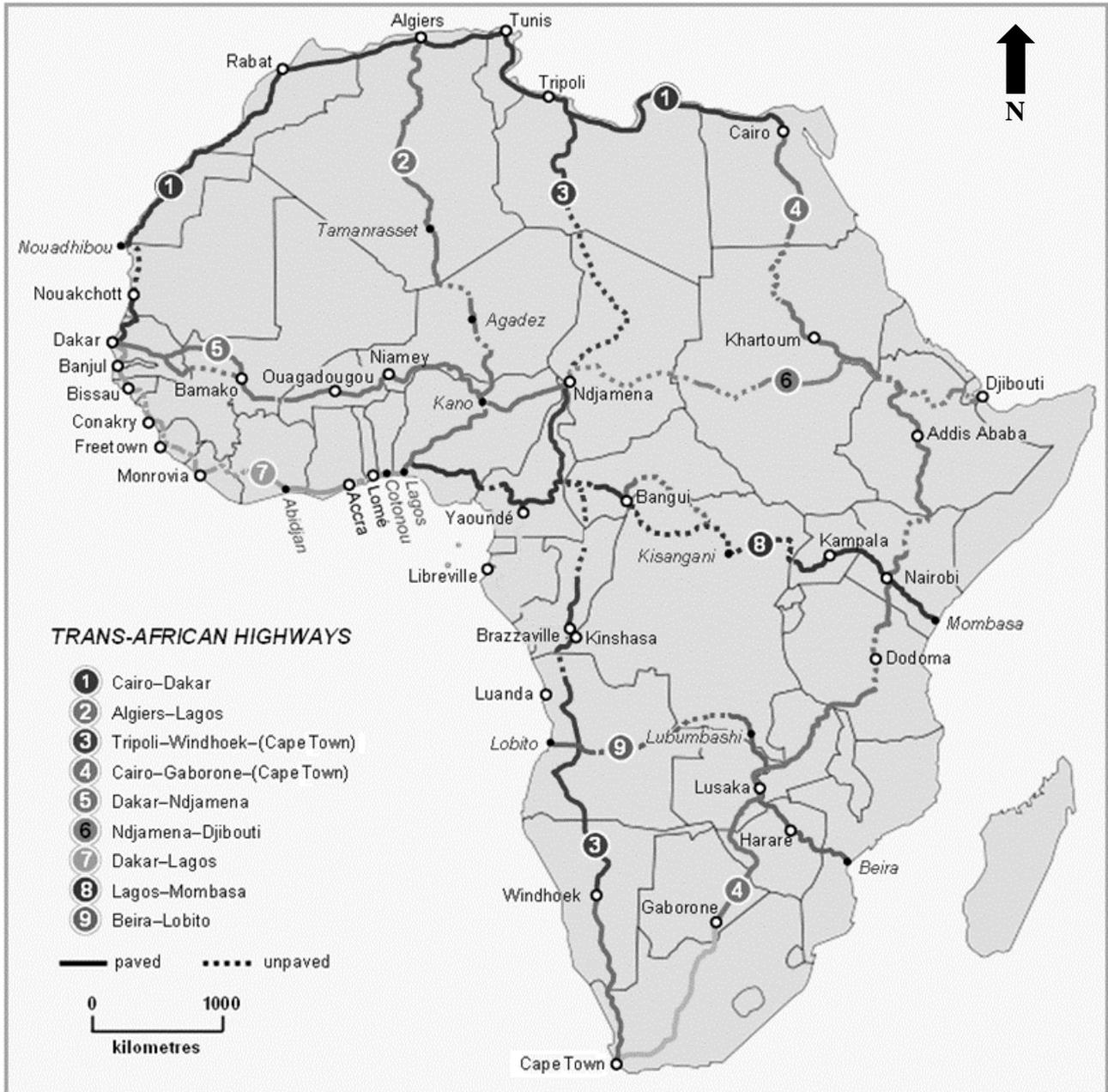
- 2.4.1 Determine the maximum number of boxes that will fit within the length and width of the designated area. (2)
- 2.4.2 If the owner stacks 2 boxes on top of each other, calculate how many storage boxes will fit in the designated area. (2)
- 2.5 The owner is looking at five different designs of tiles, which she likes equally. She numbers the tiles and then writes the numbers on a piece of paper and throws the pieces of paper into a bag. She then randomly draws a number from the bag to help her decide from the list of the 5 tile designs below:
- a beige tile with brown speckels
 - b plain white tile
 - c beige tile with brown stripes
 - d plain brown tile
 - e black tile with white spots
- 2.5.1 Determine the probability that the owner randomly chooses a tile that has the colour brown in it. (2)
- 2.5.2 Calculate the probability of her picking a tile containing either two colours or a tile with only one colour. (3)

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QUESTION 3

Peter Gostelow is a cyclist who cycled from Cape Town to Cairo. He cycled through 25 countries in Africa raising awareness and money for preventing malaria.

The following map indicates major routes that connects all the major cities in Africa, collectively known as the Trans-African Highways, which Peter may have used to plot this route. Use the map to answer the questions that follow:



[Source: <http://en.wikipedia.org/Trans_African_Highway_network>]

- 3.1 Which two cities indicated on the map are the closest to Cape Town? (2)
- 3.2 Which number represents the Trans-African Highway that connects Cape Town to Cairo? (2)

- 3.3 3.3.1 Which two cities will you drive through when travelling from Cairo to Algiers along the Trans-African Highway 1? (2)
- 3.3.2 Would one travel along paved or unpaved road between Cairo and Algiers? (2)
- 3.4 Which two highways would you have to travel on to drive from Dakar, located on the west coast of Africa to Djibouti, which is situated on the east coast of Africa? (Provide only the numbers of the highways.) (2)
- 3.5 3.5.1 According to the scale, 20 mm on the map represents 1 000 km on the ground. Help complete the following calculation.
- 20 mm represents _____ (a) _____ mm on the ground
- therefore the scale is 1: _____ (b) _____ (4)
- 3.5.2 Measure the direct (straight line) distance on the map between Cape Town and Gaborone. Give your answer in millimetres. (2)
- 3.5.3 (a) With your answers from Questions 3.5.1 and 3.5.2 above, determine the real direct distance between Cape Town and Gaborone. Give your answer in millimetres. (2)
- (b) Convert your answer to kilometres. (2)
- 3.6 Determine how many hours it would take to complete the 16 750 km distance between Cape Town and Cairo if Peter averaged a speed of 10 km/h. (The average speed takes into account the stops and rests on route.)

You may use the following formula:

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

(2)
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QUESTION 4

4.1 Thandi turned 18 just before the 2014 elections and decided to do research on South Africa's previous elections. She found out that the elections are held every 5 years and that the last elections were held in 2009. The following table shows the comparative results of the top four parties, from the 2004 and 2009 elections.

South African General Election				
All 400 seats in the National Assembly of South Africa				
				
Leader	Jacob Zuma	Helen Zille	Mosiuoa Lekota	Mangosuthu Buthelezi
Party	African National Congress (ANC)	Democratic Alliance (DA)	Congress of the People (COPE)	Inkatha Freedom Party (IFP)
2004 election	279 seats 69.69%	50 seats 12.37%	n/a	28 seats 6.97%
Seats in 2004	297	47	<i>new party</i>	34
Seats in 2009	264	67	30	18
Seat change from 2004 to 2009	▼33	▲20	▲30	▼16
2009 Population vote	11 650 748	2 945 829	1 311 027	804 260
2009 Percentage of Population Vote	65,90%	16,66%	7,66%	4,55%

[Source: <http://en.wikipedia.org/South_African_general_election_2009>]

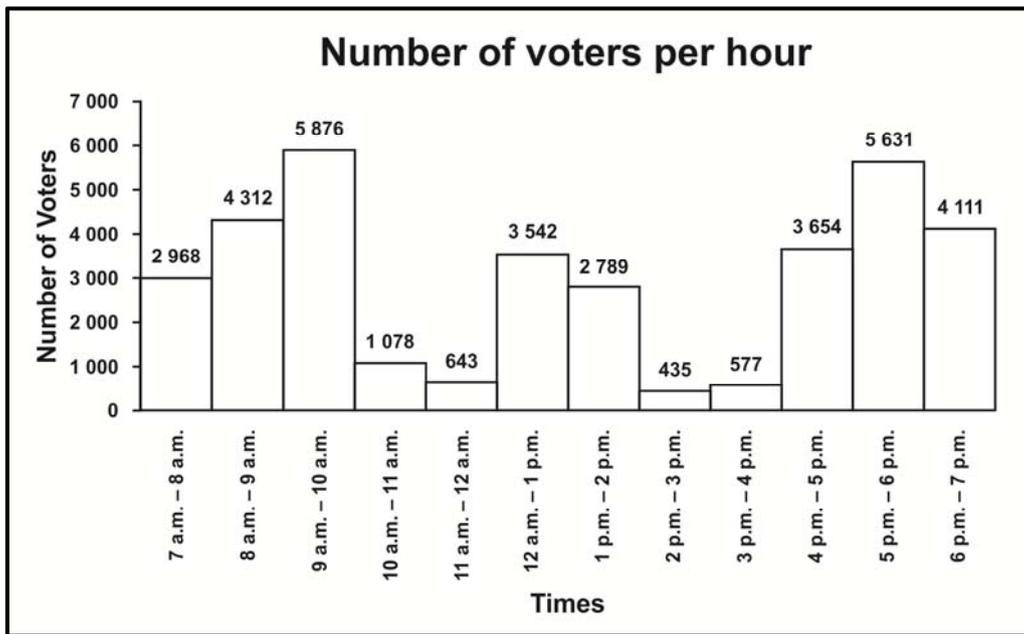
- 4.1.1 Which party won in 2009? (2)
- 4.1.2 Determine the number of votes the DA got in 2009. (2)
- 4.1.3 Refer to page iii of iii in the Answer Booklet:
 - (a) Draw a bar graph to represent the percentage votes won by the top four parties in the 2009 elections, on the axes provided. (5)
 - (b) Provide a suitable heading for the graph and label the horizontal and vertical axes. (3)

4.2 The National Assembly of South Africa is a committee that is made up of 400 seats which is responsible for making changes to our laws and our constitution. The Assembly is meant to represent the people. The 400 seats are allocated to the different political parties depending on the percentage of votes gained in the elections.

According to the table on the previous page, how many seats were accounted for in the 2009 elections? (3)

4.3 An electoral officer at one of the voting stations during the 2009 election decided to do a survey to see how many voters made their mark per hour.

The following graph represents the number of voters per hour:



4.3.1 What type of graph is depicted in the above graph? Give a reason for your answer. (2)

4.3.2 During which hour were the most number of votes cast? (2)

4.3.3 Determine the mean number of voters per hour. (5)

4.3.4 What percentage of the voters voted before 13:00? (Round off to 2 decimal places.) (5)

4.3.5 Determine the range of the voters per hour. (3)

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QUESTION 5

In Maputo, the capital of Mozambique, they have begun to build a bridge across one of its rivers, which will connect Maputo to a district (Catembe). The population in that district has increased and this will aid Maputo in its growth in infrastructure. Refer to the map in **Annexure B** and answer the questions that follow.

- 5.1 (a) Determine any two countries that lie on the western border of Mozambique. (2)
- (b) Write the missing word in your answer book.
Madagascar lies to the _____ (give direction) of Mozambique. (2)

5.2 This project (building the bridge) is costing US\$ 7,25 million (US\$ = United States Dollar), and was awarded to the China Roads and Bridges Corporation (CRBC).

5.2.1 Express US\$7,25 million numerically, without words. (2)

5.2.2 Using the exchange rate table below, convert the US\$ 7,25 million to Chinese Yuan (¥).
You may use the following conversion table:

1 ZAR (South African Rand)	= 0,089 US\$ (United States Dollar)	(4)
1 ¥ (Chinese Yuan)	= 1,84 ZAR	

5.3 According to an estate agency, Catembe currently has a population of 20 000, but once the bridge is built, this figure is expected to increase to 400 000 people over the next 20 years.

[<propertymaputo.com>]

Calculate the percentage increase in population.

You may use the following formula:

$\text{Percentage change} = \frac{\text{difference in population}}{\text{original population}} \times 100\%$	(3)
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5.4 The bridge will be 60 metres high and around 3 kilometres long with six lanes for traffic, three lanes in each direction.



5.4.1 What will the length, in metres, of all six lanes added together of the road on the bridge be? (2)

5.4.2 The average length of a car is approximately 16 feet. If 1 metre = 3,28 feet, how long is a car on average in metres? (3)

5.4.3 (a) Determine the maximum number of cars that will fit on the bridge in one lane. (3)

(b) Hence, determine the maximum number of cars that would fit across all six lanes. (2)

5.4.4 If the probability of a car being blue in colour in Mozambique is one in five, determine the maximum number of blue cars that could be on the bridge across all six of the lanes. (3)

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Total: 150 marks